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Physical activity in leisure-time and perceived environment: a population-based study with adults and the elderly from Southern Brazil

Prática de atividade física no lazer e ambiente percebido: um estudo de base populacional com adultos e idosos do Sul do Brasil

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ABSTRACT: ***Objective***: The objective of the present study was to associate walking for leisure and moderate-to-vigorous physical activity (MVPA) in leisure-time with the perception of adults and the elderly's built, natural and social environments in Southern Brazil. ***Methods***: It was a population-based cross-sectional study conducted in the urban area of the municipality of Rio Grande. To assess the practice of physical activity (PA), the International Physical Activity Questionnaire (IPAQ) was used. To assess perception of the environment, a modified version of the Neighborhood Environmental Walkability Scale (NEWS) was used. The statistical analysis was carried out using Poisson regression, considering the effect of sampling design. ***Results***: Of the 1,429 eligible, 1,290 (90.3%) were interviewed. Only 18.8% of the interviewees practiced walking and 23.4% practiced MVPA. The significant associations with both walking and MVPA were for receiving invitations from friends to perform PA and take walks with their dog. The practice of walking was also associated with: safety and access to public places for physical activity in the neighborhood. For MVPA, there was also an association with receiving invitations from family members to perform PA. ***Conclusion***: The results of this study showed that social support, access to facilities and good perception of safety were associated with PA, and were more prominent for leisure walking and for women.

Keywords: Cross-sectional Studies. Exercise. Environment. Epidemiology. Leisure Activities.

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RESUMO: ***Objetivo***: O objetivo do presente estudo foi associar a prática de caminhada e de atividades físicas moderadas a vigorosas (AFMV) no lazer à percepção dos ambientes construído, natural e social em adultos e idosos de um município do Sul do Brasil. ***Método***: Tratou-se de estudo transversal de base populacional, realizado na zona urbana do município do Rio Grande, RS. Para a avaliação da prática de atividade física (AF), fez-se uso do Questionário Internacional de AF (*International Physical Activity Questionnaire* — IPAQ) e, para avaliar a percepção do ambiente, utilizou-se uma escala modificada do instrumento *Neighborhood Environmental Walkability Scale* (NEWS). Realizaram-se as análises estatísticas por meio de regressão de Poisson, considerando-se o efeito do desenho amostral. ***Resultados***: Dos 1.429 indivíduos elegíveis, entrevistaram-se 1.290 (90,3%). Apenas 18,8% praticavam caminhada no lazer e 23,4% praticavam AFMV. Obtiveram associação à caminhada e às AFMV as seguintes variáveis: o recebimento de convites de amigos para realizar atividade física no bairro e a realização de passeios com cachorros. Para a prática de caminhada, também houve associação à segurança no bairro e à presença de áreas verdes e de instalações para a prática de AF. Para a AFMV, também houve associação ao recebimento de convites de parentes para realizar atividade física. ***Conclusões***: Os resultados do presente estudo demonstraram que o suporte social, o acesso a localidades propícias e a boa percepção de segurança estiveram associados à prática de atividade física, sendo mais proeminentes para a caminhada e para o sexo feminino.

Palavras-chave: Estudos Transversais. Exercício. Ambiente. Epidemiologia. Atividades de Lazer.

INTRODUCTION

The practice of physical activity (PA) is described as one of the main protective behavioral factors against Chronic Non-Communicable Diseases (CNCD)[1]. The benefits of PA are already well established in the scientific literature: it can contribute to the prevention of arterial hypertension, coronary heart disease, diabetes and the appearance of cancers, in cognitive and functional health, in the balance of energy, and in maintaining weight within normal parameters[1,2].

According to the systematic review conducted by Dumith[3], for a long time, studies on PA focused on assessing an individual's social and demographic characteristics (age, socioeconomic status, sex, marital status, among others) and associating them with physical inactivity. Even though most of these factors are associated with PA, they are not sufficient to be able to increase the levels of PA in the population, and they are difficult to change[3].

