The Role of Perceived Personal Barriers to Engagement in Leisure-Time Physical Activity

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Objectives. We sought to identify perceived personal barriers to physical activity and examine the potential association between these barriers and sociodemographic and behavioral variables, including participation in leisure-time physical activity.

Methods. In 2003, we conducted a population-based study in Pelotas, Brazil. Participants aged 20 years and older were selected according to a multistage sampling strategy. Participants responded to both the International Physical Activity Questionnaire and a standardized questionnaire investigating 8 perceived personal barriers.

Results. Only 26.8% of participants achieved 150 minutes per week of leisure-time physical activity. Lack of money (40.3%) and feeling too tired (38.1%) were the most frequently reported barriers to physical activity. A dose–response group association was observed between number of perceived barriers and level of physical activity. In the multivariable analysis, lack of time, dislike of exercising, feeling too tired, lack of company, and lack of money were associated with physical inactivity.

Conclusion. Detection of the determinants of physical inactivity, a growing epidemic, should be a public health priority. Brazil is a middle-income (developing) country. The prevalence of most of the personal barriers studied was higher in this population than those levels observed in high-income (developed) countries. Perceiving 5 of the 8 barriers investigated was inversely associated with leisure-time physical activity level. (*Am J Public Health.* 2007;97:515–519. doi:10.2105/AJPH.2005.070144)

In spite of the well-recognized benefits of physical activity, millions of people are physically inactive. More importantly, the prevalence of physical inactivity is growing.[1] Therefore, studies focused on identification of the determinants of physical inactivity are warranted, because the results of such research will help in planning effective interventions. In this context, perceived barriers to physical activity have been widely studied.[2–4] In a recent review regarding correlates of physical activity in adults, it was demonstrated that perceiving either environmental or personal barriers was inversely associated with physical activity level.[5] However, the perceived barriers and the magnitude of their association with physical inactivity depends on the population studied. For example, in the European Union, Zunft et al.[4] found a large between-country variation in the frequency of some perceived barriers. Even within countries, the association between these barriers and the level of physical activity may vary according to the region in which individuals live.[3]

Lack of time is one of the most frequently reported barriers in developed countries. It was suggested that this barrier may actually represent a lack of motivation,[6] but another study found an association between hours worked and leisure-time physical activity.[7] Given these contrasting findings, it is important to evaluate the role of lack of time as a barrier to physical activity in a developing country population.

Data on the prevalence and correlates of barriers are derived primarily from developed countries. For example, lack of money is not frequently reported in developed countries[8] but might have both a high prevalence and a negative influence on leisure-time physical activity in developing countries.

The aim of our study to identify perceived personal barriers to physical activity and to evaluate their association with sociodemographic and behavioral variables, including leisure-time physical activity. We further explored the role of lack of time as a perceived barrier.

METHODS

A cross-sectional study was conducted in Pelotas, Brazil, a city with 320 000 inhabitants. Data were collected from October 29 through December 21, 2003. A self-weighted sample of the urban population was selected in 2 stages. First, the 404 census tracts were sorted by average monthly income of the household head, and 144 of these were selected through systematic sampling, with probability proportional to size in the census database. Second, within each sampled tract, a systematic sampling strategy was designed to select approximately 10 households. The actual number of selected households increased or decreased if the census tract size had changed since the last census, which was conducted in 2000. Within each sampled household, all residents aged 20 years or older were eligible to participate.

Sample size calculations were performed. Parameters included a confidence level of 95%, a power of 80%, a prevalence ratio of 1.5, an excess of 10% for nonresponse, and an excess of 15% for multivariable analysis. To explore the association between common barriers to physical activity and independent variables, at least 936 individuals were needed. To estimate these barriers with a prevalence of 50% (±5 percentage points), at least 422 individuals were needed. However, the number of individuals actually interviewed was much higher (n=3100), because this study was part of a larger health survey, and other outcomes required larger samples.

