

Health Academies Program and the promotion of physical activity in the city: the experience of Belo Horizonte, Minas Gerais state, Brazil

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Abstract *The objectives of this study were to describe the history and evaluation methodology of the Brazilian Health Academy Program (PAS) in Belo Horizonte, MG and discuss it as an experience of health promotion and equity. Data from 4,048 non-users (2008-09) and 402 users (2014-15) were analyzed from two cross-sectional surveys. Socio-demographic profile and level of physical activity were described for both groups. Social interaction, satisfaction with life, quality of life, and social organization in the neighborhood were compared between < 3 and ≥ 3 monthly minimum wages income and conducted only for women aged 40 years and older. Chi-square test of Person was performed ($p \leq 0.05$). Prevalence of leisure-time physical activity among non-users was of 30.2% and users of 53.7%. Better perception of quality of life, positive satisfaction with life, greater social interactions and participation in the neighborhood were observed among women with higher income compared to their counterparts ($p < 0.001$). In turn, for all evaluated constructs, users reported better perception of the lower income group. The PAS has opportunized physical activity to the vulnerable population and seems to act on other outcomes besides the lifestyle.*

Key words *Motor activity, Health promotion, Health programs and plans, Urban health*

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Introduction

The unequal and accelerated process of urbanization points to the relevance of the urban health theme^{1,2}. The city is itself a factor of exposure to health, and modulates- in an interdependent and unfair fashion – the life of its residents³. Health promotion plays the role of transmuting the fragmentation of care spaces and claiming the social functions of the city, strengthening the logic of universality and integrality⁴.

Among the global fronts of health promotion, physical activity is a priority theme^{5,6} considering the epidemiological importance and the social gradients of this behavior in the population^{7,8}. Increasing access to public areas for physical activities or sports has been an urban policy to encourage such practice². The density and proximity of sports and leisure equipment⁹, as well as a better evaluation of the environment¹⁰ have already been associated with physical activity. However, the distribution of these facilitators is an important social-spatial segregation factor¹¹, especially, within the context of Latin America¹².

In Brazil, urbanization and iniquities are accentuated, as well as the prevalence of physical inactivity during spare time - greater among females, the elderly, and populations with lower levels of schooling and income¹³. The institutionalization of physical activity as part of the foremost agenda of the National Health Promotion Policy and created monitoring networks of these actions through partnerships with universities in Brazil and abroad^{4,6}. This path enabled implementing a national community program to encourage the population to practice physical activity: the Health Academy Program [*Programa Academia da Saúde*] (PAS)¹⁵.

Created in 2011, the PAS is a unique public equipment in Primary Care, acting as the gateway to healthcare services and promoting self-care by means of guided physical activities and other topics¹⁵. The incorporation of preexisting municipal programs into PAS, qualified as similar centers, allowed horizontality in the process of implementation and the continuity of successful actions in the country¹⁵. This is the case of Belo Horizonte, MG, where this model of intervention has been operating for more than ten years as “Academia das Cidades program”, currently integrated with PAS^{16,17}.

Besides mitigating iniquities in physical activity¹⁶, PAS has the potential reach of the population residing surrounding its centers, with an effect related to its presence and proximity^{18,19}.

Nevertheless, recent monitoring pictured a challenging scenario of implementation, with several ineffective centers, unfinished or even built¹⁵. The understanding of the program in diverse urban contexts, measures of effectiveness and impact are recommended by the PNPS to qualify and subsidize the sustainability of the PAS^{14,15}.

Assuming that the evaluation of health promotion policies provides tools to improve, manage and strengthen primary care in the country⁴, particularly in times of political and economic instability and threat to social rights, this study proposes to describe the history and methodology of evaluation of the Health Academy Program in Belo Horizonte, MG, and discuss it as an experience of health promotion and equity geared toward the right to the city under the theoretical framework of urban health³. The hypothesis is that a community health promotion program established in a vulnerable area collaborates to mitigating iniquities related to access to physical activity, and has an effect on social interaction and well-being aspects.

Physical activity promotion and the right to the city: the urban health conceptual model

Historically, the capitalist system found in urbanization the necessary pretext to sustain its development, establishing a civilization process mediated by consumption relations^{3,20}. Cities are born to absorb surplus production, and increasingly more specialized and functional areas are created typifying the modes of transportation, leisure and lifestyle^{3,20,21}.