As a result, ecological models have now been proposed by researchers in the field. They assume that the built environment (spaces created and modified by man, such as houses, schools, parks, streets, workplaces, among others), the natural environment (spaces in which there were no changes made by man, such as beaches) and the social environment (support provided through the motivation of other people or domestic animals to perform PA) where people live have a strong association with the practice of leisure PA, which is the area in which there is the greatest possibility of proposing interventions[4].

A systematic review study prepared by Bauman et al.[5] found that access to commerce, good aesthetics from the environment, the presence of PA-friendly locations close to one's

place of residence, places that have trees and are safe, and places that are in the neighborhood were associated with compliance with the PA practice recommendation from the literature for adults and the elderly, which is 150 minutes per week[2]. Another review also pointed out that living in places with few leisure areas, that are insecure and have high vehicle traffic is associated with lower levels of PA in leisure time[6].

The review conducted by McCormack and Shiell[7] identified that most studies in the area of PA and the environment come from work conducted in the United States and Australia. Arango et al.[6], in a review study, report that it is necessary to propose more studies in other countries, since there are differences in urban planning between middle, low-income, and high-income countries, since the latter generally have greater availability of green areas, sidewalks, security and PA-friendly locations.

Because most studies on PA and the environment come from high-income countries, the ability to generalize their results is limited[8]. Latin America has one of the highest rates of urbanization in the world (80% of the population lives in urban centers) and, in addition, there are socioeconomic inequalities, low access to facilities and high crime rates[8]. Arango et al.[6] point out that there are differences between the practice of PA in Latin American countries and in high-income countries, since in the former individuals are more involved with commuting rather than leisure PA.

Although the benefits of PA are known, a large part of the world population is inactive and does not practice the PA levels recommended for the maintenance or promotion of health[8]. A Brazilian survey conducted in all Brazilian capitals showed that 50 to 70% of the population did not comply with the recommendations of PA in leisure[9]. Although changes in the environment do not necessarily lead to an increase in the population's PA levels, they at least offer opportunities for this to occur.

The objective of the present study was to associate the practice of walking for leisure and moderate to vigorous physical activities (MVPA) for leisure with the perception of built, natural and social environments in adults and the elderly in a municipality in southern Brazil.

METHOD

This was a cross-sectional, population-based study, originating from a larger project called of the Health Profile of the Population of the City of Rio Grande/RS *Perfil de Saúde da População da Cidade do Rio Grande/RS*. This research project was approved by the Research Ethics Committee in the Health Field (*Comitê de Ética em Pesquisas na Área da Saúde* - CEPAS) of the Universidade Federal de Rio Grande (FURG), under report No. 20/2016, in accordance with the provisions of Resolution No. 466/12. Participants in the study were informed of the research objectives and were asked to sign an Informed Consent Form.

The target population was made up of individuals aged 18 years or older from the urban area of the municipality of Rio Grande, located approximately 320 km from the state capital.

Institutionalized individuals in nursing homes, hospitals and prisons, and those with a physical and / or mental incapacity to answer the questionnaire were excluded.

Rio Grande has approximately 200 thousand inhabitants (72.8 per km^2) with an annual *per capita* income of 45,088.30 BRL, of which 51.8% are women and about 95% live in an urban area[10]. It is a coastal and port city that is totally flat, and it is the oldest municipality in the state. It has the largest seafront in extension in the world, which is known as Praia do Cassino. It is worth noting that the municipality's urban planning did not meet the demographic growth observed in recent years. Also worth noting is the well-defined presence of the four seasons, with low temperatures in the winter and high temperatures in the summer, in addition to high relative humidity.

For the calculation of the sample size, the following questions were considered: confidence level of 95%, power of 80%, frequency of exposure of at least 20%, prevalence of the outcome of 18% and effect of a sample design of 2, which resulted in a sample of 1,114 individuals. Adding 15% to control confounding factors, the necessary sample size was 1,282 individuals. To this value, an additional 10% was added for possible losses or refusals, totaling 1,410 individuals.

