Sociodemographic determinants associated with physical activity level of *quilombolas* in the Brazilian state of Bahia: 2016 survey*

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Abstract

Objective: to analyze sociodemographic variables associated with insufficient physical activity level in Bahian *quilombolas*. **Methods**: this was a cross-sectional study with data on sociodemographic characteristics and level of physical activity using a standardized form, administered through interviews with a representative sample of adults living in *quilombos* in the geographical region of Bahia; crude and adjusted logistic regression was used. **Results**: 850 participants were included whose average age was 45.0 ± 17.0 years; 61.2% were female; prevalence of physical inactivity was 21.9% (95%CI 19.1; 24.7); insufficient physical activity level among adult *quilombolas* was higher among the elderly (OR 2.12; 95%CI 1.29; 3.49) and individuals who did not work (OR 1.47; 95%CI 1.01; 2, 14). **Conclusion**: being elderly and not working is associated with insufficient physical activity in *quilombolas*.

Keywords: African Continental Ancestry Group; Motor Activity; Health Surveys.

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Introduction

Chronic noncommunicable diseases (NCDs) are the leading set of prevalent diseases and causes of death among the different socio-economic segments of the population.[1,2] In 2011, these diseases were responsible for the deaths of more than 850,000 Brazilians, corresponding to 72.7% of deaths recorded on the Mortality Information System (SIM).[3]

Diverse factors can influence reduced occurrence of NCDs among the Brazilian population.[4] In this sense, doing physical activity (PA) is an important behavior that impacts on primary prevention and/or treatment of diverse chronic diseases,[5] and adopting a physically active lifestyle reduces NCD occurrence by 6% to 10%.[6]

Regular PA is directly related to improved and/or continuing good health in people of all ages,[7] and is inversely associated with different health risk factors (increased blood pressure, lipid and blood glucose levels), reducing premature mortality from all causes by around 30% to 35%.[8]

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However, assessing PA level (PAL) still raises methodological issues that hinder its measurement in representative samples of the population.[9] The main difficulty consists of divergence as to a universally standardized technique for measuring the diverse domains of PAL.[10,11]

Questionnaires are among the instruments widely used to determine PAL in population-based epidemiological studies, due to the ease and low cost of administering them. As such, the International Physical Activity Questionnaire (IPAQ) has been widely used in studies worldwide.[12]

High prevalence rates of insufficient practice of PA have been found in different populations and are present in around 23% of adults ≥18 years old,[7,13] so that globally it is the fourth leading mortality risk factor. In the Brazilian state capitals, 13.7% of adults are insufficiently physically active, especially females and people with lower schooling levels.[14]

PAL is also subject to environmental influences. Those who live in rural communities are seen to adhere more to global recommendations on PA; research[15,16] suggests that this disparity could be related to the structural conditions imposed on these people (geographic isolation; restricted access to health services, education, transport services and income).

A study with surviving *quilombo* (settlements originally formed by escaped slaves) communities in the north of Minas Gerais state identified that 63% did less PA than is recommended for ensuring health benefits.[17] A study with *quilombolas* (maroons) in a municipality in the southeast of Bahia state indicated that they are more active when at work than in their free (or leisure) time, scoring 42.1% and 13.1%, respectively.[18] Mussi et al.[19] also identified a low amount of PA in the free time of a Bahian *quilombola* community living on the banks of the São Francisco river.

Despite the recognized benefits for health of practicing PA,[5,6] research with *quilombolas* has indicated low PA levels.[17-19] However, considering local,[19] municipal[18] and regional[17] samples, availability of information on its negative impacts on the health of the *quilombola* population is still limited. As such, this study seeks to analyze sociodemographic variables associated with insufficient PAL among Bahian *quilombolas*.

Methods

This analysis is part of the population-based cross-sectional study entitled "Epidemiological Profile of Bahian *Quilombolas*", conducted between February and November 2016.

The empirical field is the geographical region of Guanambi, Bahia, which had 42 certified contemporary *quilombos* in 2016, distributed over ten municipalities. In view of no prior official information being available as to the number of people living in the *quilombos* of this Bahian microregion, the population was estimated assuming 80 families per *quilombo*, with two adults (>18 years old) per family in each community, totaling 6,720 adults.

The sample size calculation considered: finite population correction, 46% outcome prevalence[20] (<150 minutes of PA a week considering the following domains: leisure; work; domestic/household; and movement between one place and another), 95% confidence interval, sample error of 5 percentage points (p.p.), 1.5 times effect for

conglomerates, additional 30% for refusals and 20% for losses and confounders, resulting in a sample size of 813 subjects.

