



Factors associated with participation in community physical activity programs: National Health Survey 2019

Fatores associados à participação em programas comunitários de atividade física: Pesquisa Nacional de Saúde 2019

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ABSTRACT

Despite investments made around the world, whether in the academic sphere or in the deployment and implementation of public policies, physical activity levels have not increased satisfactorily. Thus, the objective of this work is to identify which factors influence participation in Community Physical Activity Programs in the Brazilian reality. To this end, using the 2019 National Health Survey, 20,014 subjects were investigated considering participation in these programs as an outcome, with independent variables divided into biological and sociodemographic factors. For data analysis, binary logistic regression was adopted, with a significance level of $p < 0.05$, using Jamovi[®] software, version 2.3.21. Females (OR = 1.54; 95% CI: 1.40 – 1.69), “older people” (OR = 1.10; 95% CI: 1.01 – 1.21), and “non-white” people (OR = 1.51; 95% CI: 1.38 – 1.66) were more likely to participate in Community Programs of Physical Activity. Individuals with an income above 5 minimum wages presented reductions of 34% in the chances of participation (OR = 0.66; 95% CI: 0.57 – 0.76) when compared to those who reported an income of up to 1 minimum wage, and individuals who lived close to public places for leisure had higher chances of participating (OR = 1.714; 95% CI: 1.52 – 1.92). In conclusion, although biological and sociodemographic aspects influenced participation in Community Programs of Physical Activity, the existence of public leisure facilities close to homes was the factor with the greatest impact.

Keywords: Public health; Epidemiology; Access to health services; Public policies.

RESUMO

Apesar dos investimentos realizados ao redor do mundo, seja no âmbito acadêmico, seja na implementação de políticas públicas, os níveis de atividade física não têm aumentado a contento. Assim, o objetivo deste trabalho é identificar quais os fatores que influenciam na participação em Programas Comunitários de Atividade Física na realidade brasileira. Para isso, utilizando a Pesquisa Nacional de Saúde 2019, investigou-se 20.014 sujeitos considerando como desfecho a participação nesses programas, com variáveis independentes divididas em biológicas e sociodemográficas. Para a análise dos dados utilizou-se da regressão logística binária, com $p \leq 0,05$, através do software Jamovi[®] versão 2.3.21. Observou-se que pessoas do gênero feminino (OR = 1,54; IC 95%: 1,40 - 1,69), “pessoas idosas” (OR = 1,10; IC 95%: 1,01 - 1,21) e pessoas “não brancas” (OR = 1,51; IC 95%: 1,38 - 1,66) apresentaram chances elevadas de participação nos Programas Comunitários de Atividade Física. Para o segundo bloco, identificou-se que quem apresentou renda acima de cinco salários mínimos tiveram chances reduzidas em 34% (OR = 0,66; IC 95%: 0,57 - 0,76) quando comparados aos que relataram renda de até um salário, e, os que residiam próximo aos locais públicos para lazer apresentaram chances elevadas de participação (OR = 1,71; IC 95%: 1,52 - 1,92). Em suma, aspectos biológicos e sociodemográficos influenciaram na participação em Programas Comunitários de Atividade Física, contudo, a existência de locais públicos de lazer próximos às residências foi o fator de maior impacto evidenciado.

Palavras-chave: Saúde pública; Epidemiologia; Acesso aos serviços de saúde; Políticas públicas.

Introduction

Physical activity (PA) has been the subject of frequent discussion in the academic field and in public health due to its relationship with major challenges in contemporary society: impact on hospitalizations due to morbidity and mortality resulting from non-commu-

nicable diseases and conditions (NCDs)^{1,2} and related costs³, influence on individual productivity related to the workforce⁴, reducing social inequalities and promoting sustainable development^{5,6}, and more recently, the ability to reduce the severity of COVID-19 infection, treat sequelae, and address psychosocial impacts

in the post-pandemic period⁷.