The sampling process took place in two stages, based on data from the 2010 Demographic Census[10]. As there was an estimate of finding, on average, two individuals aged 18 years or older in each household, 705 households would be needed to compose the study sample. All individuals residing in the selected households who were 18 years old or older were invited to answer the questionnaire. For this, the households of each census sector were ordered by the average monthly income of the head of the family. A total of 72 census sectors were selected systematically (of the 293 existing in the urban area). And, finally, in proportion to the size of the sector, 710 households were elected. Each uninhabited household was replaced by the next one on the right, when facing the front.

Data were collected through face-to-face home interviews. For this, nine interviewers were selected, and they underwent a 30-hour training. Data collection took place from April to July 2016. Further information on the study methodology can be obtained from Dumith et al.[11].

Two outcomes were analyzed: the practice of walking during leisure time and MVPA (except walking) during leisure time. Only PA that lasted at least 10 minutes in a usual week was considered, and the practice was categorized as yes/no. Moderate activities were those that made a person's breathing and heartbeat a little faster than normal. Vigorous activities were those that caused breathing and heartbeats to become much faster than normal.

The independent variables included characteristics of the neighborhood environment (built, natural and social): access to commerce and places to practice PA, traffic safety, safety in relation to crimes, aesthetics and satisfaction with the neighborhood, quality of the streets and sidewalks, lighting, pollution, climate, social support and the presence of a dog. These variables were analyzed individually as present, absent and together, based on the total sum of each question (scores 0 and 1). A total of 23 questions from the environment perception questionnaire were used (excluding four variables whose answers depended on

the previous question)[12]. Then, the score (which could vary from 0 to 23 points) was divided into tertiles of environments (neighborhoods) that were more or less conducive to the practice of PA, according to the perception of individuals. It should be noted that, for the sum, the score of the unfavorable questions for the practice of PA was inverted.

Complementary variables (called interveners) were analyzed in order to describe the sample and perform the control for possible confounding factors: sex (female/male), age (in years), skin color (white/non-white), marital status (single, married, widowed and divorced) education level (in successfully completed years), length of time the individual lived in the neighborhood (in years) and socioeconomic level (property index). For the creation of the goods index variable, the main components were analyzed, taking into account 11 household goods or characteristics of the household[13].

The variables related to the practice of PA were collected through the leisure and commute sections of the long version of the International Physical Activity Questionnaire (IPAQ)[14]. This questionnaire was validated with an accelerometer, showing good indicators[15]. Environment variables were collected using a modified scale of perception of the environment. It was validated for Brazilian adults[12], as it was adapted from the international questionnaire called Neighborhood Environmental Walkability Scale (NEWS)[16]. The intervening variables were collected with an instrument that was tested and standardized specifically for this study.

In order to ensure the quality of the data, 10.5% of the individuals included in the sample were re-interviewed with key questions from the questionnaire, which generated an average *kappa* coefficient of 0.80 (ranging from 0.60 to 0.93). The questionnaires, after being reviewed and coded, were typed up using the EpiData version 3.1 program, with automatic checking of the amplitude and consistency of the data. Two entries were made. They were typed up by different typists, in order to identify possible errors and correct the necessary information.

For data description and crude and adjusted analysis, the Stata 11.2 program was used. The variables were described using absolute and relative frequencies. To cross the characteristics of the neighborhood environment with PA, a Poisson regression was used, considering the effect of the sample design and presenting the respective prevalence ratios (PR) and 95% confidence interval (95% CI). In the crude analysis, each environment variable was crossed with walking for leisure and with MVPA, separately. In the adjusted analysis, each association was controlled for the seven intervening variables (sex, age, skin color, marital status, education level, length of living in the neighborhood, and goods index). For the environment score variable (in tertiles), the linear trend p test was used. The level of significance adopted was 5% for the two-way tests.