Section 4 of the official long version of the International Physical Activity Questionnaire in Portuguese (IPAQ)[9], which assesses recreation, sports, and leisure-time physical activities, was applied using a 7-day recall period (i.e., 7 days prior to the interview). The leisure-time physical activity score was calculated as the weekly time spent (in minutes) in moderate activities (including walking) plus twice the weekly time spent in vigorous activities, as recently proposed.[10] Individuals with a score of 0 were considered sedentary; those with scores of 10 to 149, insufficiently active; and those with a score of 150 or more, sufficiently active to achieve health

benefits. The first 2 categories (sedentary and insufficiently active) were merged when the variable was dichotomized, generating a "physically inactive" group, whereas the remaining individuals were considered "active." The IPAQ is recommended for individuals between 18 and 65 years old.[11] However, because its application in a similar population showed no evidence of bias,[10] our study included 358 individuals older than 65 years (11.5%).

Two pilot studies were conducted before data collection. Based on the results of these pilot studies, the final questionnaire addressing barriers was finalized. The first pilot study asked an open-ended question ("Why aren't you engaged in physical activity regularly?") for all physically inactive individuals. The aim of this first pilot study was to detect which barriers were more frequently perceived as the most important among study participants in Brazil. The following barriers were frequently reported: lack of time, lack of money, dislike of exercising, and feeling too tired. These barriers were combined with frequently mentioned barriers investigated in other international studies (feeling too old, having an injury or disease, fearing injuries, and lack of company). The second pilot study aimed to test comprehension of questions developed to address the 8 identified barriers. Initially each of these questions had 3 responses (very important, somehow important, and not important). On the basis of the data from the second pilot study, we decided to change the wording of the questions to clarify their exact meaning. In addition, the final questions investigating the barriers had only 2 alternatives for answer (yes or no; for example, "Do you feel too old to engage in physical activity?").

The independent variables studied were gender, age, skin color (divided into the broad categories White, Black, and mixed [falling between Black and White], according to the interviewer's observation), wealth status, level of education (years of formal education), and body mass index (BMI; defined as weight in kilograms divided by height in meters squared). Wealth status was assessed according to the Brazil Criterion of Economic Classification,[12] which classifies families into 5 categories (A through E), from the wealthiest to the poorest. This classification takes into account household assets, number of domestic servants, and level of education of the household head. Because of the high collinearity between wealth status and level of education, only wealth was included in some analyses. We estimated individual available daily leisure time to explore its relation with both the perception of lack of time as a barrier and level of leisure-time physical activity. To estimate this variable we asked "How many hours per day do you spend doing household chores, studying, and formally working?" The answer to this question was used to generate the variable "daily hours occupied," which in turn allowed us to estimate available time.

After attending 40 hours of training in correct application and coding of questionnaires, 32 women who had at least a secondary school (high school) degree were selected to conduct the interviews. Fieldwork supervisors applied a shortened version of the questionnaire to 10% of the randomly selected interviewees to test the reliability of some questions and to control the quality of the interviewers' results. Data were entered twice into Epi Info version 6.04 (Centers for Disease Control and Prevention, Atlanta, Ga), and thereafter transferred to Stata version 8.0 (College Station, Tex), with which all analyses were conducted.

We conducted both descriptive and analytic analyses. Poisson regression was conducted to estimate adjusted prevalence ratios, with physical inactivity as the outcome, according to the approach proposed for high-prevalence binary outcomes.[13] The multivariable analysis was carried out following a hierarchical conceptual model.[14] The entrance order of the variables in the model was gender, age, and skin color (level 1); wealth status (level 2); BMI (level 3); and the perceived barriers (level 4). All tests were 2-tailed, and the analyses took into account the clustering of the sample.