In fact, since the 1950s the relationship between PA and public health has been discussed in the scientific community⁸. More recently, in today's society, physical inactivity has been considered a pandemic^{7,9,10}, raising the discussion and alerting researchers, government officials, and the civil community about the urgency of considering physical inactivity as a public health issue, so that intersectoral measures can be taken, based on the monitoring of policies and plans, and commitment to effective actions. As a result, it is possible to observe an increase in the number of studies recognizing syndemic patterns and their impact on the health level of populations, and discussing the interaction between the physical inactivity pandemic with the COVID-19 pandemic, NCDs, and mental health¹¹.

Different initiatives are used to alert and address these syndemic patterns related to physical inactivity, such as continuous monitoring of surveillance indicators and monitoring of research and policy related to PA around the world¹⁰.

In Brazil, Community Physical Activity Programs (CPAP) are strategies that have been implemented by municipalities since the early 2000s, with financial incentives from the Federal Government since 2005¹², in order to increase population PA levels and encourage a routine of healthy habits. Based on the evaluation of these pioneering experiences by a network of researchers together with technicians from the Ministry of Health in Brazil, a national PA program called the Health Academy Program was created, implemented based on primary care and health promotion policies¹³.

The Health Academy Program, CPAP, with national reach in Brazil, is an effective strategy for promoting health and encouraging the practice of PA within the scope of Brazilian public health¹⁴. This community program has also been directly correlated with reductions in the rate of hospitalizations for NCDs², mortality from high blood pressure¹⁵, and inequality in access to health promotion actions in primary care¹⁶.

However, despite the positive impact of PA and CPAP on public health, scientific production related to PA, the existence of national surveillance systems on PA, and the availability of national plans and programs to promote PA in contemporary society¹⁷, the promotion of PA has been globally inefficient, whether due to weaknesses in public management, inconsistency in the use of terms and instruments for evaluating PA, inefficiency in the implementation of national and global

plans, or lack of recognition of PA as a fundamental human right and public health priority¹⁸.

Research and surveillance on PA are crucial to ensuring effective policies that support a healthier lifestyle for the population¹⁹. Monitoring PA can guide policies and programs to increase the population's PA levels and, consequently, impact the reduction in NCDs²⁰. Not surprisingly, PA surveillance, policy, and research are considered the three pillars that support PA Promotion²¹.

In this sense, we observe evident cracks in two of these pillars: surveillance that requires better consistency in both data collection and the process of monitoring and evaluating programs, and public policies that, through guided management, emphasize PA as a basic right and priority in public health. These cracks can be minimized with the third pillar that is consistent and in constant dialogue with local reality: coherent research, aimed at social change and the qualification of public policies and existing surveillance. Thus, the current research has the potential to strengthen these pillars, while also pointing towards social transformation.

Since the literature has highlighted the need for permanent monitoring of what is offered to the population in order to minimize the harmful effects of physical inactivity, the objective of the current study was to investigate which factors have the greatest impact on participation in CPAP in Brazil.

Methods

This is a descriptive cross-sectional study based on data extracted from the National Health Survey (PNS) - Brazil, carried out in 2019.

Sample

The population studied in the PNS comprised 88,531 Brazilians, living in households throughout the Brazilian national territory, in urban and rural areas, aged 15 and over. In order to analyze the factors that most impact the participation of Brazilians in CPAP, relevant inclusion and exclusion criteria were defined.

The sample corresponded to individuals who confirmed participating in some CPAP based on the following question in the 2019 PNS questionnaire: "Do you participate in this public program to encourage the practice of physical activity in your municipality?"

The inclusion criteria for this study were male and female individuals, over 15 years of age, of white and non-white race or color or ethnicity, and living in ur-

ban and rural areas. The income variable considered the income of the people living in the household, excluding the income of people whose status in the household was pensioner, domestic worker, or relative of a domestic worker.

Instruments

The PNS is a population survey carried out by the Brazilian Institute of Geography and Statistics (IBGE) in partnership with the Brazilian Ministry of Health, which aims to collect, systematize and publicly make available information representative of the Brazilian population, their living and health conditions²².

The questionnaire for data collection for the 2019 PNS was divided into three parts: (1) household information, (2) information on all residents, and (3) information on a randomly selected individual aged 15 or over.

The target population was made up of people living in permanent private households throughout the national territory. The PNS is included in the Integrated Household Survey System, and has as its sampling structure the Master Sample, which corresponds to census sectors selected to meet various surveys carried out by the IBGE. Further information on the 2019 PNS data collection procedures can be obtained at ²².