The interaction of environmental variables with sex (male and female) and age group (adults and the elderly) was tested, with no significant interaction for most of them ($p > 0.10$). Therefore, the analyzes were not stratified and, where there was interaction, the result was reported in the text.

RESULTS

Of the 1,429 eligible individuals, 1,300 were interviewed, with a response rate of 90.9%. Losses and refusals were more prevalent ($p < 0.05$) for males (12%, *versus* 6.5% females) and in the Downtown neighborhood, reaching 20%. There was no difference in the mean age between participants and non-participants ($p=0.64$). Ten individuals did not have complete answers to the questions in the PA block of the questionnaire. Therefore, 1,290 individuals were included in the analysis. The sample design effect found was 2.2, with an intraclass correlation coefficient of 0.047.

The majority of the sample (57%) was female, 83% were white, 46% were single and 24% were elderly people (60 years or older). The average age was 46 years old (standard deviation - SD=17.3), the average education level was 9.7 years (SD = 4.6) and the median time of residence in the neighborhood was 14 years (interquartile range = 5 to 28). The median income *per capita* was R$ 1,000 (interquartile range = 600 to 1760).

Affirmative responses to each characteristic of the neighborhood environment can be seen in Figure 1. Regarding the frequency of variables favorable to PA in the neighborhood, it was observed that 94.9% reported that the streets near their residence were flat. A total of 93.9% of those studied were satisfied with the neighborhood and 85.4% mentioned having fresh fruits or vegetables close to home. In regard to unfavorable environmental conditions in the neighborhood, 80.1% reported having access to quick snacks close to their residence, 54.6% reported that weather hinders their performance of PA and that 18.8% had had their home ransacked or robbed.

The prevalence of walking for leisure was 18.8% (95% CI 15.5 -22), ranging from 15.1% for those who perceived pollution smoke near their residence to 28.3% for those who went for walks with their dog (Table 1). In the crude analysis, the following variables obtained a statistically significant association: the existence of public places to exercise, green areas close to home, security during the day, receiving invitations from relatives and friends to walk in the neighborhood, walks with dogs, and traffic safety. In the adjusted analysis, all of the variables mentioned remained associated with walking, with the exception of the variable receiving invitations from relatives to walk in the neighborhood, which was associated only with regard to the female sex (prevalence ratio - PR = 1.53; 95% CI 1.10 - 2.13). The pollution smoke variable offered a protective effect for the practice of walking only for men (PR = 0.56; 95%CI 0.70 - 1.35). The variable of green areas close to home showed an association with leisure walking for adults only (PR = 2.34; 95% CI 1.47 - 3.72).

The prevalence of MVPA during leisure time was 23.4% (95% CI 19.9 - 26.9), varying from 21.6% for individuals who felt safe to practice PA during the night to 37.8% for those who took walks with their dog (Table 2). In the crude analysis, the following variables were associated: the presence of green areas close to home, receiving invitations from relatives and friends, the existence of sporting events in the neighborhood and dog walks. Residence in green areas with trees close to home and sporting events in the neighborhood lost their association in the adjusted analysis (Table 2). In the interaction analysis, it was found that the perception of climate as a complicating factor for the practice of PA made the elderly less likely to practice

MVPA (PR = 0.51; 95% CI 0.31 - 0.86), and that walking with dogs had a stronger association for the elderly (PR = 3.50; 95% CI 1.80 - 6.81) than for adults (PR = 1.60; 95% CI 1.22 - 2.10).

For both outcomes, a positive linear association was observed with individual perceptions of neighborhoods that were more conducive to PA practice. That is, individuals who considered living in neighborhoods with better conditions for practicing PA, walked more and did more MVPA in their leisure time (Figure 2). Such associations remained statistically significant even after adjusting for the intervening variables.