The sample design had two stages: random selection of the *quilombos* (conglomerates) and, following this, census gathering. Initially the *quilombos* were selected randomly. Through their respective residents' associations, 14 of the selected units allowed visits for the study to be conducted, while three refused to take part.

Considering all the adults in the eligible *quilombos*, the residents' associations stated that there were 1,025 adults living there during the collection period. They were all invited and were informed about the aspects of the study, ensuring equal probability of participation (Figure 1).

Individuals with cognitive disabilities or unable to communicate independently were excluded from the interviews. Those who were bedridden, had amputated limbs, limbs in plaster, pregnant and breastfeeding mothers (up to six months after childbirth) were excluded from the anthropometric measurements. Losses were defined as a measurement or examination not being performed or an unanswered interview question.

Data collection took place by means of interviews, conducted by teams comprised of health professionals and/or undergraduates according to their qualifications, after having been trained. Data collection was done in mass at weekends and on public holidays.

The dependent variable, PA level, was determined in accordance with the International Physical Activity Questionnaire (IPAQ short version).[21] IPAQ classification was done in a binary manner, whereby individuals classified as being "very active" and/or "active" were grouped together as "active"; and individuals classified as being "irregularly active" and/or "inactive" were grouped together as "insufficiently active".[22]

The sociodemographic variables were: sex (female, male), age group (adults=18-59 years; elderly= 60 years or over), marital status (married; separated/divorced; widowed and single), literate (yes, no), family income (<1 minimum wage, ≥ 1 minimum wage), currently working (yes, no), religious affiliation (yes, no).

The population studied was characterized according to the absolute and relative frequencies of the sociodemographic, lifestyle and PA status variables.

Odds ratios (OR) were estimated based on logistic regression to analyze association between predictors and PAL. Crude ORs were checked initially. Variables with a p-value <0.20 were included in the adjusted analysis. A 5% significance level was used. All the analyses were performed using the Statistical Package for Social Sciences (SPSS), version 22.0.

The project was submitted to the Bahia State University Human Research Ethics Committee on 09/01/2016, and was approved as per Opinion No. 1.386.019/2016. All participants signed a Free and Informed Consent form.

Results

The final sample was comprised of 850 *quilombolas* who attended the activities and agreed to take part in the study, either by signing or putting their fingerprint on the individual Free and Informed Consent form (Figure 1). Refusals accounted for 17% of those who were invited, but did not attend the activities. Mean age of the participants was 45.0 (± 17.0) years; 61.2% were female; 80.6% were adults; 74.6% were in a marital relationship; 71.9% were literate; 49.1% were currently working; and 79.0% had family income below the minimum wage (Table 1).

With regard to PAL, 21.9% (95%CI 19.1;24.7) were classified as being insufficiently active. Insufficiently active lifestyle was associated with participants' age group, literacy and work (Table 2).

The binary logistic regression analyses indicated that being elderly (OR=2.67; 95%CI 1.83;3.89), illiterate (OR=1.47; 95%CI 1.03;2.10) and not working (OR=1.90; 95%CI 1.35;2.68) were associated with an insufficiently active lifestyle (Table 3).

Variables with p<0.20 in the crude analysis (age group; literacy; family income; currently working; and having religious affiliation were included in the adjusted analysis. Insufficient PA level among adult *quilombolas* remained associated with the elderly age group (OR=212; 95%CI 1.29; 3.49) and with those who were not working (OR=1.47; 95%CI 1.01; 2.14) (Table 3).

Discussion

The analysis indicated that 1 in 5 adult *quilombolas* did not meet the global recommendations for PA sufficient to keep in good health, regardless of being associated with the elderly age group and not currently working.