Multiple mechanisms are related to production and perpetuation of inequalities in health in urban centers³, including social-spatial segregation and isolation^{2,20}. Real estate speculation (re)establishes the boundaries of the formal city in favor of “revitalization” and “urban development”²⁰, thus charting a type of cabin city full of areas exclusive of those who can pay. In a complex and dynamic manner, the population of those excluded densifies or disperses around such centralities³, which generally concentrate the financial centers of power, decision, infrastructure, and services to cultural and artistic production, including opportunities for physical activity^{2,20,22}.

Exercising the right to the city becomes an indispensable paradigm for combating the iniquities in metropolitan areas²². The founding concept in Lefebvre²¹ is defined as the *right to urban life, to renovated centrality, to the meeting and ex-*

change places, to the rhythms of life, and employments of time that allow the full and ample use of these moments and locations. It is, therefore, a collective right that only occurs with participation and full appropriation of the right to shape and reinvent the city as a part of it²⁰⁻²². From the perspective of international agencies, this right is operationalized, among other factors, in the fair spatial distribution of social and material resources throughout life course, especially for those in socioeconomic disadvantage²². Also, from access to public places, transportation, green areas and the recognition of neighborhoods as agents of cohesion and social capital, with recreation and leisure being indispensable attributes for a full life²².

The policies that encourage physical activity, which are the focus of this study, should pass through the right of occupation, construction, and fruition of the urban territory^{20,22}, contributing towards the materialization of the right to the city deriving from spaces of health production and community strengthening^{4,5}. The equal availability of resources is crucial and has as starting point the decentralization of the areas of sports and leisure, and the creation of opportunities in the daily lives of the populations, especially those most vulnerable^{2,22}.

The theoretical model of urban health proposed by Caiaffa et al.⁹ encompasses community interventions of physical activity as intermediate in the process of production of health, considering it has a promising influence on the urban conditions related to services, infrastructure, and most of all, modifications in the physical and social environments.

Using PAS as example, the implementation of the program would affect the availability of areas for the practice of physical activity and community interaction, acting as a catalyzer of a more favorable context to changes in lifestyle, and also how the inhabitants perceive and appropriate the neighborhood. Hence, the effects of PAS may cross over the increase in social networks, empowerment, knowledge, and lifestyles. Socioeconomic and individual characteristics modulate this whole process, as well as policies in different sectors and scales, affecting both the intervention, the environment and the habits themselves³.

Health Academy Program [Programa Academia da Saúde -PAS] in Belo Horizonte, MG city

In 2005, the “Academia das Cidades program”, were planned by the Municipal Department of

Health of Belo Horizonte/MG. Between 2007 and 2008, there was an expansion of the program in the city, and was incrementally trained by the national policy as of 2011^{15,16}. Currently, there are in the city Health Academies and the “Academia das Cidades” program, namely, PAS. Up until the first semester of 2017, of the 76 existing centers, 57 were qualified as similar, as shown in Figure 1 (program management data). PAS sees people referred by the Primary Healthcare Units or spontaneous demandin centers that operate in up to three shifts¹⁶.

The PAS assignments were expanded beyond physical activity and healthy eating, being spaces recommended for the production of care and healthy lifestyles, community mobilization, health education, artistic and cultural practices, integrative practices planning and management¹⁵.

The Belo Horizonte Observatory for Urban Health /UFMG is a member of the Health Ministry physical activity monitoring network¹⁷, responsible for assessing the program in this capital city as from 2006, even before the first center was opened¹⁶. This partnership resulted in two large cross-sectional studies: “The BH Health Study (2008-09)”, which established a baseline to evaluate the impact of the program, and “Modes, lifestyles, and health - a study of the Health Academies Program in Brazilian cities: from understanding the program to effectiveness of the actions – “MOVE-SE Academias (2014-15) study”, which consolidates the evaluation after six years of the first study.

Methods

Data base

The BH Health Study (2008-09)

The “BH Health Study (2008-09)”, study established a baseline to assess the impact of the PAS program, measuring direct effects based on individual changes among its users, as well as the population effect among non-users¹⁹. At the time of the survey, the municipal police was recent and the joint efforts of authorities and other health-care services players enabled carrying out a study based on prior information about the location where the program would be implemented^{17,19}.