Procedures

To meet the objectives of this work, the outcome considered was “*Participation in Community PA Programs*”, organized based on question P04801, from the original research instrument, as follows, “Do you participate in this public program to encourage the practice of PA in your municipality?”, where answer 1 indicated “Yes” and answer 2 indicated “No”.

The explanatory variables of the proposed binomial logistic regression model were: sex, age group, race or color or ethnicity, household territory, monthly household income, and existence of public places for PA near the interviewee’s residence. The presentation, characterization, and categorization of the independent variables are shown in Table 1.

Statistical analysis

For the initial survey on the profile of the subjects selected to participate in the study, a descriptive analysis was carried out based on the distribution of frequencies related to the independent variables.

The data were then analyzed using logistic binomial regression, to identify the association between the stage and the explanatory variables. For this purpose, the odds ratios and respective confidence intervals were observed, considering the variables statistically

Table 1 – Variables used in the study, and their categorizations and classifications

Variable	Categorization used	Reference for categorization
Sex	Female	The variable was taken from question “C6. Sex”. Answer 1 (Man) was categorized as “Male” and answer 2 (Woman) was categorized as “Female”
	Male	
Age group	Adults	The variable was taken from question “C8. Age”. The response was categorized into “adults” (<60 years) and “older people” (≥60 years)
	Older people	
Race or color or ethnicity	White	The variable was taken from question “C9. Color or race. Answer 1 was left as “White” and answers between 2 and 5 (black, yellow, brown and indigenous, respectively) were categorized as “Non-white”
	Non-white	
Territory of the domicile	Urban	For this variable, question V0026 “type of census situation” was used, as “Urban” or “Rural”
	Rural	
Monthly household income ^a	Up to 1 Minimum wage	The variable was taken from the derived variable module in question VDF002 “Household income (excluding the income of people whose status in the household was pensioner, domestic employee, or relative of a domestic employee)”, corresponding to the minimum wage in force in 2019 in Reais*
	Up to 2 Minimum wages	
	Up to 3 Minimum wages	
	Up to 4 Minimum wages	
	Up to 5 Minimum wages	
Existence of a public place for physical activity near home	More than 5 Minimum wages	The variable was taken from question P046 “Near your home, is there a public place (square, park, closed street, beach) where you can go for a walk, exercise or play sports?”. Answer 1 was left as “Yes” and answer 2 as “No”
	Yes	
	No	

a = Variable presented in Reais (R\$), the currency in force in Brazil. In 2019, the minimum wage was R\$998 and the dollar exchange rate (US\$) was R\$4.0301 according to the Brazilian Institute of Applied Economic Research (IPEA). More information can be found on the website <https://www.ipea.gov.br/portal/>

significant at $p < 0.05$. Regarding the binary logistic regression analysis of this research, the model used was composed of two blocks analyzed among themselves: the block of biological variables (sex, age group, race or color or ethnicity) and the block of sociodemographic variables (territory of residence, monthly household income, and existence of public places for PA close to the residence). All analyses were performed in the program *Jamovi*® for Windows, version 2.3.21 (<https://www.jamovi.org/>).

Results

The accessed database consisted of 88,531 people, of which 20,014 (22.6%) knew about a CPAP and 68,517 (77.4%) did not know about a CPAP. Regarding those people who knew about a community program focused on PA, 2,362 of them participated (11.8%), while 17,652 did not participate (88.2%).

Among the 2,362 people interviewed who participated in a CPAP (11.8%), the majority were female, adults, of “non-white” race or color or ethnicity, residents of urban areas, with a gross monthly household income of up to 2 minimum wages, and who stated that they had public places for leisure close to their homes, as can be seen in Table 2.

Regarding the block of biological variables (Table 3) and the relationship with participation in a CPAP, it can be observed that the variable “sex” indicates that subjects of the “female” sex have a 54% higher chance of participating in these programs compared to the male sex (OR = 1.54; 95% CI: 1.40 - 1.69). Furthermore, regarding the “age group”, the chances of older people participating in these CPAP were increased by 51% when compared to adults (OR = 1.51; 95% CI: 1.38 - 1.66). “Non-white” people also presented approximately 10% more chances of participating in a CPAP than self-declared “white” people (OR = 1.10; 95% CI: 1.01 - 1.21).