RESULTS

Within the 1530 households visited, 3214 individuals were eligible for the study, of whom 3100 were interviewed (nonresponse rate=3.5%). Descriptive analyses showed that 43.4% of individuals were men, 81.0% were White, 13.8% were obese (BMI≥30 kg/m^2), and 41.9% were poor (categories D and E of the Brazil Criterion of Economic Classification). The mean (SD) age and level of education was 43.2 years (16.1) and 7.7 years (4.4), respectively. The age range was 20 to 92 years. Nearly 60% (58.1%) of the individuals (95% confidence interval [CI]=56.4, 59.9) scored 0 minutes of leisure-time physical activity on the 7 days before the interview, whereas 15.1% (95% CI=13.8, 16.4) presented a level of physical activity below 150 minutes per week, and 26.8% (95% CI=25.2, 28.3) were active.

Table 1 shows the prevalence of each perceived barrier in the entire sample and stratified by potential predictors. Overall, 85.1% of individuals reported at least 1 barrier to physical activity, and the mean number of barriers was 2.1 (95% CI=2.00, 2.11). The design effect for the numeric variable "number of barriers" was 1.48 with a mean number of 22 respondents by primary sampling unit. The corresponding intraclass correlation coefficient was 0.0237.

Lack of money was the most frequently reported barrier, followed by feeling too tired, lack of company, and lack of time (all these with a prevalence greater than 30%). Feeling too old for physical activity and disliking exercising were the least frequently reported barriers (6.8% and 15.1%, respectively). The most cited barriers among women were feeling too tired (45.9%) and lack of money (45.6%), whereas among men it was lack of money (33.6%). Women were more likely than men to perceive all reported barriers to physical activity, except fear of injuries.

Although age was positively related to having an injury or disease, fear of injuries, dislike of exercise, and feeling too old, it was negatively associated with lack of company and lack of time. Wealth status was inversely associated with lack of money, fear of injuries, and feeling too old. Positive relations between BMI and having an injury or disease and fear of injuries also were found. In addition, low BMI was related to a greater likelihood of reporting a dislike of exercise as a barrier. Leisure-time physical activity level showed a strong inverse relation to all barriers ($P<.001$), except fear of injuries ($P=.21$).

Figure 1 shows that individuals who reported lack of time as a barrier to physical activity actually did have less available leisure-time ($P<.001$). It also shows that individuals with less available leisure-time were more likely to be physically inactive ($P<.001$).

TABLE 1—Prevalence of Perceived Barriers to Physical Activity in a Cross-Sectional Sample, Stratified by Demographic, Socioeconomic, and Behavioral Variables: Pelotas, Brazil, October–December 2003