Two among the nine Regional Administrations of Belo Horizonte, MG were selected for the survey. In these territories, areas were delimited around four strategic geographic points: one recently opened academy, and another three sites

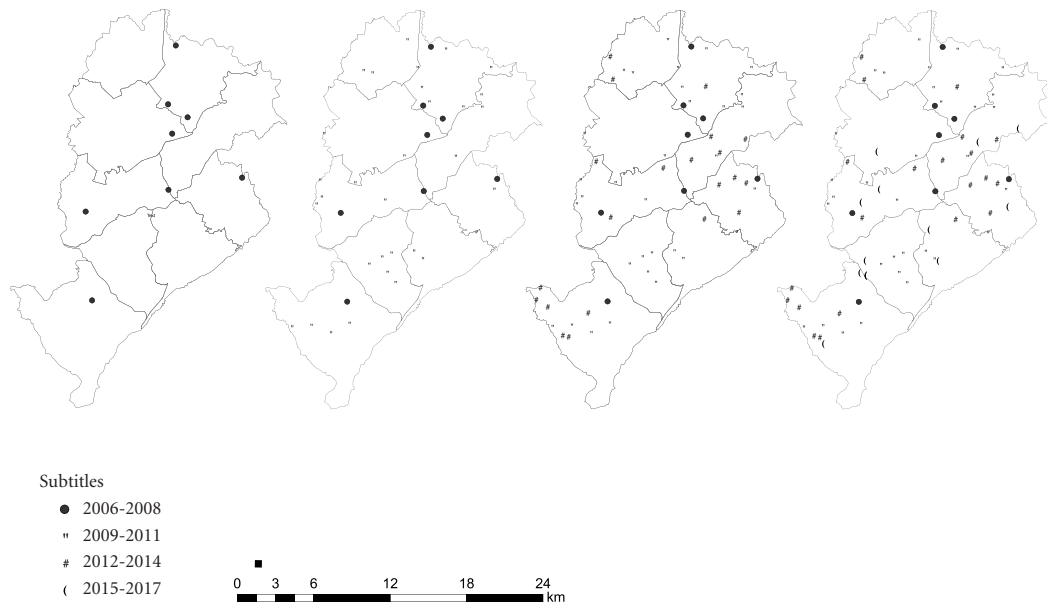


Figure 1. History of implementation of the Health Academy Program in Belo Horizonte, 2006-2017.

where the future centers would be implemented. A total of 4048 adults aged 18 years and more, residents in the vicinity of these four sites, and all 319 users of the pole under operation, were interviewed. The study was approved by the Research Ethics Committee of the Federal University of Minas Gerais^{17,19}. Further details can be found in prior studies^{10,16,17,19}.

MOVE-SE Academias (2014-15) study

“The MOVE-SE Academias (2014-15) study” integrates the umbrella project “Health Academy: evaluation of physical activity promotion programs in Brazil”, and monitors the implementation of the program as to management, governance and impact, according to the “Strategic Action Plan for Tackling Chronic Non-communicable Diseases in Brazil - 2011-2022”¹⁴.

A probabilistic sample design was adopted to select the population of non-users using clusters in three stages: (a) ten centers selected from the list provided by the program management, in which four of them, inherited from the baseline survey the “BH Health Study (2008-09)”, had probability 1; (b) census tracts, selected with distinct probabilities and with sample size proportional to the total number of sectors surrounding each sampled PAS pole; (c) households, selected

by means of systematic sampling based on the number of households per census tracts of the Census 2010. In each household, one adult inhabitant (18 years or more), selected according to the quota established by sex and age range, was interviewed, totaling up 1,376 interviews.

The addresses of the sampled centers were georeferenced, and the Euclidean distances between the centroid of each census tract and the nearest center were calculated. The eligible sectors were within a radius of one thousand meters around each of the ten PAS poles, and with more than 50 households. In the same way, the probabilities of selecting each sector were differentiated according to proximity to the PAS poles, including the sectors where the health academies were located as probability 1. The census sectors located up to 500 meters from any other pole had 2.4-fold more chances of being picked relative to those located more than 500 meters away¹⁹.

All users residing in the selected sectors were included in the population sample of non-users mentioned above. In some centers, it was necessary to add other sectors to complete the sample size, as long as within the radius of one thousand meters and with a greater number of users. A proportional distribution of users was adopted according to the number of individuals per pole,

sex, age range, and academy shift. A total of 402 interviews were carried out.