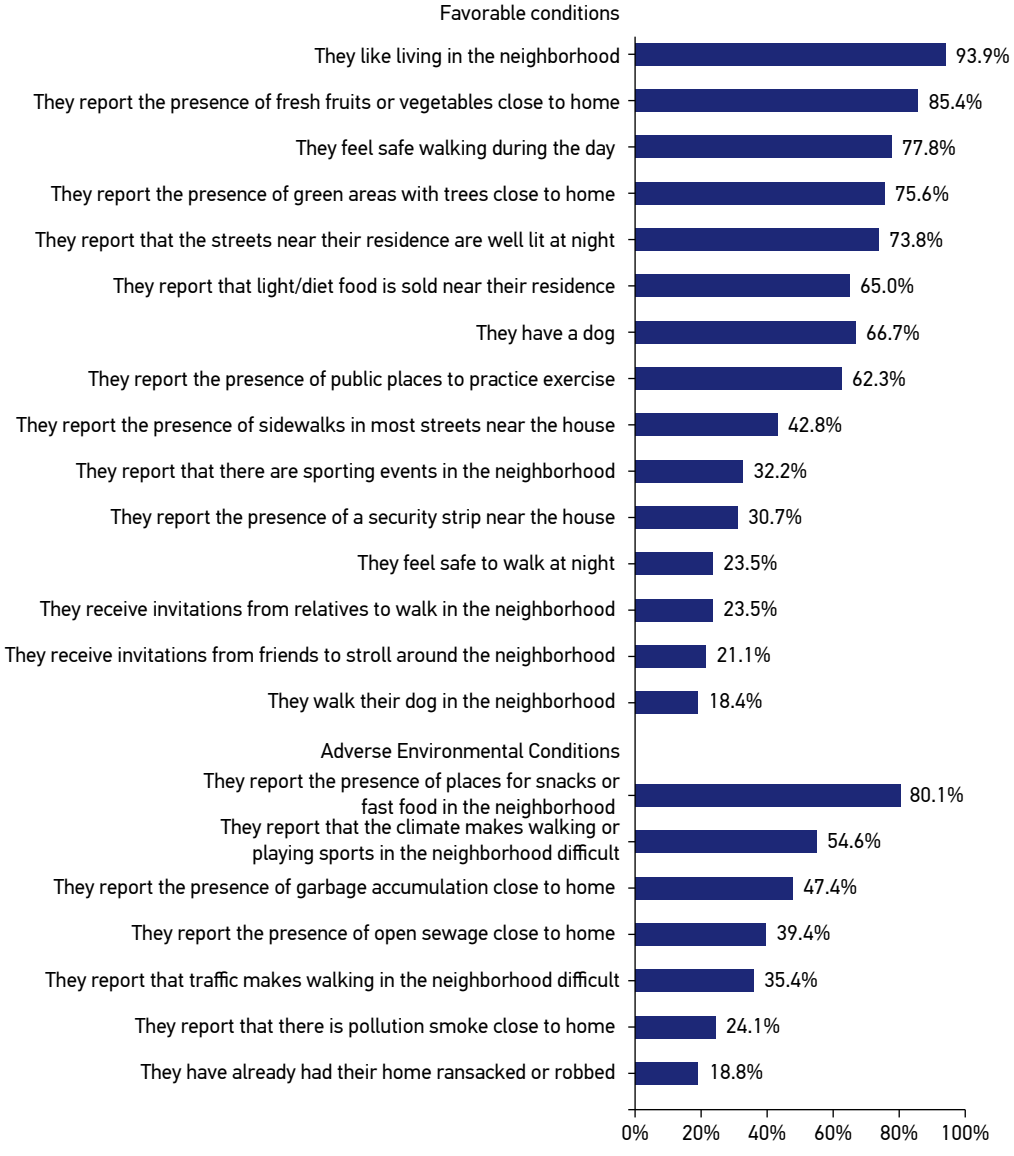


Figure 1. Relative frequencies of neighborhood variables, considering the affirmative responses for each item. Rio Grande, RS, 2016 (n = 1,290).

Table 1. Association of leisure walking with neighborhood environmental factors, considering affirmative responses to each item. Rio Grande, RS, 2016 (n = 1,290).