	Perceived Barrier to Physical Activity							
	Lack of Money	Feel Too Tired	Lack of Company	Lack of Time	Have an Injury or Disease	Fear of Injury	Dislike Exercising	Feel Too Old
Overall	40.3	38.1	32.2	31.5	23.2	19.5	15.1	6.8
Gender, *P*	<.001[a]	<.001[a]	<.001[b]	.01[a]	<.001[a]	.81[a]	<.001[a]	.04[a]
Men	33.6	28.0	26.7	29.1	20.2	19.7	12.1	5.7
Women	45.6	45.9	36.5	33.4	25.5	19.4	17.4	7.5
Skin color, *P*	<.001[a]	.49[a]	.78[a]	.35[a]	.35[a]	.02[a]	.91[a]	.13[a]
White	38.2	38.4	32.3	31.9	23.6	18.7	15.0	6.4
Non-White[c]	49.4	36.8	31.7	29.9	21.6	23.0	15.2	8.2
Age, y, *P*	<.001[a]	.02[a]	.001[b]	<.001[b]	<.001[b]	<.001[b]	<.001[b]	<.001[b]
20–29	32.7	42.2	37.0	34.7	12.8	11.1	10.9	1.6
30–49	42.6	35.9	32.6	35.8	18.2	16.2	14.3	4.5
50–59	47.3	36.1	28.9	29.8	29.8	22.1	15.3	5.9
60–69	41.7	36.9	26.1	19.4	40.2	31.0	18.7	10.6
≥70	36.6	42.8	28.6	15.5	50.0	45.5	27.7	32.7
Wealth status,[d] *P*	<.001[b]	.93[b]	.98[b]	.74[b]	.27[b]	<.001[b]	.93[b]	<.001[b]
A/B[e]	26.0	38.8	31.6	30.1	23.6	12.5	16.7	3.4
C	38.9	37.0	32.6	32.7	20.6	18.3	13.1	5.0
D	49.8	39.0	33.4	31.7	25.2	24.2	15.8	9.3
E	53.5	37.8	27.8	30.3	25.1	27.8	15.9	15.6
BMI (kg/m^2), *P*	.20[b]	.01[a]	.07[b]	.91[b]	<.001[b]	.004[b]	<.001[a]	.03[a]
<18.5	35.8	42.4	32.8	26.9	23.9	19.4	28.4	7.5
18.5–24.9	37.3	36.6	30.5	32.1	18.7	16.1	13.0	4.4
25.0–29.9	39.0	33.6	32.3	29.6	23.9	17.3	12.9	6.7
≥30.0	40.7	42.9	36.2	32.5	30.8	25.1	19.1	8.2
Physical activity level, *P*	<.001[b]	<.001[b]	<.001[b]	<.001[b]	<.001[b]	.21[b]	<.001[b]	<.001[b]
Sedentary	46.4	44.6	34.3	41.5	26.4	19.9	20.9	8.4
Insufficiently active	35.2	34.1	35.3	27.2	19.9	21.5	8.0	6.2
Sufficiently active	29.9	26.6	25.8	12.5	18.1	17.4	6.9	3.6

Note. BMI = body mass index.
[a]Wald test for heterogeneity.
[b]Wald test for trend.
[c]Black or mixed (falling between Black and White).
[d]Wealth status was determined according to the Brazil Criterion of Economic Classification.
[e]Categories A and B were merged for this analysis.

Figure 2 shows that the higher the number of perceived barriers, the higher the prevalence of physical inactivity. Individuals who reported 6 or more barriers presented a prevalence of leisure-time physical inactivity that was 113% higher than those who did not report any barrier (92.3% and 43.3%, respectively).

Table 2 presents the prevalence ratios of each perceived barrier with physical inactivity (crude and adjusted analyses). In the adjusted analysis, 5 barriers emerged as being statistically associated with physical inactivity: lack of time, dislike of exercise, feeling too tired, lack of company, and lack of money. Although women reported more barriers than did men, no relevant gender differences were observed for the association between barriers and physical inactivity (data not shown). The lack of time barrier showed the strongest association with physical inactivity (adjusted prevalence ratio 1.35; 95% CI=1.30, 1.41).

DISCUSSION

Strengths of the Study

This study relied on a population-based survey for data collection and included adults aged 20 years and older. A very low nonresponse rate was achieved (3.5%) by visiting the households several additional times until every eligible member was either interviewed or decided not to take part. Fieldworkers were carefully trained and supervised to obtain high-quality information. The inclusion of a wide age range and both physically active and inactive individuals was also important to allow for the exploration of the associations between physical inactivity and barriers and to generalize the results with greater confidence. Also, we believe, this is the first population-based study in Brazil to investigate perceived barriers to physical activity.