Data was gathered from November 2014 to March 2015, and 12 months later follow-up was conducted in a subsample of 731 individuals (552 non-users). In both stages, the study included face-to-face interviews, blood pressure and anthropometric (weight, height, and waist circumference) measurements. Additionally, biochemical tests were performed to determine the glycemic profile by glycated hemoglobin, as well as the lipid profile by cholesterol – total and fractions – and triglycerides. The study was approved by the Research Ethics Committee of the Federal University of Minas Gerais.

Study sample

For this study, analyses were conducted based on two surveys described before. The data of the population - non-users of the program - derived from the study the “BH Health Study (2008-09)” (n = 4,048) considering that at that time the program was recent, allowing a potential control of the confounding factors related to the associated proximity exposure. On the other hand, the data of the users came from the study “MOVE-SE Academias (2014-15) study” (n = 402), since it included a larger sample of centers and the national policy implementation period¹⁵.

Variables

The variables sex, age (18-29; 30-39; 40-49; 50-59; ≥ 60 years old), schooling (0-8; 9-11 e ≥ 12 years of study), and family income (less than 2, 2-less than 3, 3- less than 5, ≥ 5 minimum wages) were described for both groups. Additionally, the following were assessed for users: a) how long they have attended the PAS (years); b) how often they have participated in artistic and cultural activities (theater, music, painting, arts and crafts) at the PAS; c) how often they have participated in events/parties/get-togethers organized by the PAS, using a five-item scale (always, sometimes, rarely, never, or activity not offered); d) *Relative to the presence of the PAS your neighborhood, do you feel that the interaction among neighbors has decreased, not changed, increased*; e) *After you started attending the PAS, do you feel that your health worsened/worsened a lot, did not change, improved/improved a lot*.

The levels of physical activity measured by the long version of the International Physical Activity Questionnaire²³ were obtained by multiplying

frequency (days/week) and the mean duration (minutes/day) of walking, light, moderate and vigorous activities, and the latter was multiplied by two. Those with a score of physical activity ≥ 150 minutes/week^{24,25} were considered active. All those with complete information regarding the physical activity variable were included in this analysis.

The variables of social interaction, satisfaction with life, quality of life, and social organization in the neighborhood were described only for women aged 40 years and older, as an attempt to resemble the group coming from the population with the profile of PAS users, so that the described results could be explained by information bias. These variables were selected because they represent relevant constructs in health², which are potentially affected by urban conditions and inequities³. To understand the impact of the social determinants of health on such constructs among non-users, family income was used as a marker of vulnerability, classified as < 3 and ≥ 3 monthly minimum wages considering the distribution of the gross family income. This stratification was not conducted for users who were 40 years of age or older because they concentrated income < 3 minimum wages (64%). This proportion was significantly higher compared to the group of non-users aged 40 years and over in the lowest income stratum (53%) (p < 0.001).

The social interaction variable was obtained from the analysis of the major components of the following question: *How often do you go to bars, pubs, night clubs or concert halls; popular festivities or street festivals; recreation clubs or associations; soccer fields; cinema; fashion malls; theater; parks/squares; cultural groups?* The score of the first component was divided into terciles and classified as low, medium, and high social interaction²⁶.

Satisfaction with life²⁷ was measured by an ascending scale from 1 to 10, schematically represented by the design of stairs in which the lowest value represents the worst life, and the highest, the best life. The evaluation was made regarding current life satisfaction. The cut-off point adopted was the median of the steps chosen, and the answers were classified as negative/unsatisfied (steps 1 to 6) and positive/satisfied (steps 7 to 10).

Quality of life was measured by the question *What do you think of your quality of life?* - given on a Likert scale with five items (very poor to very good), categorized as “Very poor /poor”, “Neither good nor poor”/“Very good/good”. And lastly, the question *Have you already gotten to*

gether with your neighbors to try to solve a problem that affects the neighborhood in which you live? (yes/no).

Statistical analyses

Descriptive analysis of the data through frequency distribution, means and standard deviation (SD) was performed in STATA software (Corporation, College Station, Texas) version 12.0. Pearson's chi-square test was used to test differences between the family income strata in the population ($p \leq 0.05$).