Variable	Walking (%)	Crude Analysis	Adjusted Analysis*
		PR (95%CI)	PR (95%CI)
Favorable Conditions			
Public place for exercise	21.1	1.40 (1.05; 1.85)	1.31 (1.01; 1.70)
Likes living in the neighborhood	19.2	1.69 (0.81; 3.55)	1.49 (0.71; 3.09)
Fresh fruits or vegetables close to home	18.6	0.94 (0.62; 1.43)	0.91 (0.58; 1.45)
Light/diet food for sale close to home	19.7	1.18 (0.81; 1.73)	1.12 (0.76; 1.65)
Sidewalks on most streets close to home	19.4	1.07 (0.83; 1.39)	0.97 (0.76; 1.23)
Green areas with trees close to home	21.2	1.86 (1.30; 2.65)	1.76 (1.25; 2.46)
Flat streets close to home	18.5	0.76 (0.57; 1.24)	0.65 (0.44; 1.09)
Safety lanes close to home	18.9	1.03 (0.76; 1.40)	0.93 (0.70; 1.23)
Well-lit streets close to home at night	19.4	1.14 (0.84; 1.53)	1.14 (0.81; 1.61)
Safe to walk close to home during the day	20.5	1.59 (1.12; 2.28)	1.61 (1.14; 2.28)
Safe to walk close to home at night	18.5	0.98 (0.74; 1.29)	1.10 (0.83; 1.46)
Invitation from friends to walk in the neighborhood	24.3	1.40 (1.11; 1.78)	1.34 (1.07; 1.68)
Invitation from family members to walk in the neighborhood	23.2	1.32 (1.00; 1.75)	1.28 (0.98; 1.67)
Sporting events in the neighborhood	20.4	1.14 (0.88; 1.49)	1.09 (0.86; 1.39)
Has a dog	18.8	1.02 (0.81; 1.27)	1.13 (0.90; 1.40)
Walks the dog in the neighborhood	28.3	1.72 (1.38; 2.16)	1.59 (1.29; 1.95)
Adverse Conditions			
The home has already been ransacked or robbed	19.8	1.08 (0.79; 1.49)	0.92 (0.67; 1.27)
There are places for snacks or fast food in the neighborhood	18.1	0.86 (0.62; 1.17)	0.85 (0.63; 1.16)
Garbage accumulates close to home	19.2	1.05 (0.77; 1.42)	1.16 (0.88; 1.54)
There is an open sewer close to home	16.3	0.81 (0.62; 1.06)	0.92 (0.71; 1.19)
Traffic makes walking difficult in the neighborhood	15.4	0.76 (0.59; 0.98)	0.73 (0.57; 0.94)
There is pollution smoke close to home	15.1	0.77 (0.61; 0.98)	0.78 (0.62; 0.96)
The climate makes walking or playing sports difficult in the neighborhood	19.2	1.06 (0.80; 1.40)	1.01 (0.78; 1.31)

PR: prevalence ratio; 95%CI: 95% confidence interval; *adjustment for: sex, age, skin color, marital status, education level, number of residents in the home, index of assets and time living in the neighborhood. In bold are statistically significant associations.

Table 2. Association of moderate to vigorous physical activity (MVPA) in leisure time with environmental factors in the neighborhood, considering the affirmative responses to each item. Rio Grande, RS, 2016 (n = 1,290).