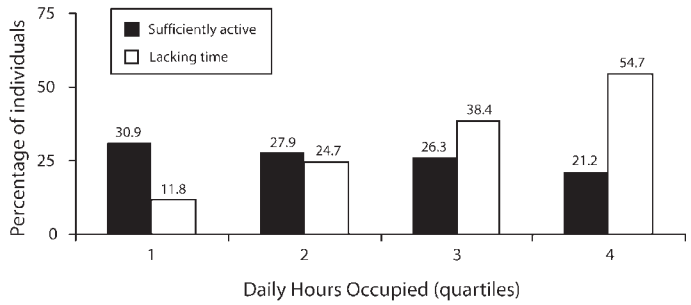
Limitations

There were limitations to our study. First, its cross-sectional design did not allow us to infer a causal relationship between the barriers and physical activity level, mainly because of the inability to establish temporality. Second, because the study was part of a larger health survey and interview length was a concern, only 8 barriers were investigated. Thus, 2 pilot studies were previously conducted to determine the most common reasons for not regularly undertaking physical activities and to test the understanding of the questions developed to investigate these barriers. We opted to evaluate only leisure-time physical activities; therefore, individuals who did not meet the physical activity guidelines in our study may have been active in other domains (occupation, commuting, and housework). However, most studies on barriers to physical activity used the same strategy, because the main purpose of such studies is to evaluate voluntary activities and not those related to one's occupation.

Understanding the Issue

Although our sample was derived from the population of a single medium-sized Brazilian city, the results are extremely relevant in terms of public health, because they show that developing countries might have different determinants of physical inactivity than those observed within developed countries.

As a general result, the prevalence of all barriers (except feeling too old and lack of time) was much higher in our study than that reported in developed countries.[4,6,8,15] This finding may explain the higher rates of leisure-time inactivity observed in developing



Note. Quartile 1 = 0–6 hours; quartile 2 = 6.1–8.8 hours; quartile 3 = 8.9–11 hours; quartile 4 = 11.1–19 hours.

FIGURE 1—Relationship between leisure-time physical activity, the perception of lack of time as a barrier to physical activity, and quartiles of daily hours occupied: Pelotas, Brazil, October 29–December 21, 2003.

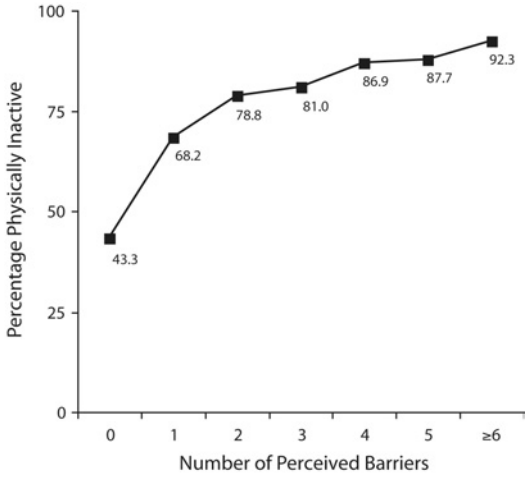


FIGURE 2—Prevalence of leisure-time physical inactivity and the number of perceived barriers to physical activity: Pelotas, Brazil, October 29–December 21, 2003.

countries in comparison to those in developed countries.[16,17] The lower frequency of the perceived barrier feeling too old observed in the current study, in comparison to other studies, might be explained by the fact that most data on this barrier are derived from developed countries, where the proportion of elderly individuals is higher than in Brazil.[18]

Lack of money was the most frequently reported barrier in our study (40%). Few studies investigated the prevalence and the effect of this barrier on physical activity level. In an Australian study, the prevalence of reporting lack of money as a barrier was approximately 12% among insufficiently active individuals.[8] When we restricted our analysis to this group, the prevalence was 44%. The plausible explanation for this difference is the economic deprivation of the Brazilian population. However, walking is an effective physical activity to improve health, and its cost is minimal. Thus, it is possible that a large segment of the Brazilian population associates health benefits of physical activity exclusively to participating in sophisticated sports and attending fitness clubs. The lack of appealing public spaces in which one can engage in physical activities is a factor that might contribute to this link.

Despite lack of time being one of the most frequently cited barriers,[2–4,15,19,20] few studies have investigated its effects on physical activity level. Bowles et al.[6] suggested that perceiving lack of time as a barrier could, in fact, be a reflection of a lack of self-motivation rather than a legitimate obstacle to regular participation in physical activities. Our results are in contrast with this hypothesis. Individuals in our sample who perceived lack of time as a barrier did indeed have less available leisure-time to practice physical activities. Moreover, these individuals were also more likely to be physically inactive, even after adjustment for confounders (including other barriers). A factor that might explain why individuals report this barrier is that many may have free time only at night and may not consider these hours as practical for physical activity, owing to the rarity of safe areas designated for nighttime physical activity in Brazil.