Results

A total of 4,048 non-users and 402 users were interviewed based on the two assessment surveys mentioned. Most of the non-users were of female (53,1%), 14.5% were aged 60 years or more, 22.5% had more than 12 years of schooling, and 35.90% had a monthly family income higher than or equal to five minimum wages. In contrast, 85,3% of users were women; most older than 50 years old (70,9%), with less than eight years of schooling (57,2%), and monthly family income lower than three minimum wages (64,1%) (Table 1).

Users reported a long time of participation in PAS, and roughly 41.0% were enrolled for three years and more. The report of participation in parties/events/get-togethers organized by the program (66,2%) was greater when compared to that related to cultural and artistic activities (33,1%). These results further suggested that, within the realm of the ten centers investigated, such activities had been offered bearing in mind the low frequency of the category "activity not offered". 51.8% of users stated that PAS increased the interaction among neighbors (Table 1).

The prevalence of active individuals in leisure among the non-users was 30.2%, and it was greater among male subjects, aged less than 29 years, and more than nine years of schooling. Among the users, the total prevalence of active individuals was 53.7% and presented with a distribution by sex, age, and schooling distinct from that of the general population. It was more frequent among women, aged more than 60 years, and did not differ among the levels of schooling (Figure 2).

Figure 3 shows the analysis for females aged 40 years and more. Each quadrant represents one of the variables evaluated, and the center of the

figure displays the proportions of each variable for PAS female users. The next levels scale the discrepancies in family income observed among the non-users ($p < 0,001$). Users reported significantly better perception of quality of life (83.2%), satisfaction with positive life (67.9%) and higher social interaction (24.0%) when compared to their peers, women with lower income, except for neighborhood organization with similar proportions between groups, higher than 20% (Figure 3). There was no significant difference in good / very good quality of life and satisfaction with life among users and women with higher income.

Discussion

The evaluation of PAS in Belo Horizonte, MG complied with the expansion of the program establishing the baseline based on a robust design, followed by cross-sectional monitoring, with a longitudinal component, of the program centers in the city. The results of this study corroborate PAS as an intervention for urban health promotion and equity. Besides providing the opportunity of physical activity to the most vulnerable population, promoting the right to health in the city, it seems to act on other outcomes beyond lifestyle.

Thus, as it is in other capital cities, PAS has mitigated the unfair inequalities in access and fruition of the benefits of engaging in physical activity^{16,18}. The largest participation of women may be related to the nature of the physical activities offered, or to the greater participation in healthcare services, and possibly, a greater recruitment by the program²⁸. Additionally, this group has already been identified as "individuals not attending or demanding" leisure physical activities, because women are less active in this domain as compared to men^{13,25}. Regarding to the capacity of the PAS, the period of participation reported suggests that people are maintained for long years, which reduces the population reach of the program.

The inequities in income observed for social interaction and in the neighborhood, life satisfaction, and quality of life were alarming and show the relevance of Health Promotion policies in demanding social justice and full life conditions in the cities.

Regarding social interaction, in poor neighborhoods, the opportunities for involvement in social activities and the availability of services tend to be scarce and homogeneous, not consid-

Table 1. Distribution of socio-demographic characteristics of the population and users of PAS. Belo Horizonte, MG 2008-09 / 2014-15.

Variables	Population (BH Health study 2008-09 n = 4.048		PAS users (MOVE-SE 2014-15) n = 402	
	n	%	n	%
	Demographic characteristics			
Sex				
Female	2.389	53,11	343	85,32
Age (mean ± dp)	40,95 ± 16,14		57,16 ± 12,63	
Age				
18 – 29	955	30,72	11	2,74
30 – 39	801	20,64	24	5,97
40 – 49	787	19,22	82	20,40
50 – 59	671	14,93	108	26,87
60 and more	834	14,49	177	44,02
Education level (years)*				
0 – 8 years	1.934	40,80	230	57,21
9 – 11 years	1.409	36,68	138	34,33
≥ 12 years	701	22,52	34	8,46
Monthly family income (minimum waves) ^{b*}				
Less than 2	1.056	19,45	127	32,65
2 less than 3	915	20,58	122	31,36
3 less than de 5	896	24,07	74	19,02
≥ 5	1.083	35,90	66	16,97
Female ≥ 40 years	1.384	54,72	309	84,20
PAS variables				
How long you have attended the PAS (years)?*				
Less than one	-	-	54	13,5
1 less than 2	-	-	84	21,0
2 less than 3	-	-	98	24,5
> 3	-	-	164	41,0
Artistic / cultural activities at the PAS				
Always/sometimes	-	-	133	33,08
Rarely/ never	-	-	224	55,72
Not offered	-	-	45	11,20
Events/parties/get-togethers at PAS				
Always/sometimes	-	-	266	66,17
Rarely/ never	-	-	135	33,58
Not offered	-	-	1	0,25
PAS presence changed neighbors' interaction				
Decreased	-	-	3	0,81
Not changed	-	-	175	47,43
Increased	-	-	191	51,76
After you started attending the academy, do you feel that your health				
Worsened/Worsened a lot	-	-	1	0,25
Did not change	-	-	25	6,22
Improved/Improved a lot	-	-	376	93,53