Variable	MVPA (%)	Crude Analysis	Adjusted Analysis*
		PR (95%CI)	PR (95%CI)
Favorable Conditions			
Public place for exercise	24.8	1.18 (0.90; 1.57)	0.96 (0.75; 1.24)
Likes living in the neighborhood	24.0	1.59 (0.91; 2.77)	1.37 (0.81; 2.33)
Fresh fruits or vegetables close to home	23.8	1.11 (0.81; 1.51)	1.12 (0.87; 1.47)
Light/diet food for sale close to home	24.6	1.16 (0.94; 1.42)	1.12 (0.93; 1.34)
Sidewalks on most streets close to home	22.6	0.94 (0.73; 1.22)	0.91 (0.75; 1.10)
Green areas with trees close to home	24.9	1.34 (1.01; 1.78)	1.15 (0.90; 1.47)
Flat streets close to home	23.4	0.97 (0.65; 1.45)	0.95 (0.67; 1.34)
Safety lanes close to home	24.2	1.05 (0.82; 1.35)	1.02 (0.82; 1.26)
Well-lit streets close to home at night	22.4	0.86 (0.67; 1.11)	1.09 (0.87; 1.37)
Safe to walk close to home during the day	24.4	1.22 (0.92; 1.61)	1.04 (0.80; 1.35)
Safe to walk close to home at night	21.6	0.91 (0.74; 1.14)	0.88 (0.72; 1.07)
Invitation from friends to walk in the neighborhood	35.3	1.72 (1.43; 2.08)	1.61 (1.34; 1.92)
Invitation from family members to walk in the neighborhood	32.0	1.56 (1.24; 1.96)	1.49 (1.21; 1.84)
Sporting events in the neighborhood	28.1	1.36 (1.08; 1.70)	1.21 (0.99; 1.47)
Has a dog	23.8	1.05 (0.82; 1.35)	1.03 (0.85; 1.26)
Walks the dog in the neighborhood	37.8	1.86 (1.45; 2.37)	1.43 (1.16; 1.76)
Adverse Conditions			
The home has already been ransacked or robbed	24.0	1.04 (0.78; 1.38)	0.91 (0.67; 1.23)
There are places for snacks or fast food in the neighborhood	23.3	0.96 (0.74; 1.25)	0.90 (0.73; 1.12)
Garbage accumulates close to home	23.6	1.01 (0.81; 1.25)	1.02 (0.84; 1.23)
There is an open sewer close to home	21.6	0.87 (0.69; 1.09)	0.94 (0.75; 1.18)
Traffic makes walking difficult in the neighborhood	23.3	0.99 (0.79; 1.24)	1.13 (0.93; 1.37)
There is pollution smoke close to home	23.2	1.00 (0.80; 1.25)	1.00 (0.80; 1.25)
The climate makes walking or playing sports difficult in the neighborhood	24.2	1.08 (0.86; 1.34)	1.03 (0.85; 1.25)

PR: prevalence ratio; 95%CI: 95% confidence interval; *adjustment for: sex, age, skin color, marital status, education level, number of residents in the home, index of assets and time living in the neighborhood. In bold are statistically significant associations.

DISCUSSION

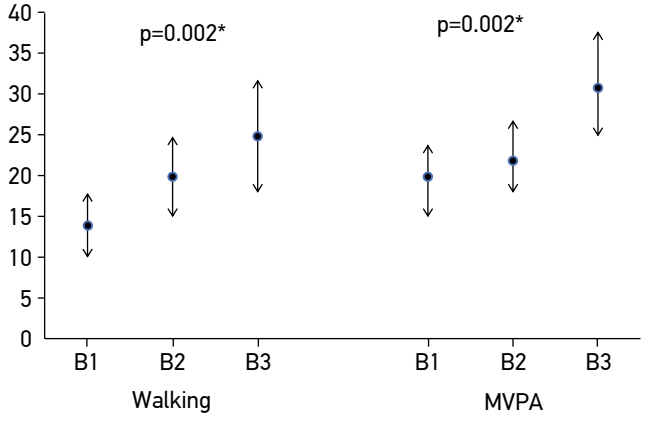
The results of the present research demonstrated that access to places that are favorable to the practice of PA, the perception of safety in the neighborhood and social support were associated with the practice of walking for leisure. For MVPA, an association with social support was found. In general, the associations were stronger for women (data not shown). Similar findings were found in other studies, using the same instrument[17-19].