Table 2 – Characteristics of the study sample (N = 20,014)

Variable	Participation in a CPAP		No participation in a CPAP	
	n	%	n	%
Sex				
Female	1,654	8.3	10,575	52.8
Male	708	3.5	7,077	35.4
Age group				
Adult	1,581	7.9	13,314	66.5
Older people	781	3.9	4,338	21.7
Race or color or ethnicity				
White	873	4.4	6,800	34.0
Non-white	1,489	7.4	10,848	54.2
Territory of the domicile				
Urban	2,159	10.8	1,771	8.9
Rural	203	1.0	15,881	79.3
Monthly household income^a				
Up to 1 min wage	367	1.8	2,408	12.0
Up to 2 min wages	545	2.7	3,726	18.6
Up to 3 min wages	438	2.2	3,059	15.3
Up to 4 min wages	293	1.5	2,168	10.8
Up to 5 min wages	201	1.0	1,493	7.5
More than 5 min wages	518	2.6	4,793	24.0
Existence of a public place for physical activity near home				
Yes	1,944	9.7	12,994	64.9
No	418	2.1	4,658	23.3

a = Missing data regarding this variable not included in the table (n = 20,009; Missing = 5); CPAP = Community Physical Activity Programs

In the block of sociodemographic variables (Table 4), it was identified that participants with a monthly household income greater than five minimum wages had approximately 34% less chances of participating in a CPAP compared to those who received up to 1 minimum wage per month (OR = 0.66; 95% CI: 0.57 - 0.76).

Among the explanatory variables analyzed in this research, the variable that presented the greatest pos-

Table 3 – Association between physical activity and biological variables

Variable	Estimate	Odds Ratio	Standard Error	95% CI		p
				Minimum	Maximum	
(Constant)	2.476	0.052	0.084	0.076	0.093	<0.001
Sex						
Female – male	0.434	0.048	1.544	1.406	1.695	<0.001
Age group						
Older people – adult	0.416	0.048	1.515	1.381	1.663	<0.001
Race or color or ethnicity						
Non-white – white	0.102	0.046	1.107	1.012	1.211	0.026

Table 4 – Association between physical activity and sociodemographic variables

Variable	Estimate	Odds Ratio	Standard Error	95% CI		p
				Minimum	Maximum	
(Constant)	-2.304	0.092	0.100	0.083	0.120	<0.001
Existence of a public place for physical activity						
Yes – No	0.539	0.058	1.714	1.529	1.922	<0.001
Household monthly income						
Up to 2 wages – Up to 1 wage	-0.058	0.073	0.0944	0.819	1.088	0.427
Up to 3 wages – Up to 1 wage	-0.091	0.076	0.0913	0.787	1.060	0.234
Up to 4 wages – Up to 1 wage	-0.160	0.084	0.852	0.723	1.005	0.058
Up to 5 wages – Up to 1 wage	-0.166	0.094	0.8847	0.704	1.019	0.077
More than 5 wages – Up to 1 wage	-0.412	0.073	0.662	0.573	0.765	<0.001
Domicile territory						
Urban – Rural	0.040	0.081	1.040	0.888	1.219	0.624

itive influence on the outcome was the “existence of public places for practicing PA close to home”, as the chances of participating in a CPAP increased by 71% (OR = 1.71; 95% CI: 1.52 - 1.92) for these individuals.

Discussion

The main objective of the current work was to investigate the factors that most influence the participation of Brazilians in CPAP throughout Brazil, based on secondary data from the PNS 2019. This research demonstrated that women, older people, and non-white individuals presented 54%, 51%, and 10%, respectively, higher chances of participating in a CPAP. These data corroborate other studies on the majority participation of women, older people, and non-white people in these programs^{14,23–25}.

The findings can be explained by the greater demand for medical care by women²⁶ and also greater participation in health promotion activities in primary care by the female public²⁷. The type of activity offered by CPAP professionals can also represent an important factor in participation²⁸, just as the availability of practice times only during business hours can represent a barrier to the participation of adults in work activities compared to the participation of older people¹⁴.