^a R\$ 415,00 2008-09 / R\$ 724,00 2014/15. *1 a 72 missing values.

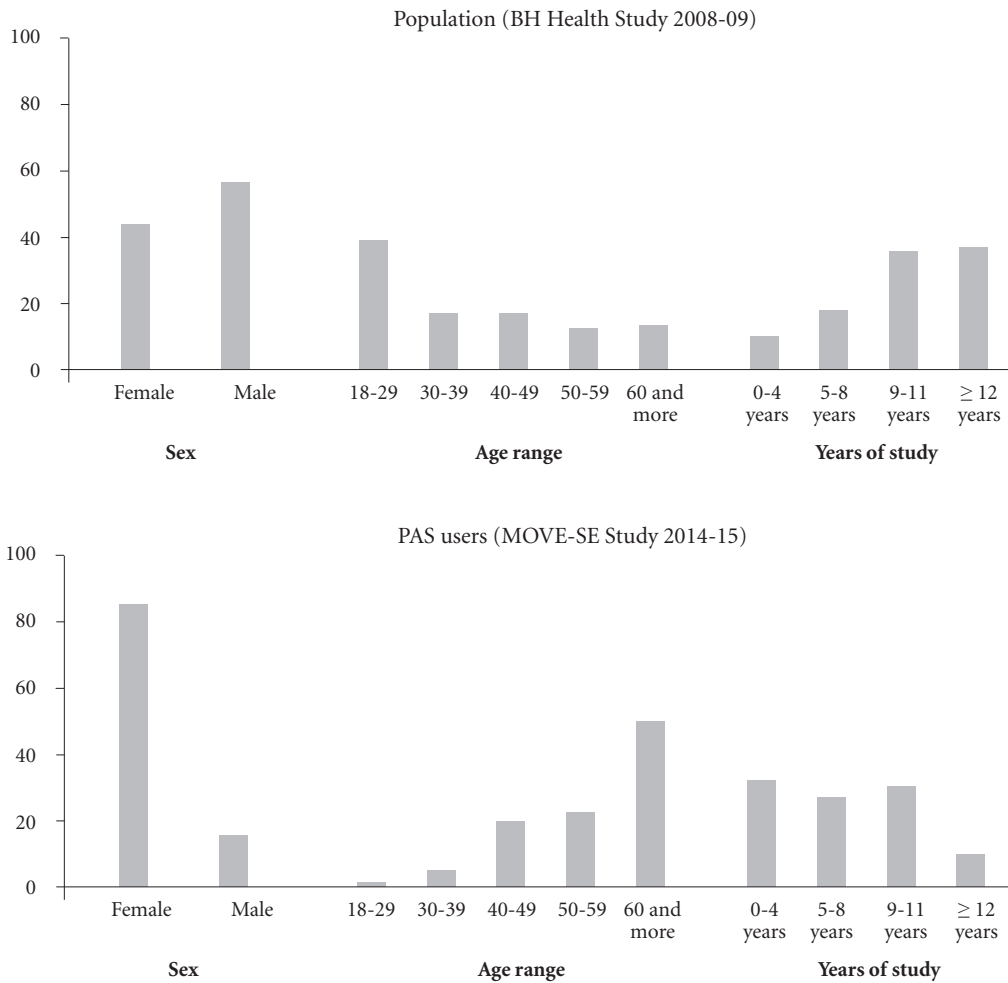


Figure 2. Proportion of active in leisure by sex, age group and years between users and non-users of PAS. Belo Horizonte, MG, 2008-09/2014-15.

ering the composition and demands of the local population^{2,22,29}. Income has a preponderant impact in this outcome, since even when free, the cultural, artistic and leisure events are centralized and demand spending money with transportation, for example.