The association of social support with walking at leisure and with MVPA at leisure is an important result to mention, since interventions to promote PA must consider social support networks in their proposals. Social support can make the practice of PA more pleasant, by forming partnerships between friends, neighbors and relatives. Furthermore, they act as a motivating agent for other people in the neighborhood to exercise[20].

The present study showed an association between leisure walking and perceived safety in the neighborhood. This association for adults is still inconsistent in the literature[17,21-23]. It is more consistent for the elderly population[24]. Such inconsistencies may be due to the subjective measurement of security, which does not indicate whether the neighborhood is safe or not, but rather the individual's perception of it.

There was an association between the existence of green areas and leisure walking. The hiking trails and bike paths in the city of Rio Grande, although few, are almost all filled with trees, which may explain this association. A study in Pelotas (RS) also found an association between PA during leisure time and the presence of green areas[23].

Other studies have pointed out associations between PA and the presence of facilities and locations that are conducive to the practice of PA[17,18]. A study in 11 countries (n = 11,541), including Brazil, conducted by Sallis et al.[20] showed that the perception of greater access to commercial areas, bus stops, streets with sidewalks, places to cycle and free public spaces is



*p of linear trend; B1: less favorable neighborhoods; B2: intermediate neighborhoods; B3: more favorable neighborhoods.

Figure 2. Association of leisure walking and moderate to vigorous physical activity (MVPA) with the perception of the neighborhood environment, Rio Grande, RS, 2016 (n = 1,290).

associated with greater PA practice. It is worth noting that, although just the existence of facilities that are conducive to PA practice does not determine an increase in PA levels, their existence in the neighborhood offers a greater opportunity to perform this type of activity.

Corroborating the findings of the survey, Brown et al.[25] in Canada, also obtained an association between taking walks with a dog and greater PA in leisure. The researchers found that dog owners spent more time on light and moderate physical activity and walked an average of 300 minutes per week, *versus* 168 minutes per week for those who did not own dogs[25]. A pet dog can act as a motivating agent or social support mechanism for PA[26].

As a positive point of the present study, it was possible to demonstrate the use of a representative sample of the adult and elderly population of the municipality. The results could then be extrapolated to the target population and perhaps to other populations with similar characteristics. The study obtained a high response rate, thus increasing internal validity. The environmental assessment instrument used was adapted and validated with the Brazilian population, as well as the instrument used to measure PA.

The study had some methodological limitations, such as its cross-sectional design. This format makes it impossible to show the temporality of the association between PA and the environment, that is, it is not possible to establish whether the favorable environment is the cause of PA practice or if active people perceive their neighborhood in a more positive way. It is also worth mentioning that there was no question as to where the individuals practiced PA. Thus, individuals who lived in neighborhoods whose environmental conditions were less conducive to the practice of PA could have practiced it elsewhere.

The instrument used to characterize the environment was a perception scale from the neighborhood, therefore it depends on the individual's knowledge of the place where he or she resides. As such, the notion of proximity to locations and structures may differ from individual to individual. Furthermore, it is likely that people who perform PA are more likely to perceive negative aspects of the environment when compared to those who do not practice PA, which could underestimate the measures of effect found.

For other studies with the same theme, the use of research instruments adapted to the local reality are recommended, in order to facilitate the exploration of associations that are still inconsistent in the literature. As there are still few longitudinal studies, it is recommended that more studies with this design are carried out in order to highlight the temporality of the associations. In addition, if there is financial viability, one should explore the use of objective measures to characterize the environment, such as those originating from georeferenced data (satellite images).

CONCLUSION

The study demonstrated that the perception of variables in the neighborhood environment was associated with PA. There were also some peculiarities according to sex and age group. Interventions related to the promotion of PA must take into account the built,

social and natural environments. For example, investing in PA facilities, in green and safe areas in the neighborhood can encourage leisure walking. Social support (support from friends and relatives) can contribute to the practice of MVPA. It is worth noting that simple measures, such as encouraging the population to walk their dogs, can increase the practice of PA, especially in the elderly.

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