Prevalence of insufficient PA in the *quilombola* population studied is lower than the 31.1% of the global population recorded by a survey conducted in
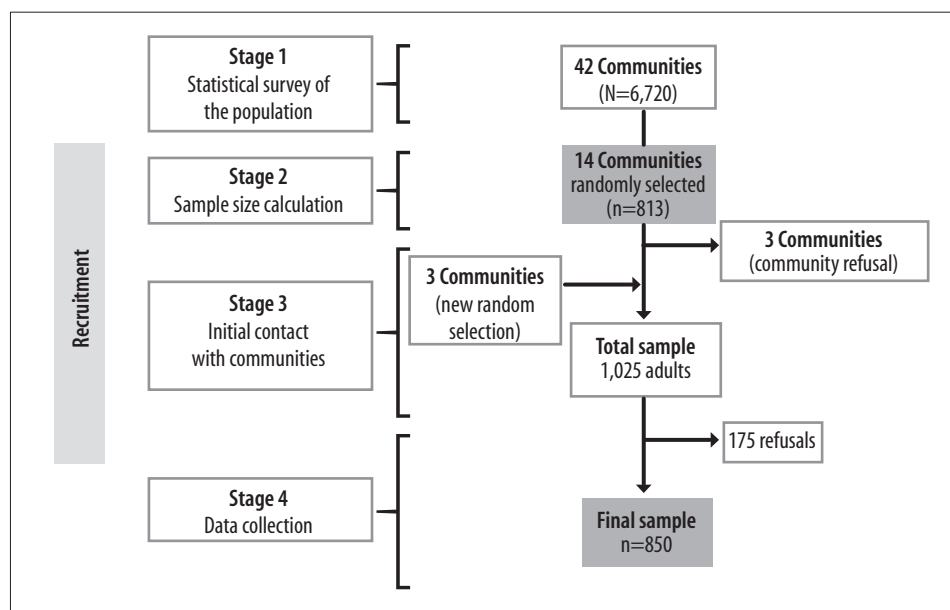
Epidemiol. Serv. Saude, Brasília, 29(3):e2018511, 2020

3

Figure 1 – Steps for executing data collection

122 countries in 2012,[13] as well as being lower than the 46.0% identified among the adult Brazilian population in 2013.[23] However, it is close to the 26.3% found in *quilombolas* in the municipality of Vitória da Conquista, Bahia, in 2011,[24] and higher than the 17.1% found in rural communities in the Jequitinhonha Valley in Minas Gerais between 2008 and 2009.[15]

The disparities in prevalence rates can be explained, among other factors, by the daily lives of the different population groups. People who live in rural areas tend to have more active jobs and more active movement between one place and another,[15,18] which have impact on increased burning of energy, compared to those who live in urban spaces. However, it must be remembered that use of different instruments for measuring and assessing PA can also generate discrepant results with regard to the outcome investigated. For example, even if the same instrument is used to measure PA, if any of the PA domains are not taken into consideration[23] in data interpretation, this can result in prevalence rates being generated that are different to those identified by studies that use more dominions.

As was found in the Black *quilombola* population, low levels of PA in relation to aging have also been found in national[25] and global[13] studies. The decrease in PAL found as age increases may be related to diverse limiting physiological factors imposed by age (reduction

of physical abilities and onset of diseases), as well as social and psychological aspects.[20]

Another important point relates to environmental limitations imposed on elderly people living in vulnerable communities, given that in such communities transport can be more restricted, leisure options can be fewer (parks, squares and cycle paths) and/or less access to government PA encouragement programs (facilities with fitness equipment, for instance).[18,27]

The data gathered in this study showed positive association between higher PALs and working. This association can be explained by high physical activity levels being required in the work domain of these communities. A rural population study found 30.8% (95%CI 27.0; 34.6) physical activity prevalence,[15] and a study with a rural *quilombola* community found 42.1% (95%CI 38.6; 45.5) physical activity prevalence in their work domain.[18]

Differently to findings of other population-based studies, which identified association between insufficient PAL and being of the female sex[13,23] or of the male sex,[24] this study did not identify association between biological sex and PAL. Absence of association between these factors may be related to the particularities of the rural environment, because in such places men and women carry out activities, especially work activities, that require considerable physical exertion.[28]

Table 1 – Description of the sociodemographic characteristics of adult quilombolas, Bahia, Brazil, 2016

Variables	N	%
Sex		
Female	520	61.2
Male	330	38.8
Age group		
Adults	685	80.6
Elderly	165	19.4
Marital status		
Married	634	74.6
Separated/divorced	29	3.4
Widowed	41	4.8
Single	122	14.4
Literate		
Yes	595	71.9
No	232	28.1
Currently working		
Yes	406	49.1
No	421	50.9
Family income		
< 1 minimum wage	579	79.0
≥ 1 minimum wage	154	21.0
Religious affiliation		
Yes	804	96.5
No	28	3.5

Table 2 – Distribution of physical activity level (PAL) of Bahian quilombolas, by sociodemographic characteristics, Bahia, Brazil, 2016