As a community integration place, PAS may approximate social cohesion networks and the establishment of new bonds, which give meaning to the perception of increased interaction among neighbors after the program¹⁹. This aspect would have an impact, for example, on the levels of organization and engagement with the issues of the neighborhood²². The effect of the program is emphasized by providing, in the centers, other op-

tions besides physical activity, according to user reports. It is necessary to evaluate the contents offered, as recommended in a recent assessment study¹⁵, in order to interpret these findings and levels of participation.

The constructs evaluated in this article have multiple dimensions and overlap each other, as the positive perception of quality of life aspects reflect dimensions of life satisfaction²⁹, which in turn, has already been correlated with greater social interaction³⁰. Regardless of health condition, cross-sectional studies have reported an association between a higher level of physical activity and a better perception of quality of life in the elderly and adults²⁹. The tools and dimensions

Social organization in the neighborhood (yes)	≥ 3 SM	27,94*	80,38*
	< 3 SM	22,33	63,43
Social interaction (high)	≥ 3 SM	23,30	83,17
	< 3 SM	24,01 ^a	67,96
		11,44	60,99
		31,69*	73,26*
		* $\geq 3 \times < 3$ $p < 0,05$	* $< 3 \times$ PAS $p < 0,05$

Figure 3. Frequency of the proportion of social interaction, satisfaction with life, quality of life and social organization in the neighborhood, between users and non-users of PAS stratified by family income. Belo Horizonte, MG, 2008-09/2014-15.

evaluated, as well as the populations involved, hinder comparison with results published in the literature²⁹.

In a prior study using the database of the BH Health Study (2008-09) study, dissatisfaction with life was related in an independent manner with the worse perception of health, even when controlling for absence of morbidities²⁶. Such indicator could clarify the results regarding life satisfaction found in this study. Among women who reported a monthly income lower than three minimum wages, self-evaluation of health was significantly worse (15.8%, $p < 0.001$) compared to those with higher incomes (5.5%). Among the users of PAS, good/very good self-evaluation was expressive, 71.5% (data not shown) and therefore could influence the levels of satisfaction, which despite being inferior, did not show a significant difference relative to the higher income stratum. We point out that users mentioned an expressive-

ly improvement in health condition after enrolling at the PAS, demonstrating that besides the objective health status, other aspects influence such a perception.

It is possible that among women in a context of vulnerability, those with greater social support¹⁹, more concerned about their health, or who have lived in the neighborhood longer, would seek PAS more frequently. The design of this study does not allow such an inference; however, the findings suggest that besides the expressive effect of family income, users of PAS reported a better perception for the evaluated constructs, are closer to the higher family income population, suggesting that the program is capable of mitigating the inequities in health.

In addition to the limitations mentioned concerning the design, other issues of this study could be a problem, such as use of self-reported measures of physical activity²³; quality of life assessment by means of a single question, not considering its specific dimensions²⁹ and information bias due to false answers or responses considered socially acceptable. However, the interviews with users and population were conducted in the households, which could minimize this bias. The instrument used to measure physical activity was validated for the Brazilian population²³, with the presentation of answer cards to standardize data collection¹⁷. The use of the stratified analysis minimizes the classic confounding effects, and was considered consistent with the inequities reported in literature¹³. Furthermore, the study analyzed baseline data and a sample of the program centers in Belo Horizonte, MG from surveys specifically designed to evaluate these interventions.

This study advances in terms of evaluation of the program by expanding the outcomes analyzed to other health domains. The findings signal that PAS has acted directly on distal factors, giving priority to the social determinants of physical activity, offering and claiming the public areas to foster and re-examine the meaning of promoting health and life in cities. Continued evaluation and measuring of long-term effects are fundamental for improving the policy¹⁵.

Collaborations

AP Fernandes participated in the design and development of the project, performed the data analysis, drafted the initial version, critical writing and approved the final version; ACS Andrade participated in the design and development of the project,, contributed to the data analysis, reviewed and approved the final version; DAS Costa participated in the design, performed data analysis, reviewed and approved the final version; MAS Dias participated in the design of the project; DC Malta participated in the design and development of the project; WT Caiaffa participated in the design and development of the project, data analysis, critical writing and approved the final version.

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