In addition to lack of time, 2 other barriers were important predictors of physical inactivity: feeling too tired and a dislike of exercise. Both of these barriers may reflect a lack of motivation to engage in physical activity. Motivational factors have been shown to be associated with physical activity level.[5,21] In fact, motivation is one of the pillars of behavioral theories,[22] and early experiences with physical activity may play an important role in adults' level of motivation. For example, some studies[23,24] have detected that participation in sports during adolescence is a protective factor against physical inactivity in adulthood.

Our study identified subgroups that were more likely to perceive particular barriers to physical activity, and in turn were also more likely to have lower levels of physical activity. More women than men reported perceiving most of the barriers. Some barriers were more prevalent in both older and less educated individuals. Comparable results have been reported in Australia and the European Union.[4,8] This information is of high public health significance because many of the respondents in these groups may be unsure about some aspects of physical activity. For example, the high prevalence of feeling too old as a barrier in the group aged 70 years or older may reflect a lack of knowledge of the beneficial effects of physical activity on health, a result that has been previously demonstrated.[25]

Conclusion

A strong positive dose–response group relationship between number of perceived barriers and physical inactivity was found in this study. In order to increase leisure-time physical

TABLE 2—Prevalence Ratios (Crude and Adjusted, With 95% Confidence Intervals [CIs]) for Barriers to Physical Activity: Pelotas, Brazil, October–December 2003

Barrier	Crude (95% CI)	Adjusted[a] (95% CI)	*P*
Lack of time	1.36 (1.31, 1.41)	1.36 (1.31, 1.41)	<.001
Dislike exercising	1.25 (1.19, 1.30)	1.16 (1.11, 1.22)	<.001
Feel too tired	1.19 (1.15, 1.25)	1.13 (1.08, 1.18)	<.001
Lack of company	1.11 (1.06, 1.17)	1.08 (1.02, 1.13)	.004
Lack of money	1.17 (1.12, 1.22)	1.06 (1.02, 1.11)	.008
Have an injury or disease	1.11 (1.06, 1.16)	1.04 (0.99, 1.10)	.13
Feel too old	1.18 (1.11, 1.26)	0.99 (0.93, 1.07)	.98
Fear of injury	1.05 (0.99, 1.10)	0.97 (0.92, 1.02)	.22

[a]Adjusted for gender, age, skin color, wealth status, and barriers with *P* value of < .2.

activity at the population level, policymakers should focus their interventions on strategies designed to increase awareness of particular aspects of physical activity, which in turn may help individuals to overcome the perceived barriers to physical activity. On the other hand, because an array of other factors are known to influence behavior (e.g., environmental, social support, self-efficacy), interventions that are focused on a few specific determinants of physical inactivity are unlikely to increase physical activity to desired levels in the population. The many aspects involved all need to be addressed as a whole, as they are likely to function as a chain.[26] Furthermore, pro–physical activity campaigns should not be tailored to population subgroups apparently unwilling to be active. Perhaps an attempt to change the behavior of the whole population would be easier to implement and produce results than would working on strategies targeted only at those who are supposedly most in need.[27] ■

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Contributors

F.F. Reichert conceptualized the study, conducted some of the analyses, and wrote the article. A.J.D. Barros and M.R. Domingues contributed to the writing and revision of the article. P.C. Hallal conducted some of the analyses and aided in the writing. All authors participated in designing the questionnaire.

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Human Participant Protection

The ethical committee of the Federal University of Pelotas Medical School, which is affiliated with the National Commission on Research Ethics of the Brazilian Ministry of Health, approved the study protocol. All individuals provided informed consent before the interview.

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