Regarding the race or color or ethnicity variable, in the current study we identified greater participation in a CPAP of non-white individuals compared to white individuals. Greater decentralization of health services, including CPAP, over the years may be a factor that generates greater participation of the non-white population in these programs. Tomasiello et al.²⁹ identified that people of black race or color or ethnicity and lower income have greater ease in accessing primary care health

establishments due to the greater capillarity of these services within communities in municipalities, while highly complex establishments, located in central regions, are more accessed by the white and high-income population in most of the cities analyzed in the study.

In contrast, Szwarcwald et al.²⁶ in their study on the change in the pattern of use of health services through the PNS 2023 and the PNS 2019, identified an increase in the number of people who declared themselves as black between 2013 and 2019, pointing to a more pronounced growth in access by black and brown people to health services compared to the white population. Therefore, it is pertinent to observe future studies that address the impact of social factors such as race or color or ethnicity and social class, and their intersectionality in access to health services.

Analyzing the sociodemographic variables, we identified greater participation of people with lower incomes, despite having less knowledge about the existence of CPAP compared to other groups, which points to the equitable content of these programs and highlights their importance in reducing inequalities in access to health promotion programs, corroborating the research by Silva et al.¹⁴.

Regarding the importance of the environmental factor for the practice of PA, previous studies have already shown the importance of the presence of planned and built environments to increase levels¹. Similarly, Silva et al.¹⁴ in their review with the objective of evaluating CPAP in Brazil, identified that people who lived close to the centers were more likely to practice PA in leisure time when compared to those who lived far from the centers of these programs. Undoubtedly, among other factors

that determine participation in a CPAP, distance is a preponderant variable in the evaluation of participation^{16,24,25}.

Regarding research on the impact of built environments, in a systematic review, Pacheco & Schwartz²⁹ showed that scientific studies addressing physical spaces for leisure and sport in a primary aspect are incipient, as constructed spaces generally appear secondary to analyses of experiences in sport and leisure facilities. Similarly, it appears that there is the same need for research in the field of public health, addressing the importance of built spaces and urban mobility for the practice of PA and, consequently, as already mentioned, its positive effects on the health of the population, representing a topic for future studies.

Although the current study has limitations such as the non-inclusion of other sociodemographic variables that could be relevant to the outcome of participation in a CPAP, and the failure to specify in the PNS questionnaire whether public spaces were implemented to perform the CPAP, or simply squares, population surveys represent an extensive source of population health data, as they present several sociodemographic indicators widely used by professionals and researchers in the field.

In conclusion, although biological aspects also influence the outcome of participation in CPAP, the existence of public leisure areas close to homes was the factor with the greatest impact evidenced in this study. This aspect is challenging, especially given the growth of fiscal austerity measures in recent years in Brazil, resulting in weakening of the financing of the Health Academy Program and impacting the planning of actions that could reflect an increase in the population's PA levels. It is considered important to conduct new studies that verify the influence of the built environment and urban mobility on participation in CPAP, assessing their impact on public health, as well as continued observation of the monitoring of intersectoral public policies and health surveillance systems in Brazil.

Conflict of interest

The authors declare no conflict of interest.

Authors' contributions

Alves MS: Conceptualization; Methodology; Data and experiment validation; Data analysis; Research; Tool provision; Data curation; Project administration; Data presentation design; Writing of the original manuscript; Approval of the final version of the manuscript. Silva RJS: Conceptualization; Methodology; Data and experiment validation; Data analysis; Supervision; Data

presentation design; Writing - review and editing; Approval of the final version of the manuscript. Santana CM: Methodology; Data presentation design; Writing - review and editing; Approval of the final version of the manuscript. Martins HL: Methodology; Data presentation design; Writing - review and editing; Approval of the final version of the manuscript. Menezes LS: Methodology; Data presentation design; Writing - review and editing; Approval of the final version of the manuscript. Simões VA: Methodology; Data presentation design; Writing - review and editing; Approval of the final version of the manuscript.

Declaration regarding the use of artificial intelligence tools in the article writing process

The manuscript did not use artificial intelligence tools for its preparation.

Availability of research data and other materials

The contents underlying the research text are contained in the manuscript.

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