	Nível de atividade física (NAF)		p-valor
	Insuficientemente ativo	Ativo	
	% (n)	% (n)	
Sex			
Female	22.4 (114)	77.6 (394)	
Male	21.0 (68)	79.0 (256)	0.621
Age group			
Adults	18.2 (123)	81.8 (551)	
Elderly	37.3 (59)	62.7 (99)	<0.001
Marital status			
Married	21.5 (136)	78.5 (498)	
Separated/divorced	20.7 (6)	79.3 (23)	
Widowed	26.8 (11)	73.2 (30)	
Single	18.2 (22)	81.8 (99)	0.615
Literate			
Yes	19.5 (116)	80.5 (479)	
No	26.3 (61)	73.7 (171)	0.032
Family income			
< 1 minimum wage	20.2 (91)	79.8 (359)	
≥ 1 minimum wage	25.4 (72)	74.6 (211)	0.098
Currently working			
Yes	16.0 (65)	84.0 (641)	
No	26.6 (112)	73.4 (309)	<0.001
Religious affiliation			
Yes	21.5 (173)	78.5 (631)	
No	32.1 (9)	67.9 (19)	0.181

Table 3 – Crude and adjusted binary logistic regression analysis of physical activity level (PAL) and sociodemographic correlates among *quilombolas*, Bahia, Brazil, 2016

	Insufficiently active N (%)	Crude analysis OR (95%CI)	p-value	Adjusted analysis OR (95%CI)	p-value
Sex					
Female	114 (22.4)	1			
Male	68 (21.0)	0.92 (0.65;1.29)	0.621		
Age group					
Adults	123 (18.2)	1		1	
Elderly	59 (37.3)	2.67 (1.83;3.89)	<0.001*	2.12 (1.29;3.49)	0.003*
Marital status					
Married	136 (21.5)	1			
Separated/divorced	6 (20.7)	0.96 (0.38;2.39)	0.922		
Widowed	11 (26.8)	1.34 (0.66;2.75)	0.420		
Single	22 (18.2)	0.81 (0.49;1.34)	0.418		
Literate					
Yes	116 (19.5)	1		1	
No	61 (26.3)	1.47 (1.03;2.10)	0.033*	1.03 (0.67;1.56)	0.903
Family income					
< 1 Minimum wage	91 (20.2)	1		1	
≥ 1 Minimum wage	72 (25.4)	1.35 (0.95;1.92)	0.099	1.01 (0.68;1.50)	0.947
Currently working					
Yes	65 (16.0)	1		1	
No	112 (26.6)	1.90 (1.35;2.68)	<0.001*	1.47 (1.01;2.14)	0.047*
Religious affiliation					
Yes	173 (21.5)	1		1	
No	9 (32.1)	1.73 (0.77;3.89)	0.186*	1.09 (0.35;3.41)	0.880

OR (odds ratio) for prevalence, using a 95% confidence interval (CI).

* p<0.05.

Contrary to other population-based studies,[15,18,26] schooling, after data adjustment, did not keep positive association with practicing PA among the Black *quilombola* population. This situation leads us to believe that schooling is not a consistent factor for adherence to regularly practicing PA in the surviving rural *quilombola* communities we studied. The divergence of the results presented here in relation to other population-based studies can be explained by the sociodemographic, economic, environmental, work and behavioral particularities of the population studied. Other studies[18,28,29] conducted with rural populations have alerted that the particularities of the rural environment hinder comparisons with the findings of other analyses with urban groups, or even with rural populations in other regions.

This study has some limitations that should be indicated. Cross-sectional surveys do not allow cause and effect relationships to be established between the variables under analysis. The use of the IPAQ short version which relies on self-reported information may underestimate or overestimate PA levels. As a questionnaire, it does not enable PA domains to be fractioned. It is also subject to comprehension bias and memory bias. Notwithstanding, this instrument underwent a validation process with the Brazilian population,[21] in addition to being widely used in international studies.[12]

This study has contributed to providing information on the surviving *quilombola* population. Its population and territory dimensions can be used in the implementation of public PA and health policies and programs in communities which are frequently socioeconomically vulnerable. Moreover, methodological matters such as using accelerometers for assessing PAL and a detailed questionnaire on the religious practices of this population group can by explored by future studies.

The epidemiological information obtained by the study indicates that those who live in surviving *quilombo* communities in the interior region of Bahia state have low prevalence of insufficient PA behavior. Furthermore, active lifestyle was found to be inversely related to age and positively associated with working. This draws attention to the need to implement public policies to encourage PA among the elderly.

Authors' contributions

Rodrigues DN and Carvalho FO were responsible for the study concept and design; Rodrigues DN, Carvalho FO, Mussi RFF, Almeida CB, Nascimento Junior JRA and Moreira SR were responsible for analysis and interpretation of the results, drafting and critically reviewing the contents. All the authors have approved the final version of the manuscript and declare themselves to be responsible for all aspects thereof, including the guarantee of its accuracy and integrity.

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7

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