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Social participation and self-assessment of health status among older people in Brazil

Participação social e autoavaliação do estado de saúde entre idosos no Brasil

Bruno Luciano Carneiro Alves de Oliveira (https://orcid.org/0000-0001-8053-7972) [1]
Sara Fiterman Lima (https://orcid.org/0000-0003-0015-3413) [2]
Andréa Suzana Vieira Costa (https://orcid.org/0000-0003-4490-766X) [2]
Alécia Maria da Silva (https://orcid.org/0000-0001-6377-313X) [3]
Maria Teresa Seabra Soares de Britto e Alves (https://orcid.org/0000-0002-4806-7752) [4]

Abstract *To estimate the prevalence of social participation (exposure) and its association with positive self-assessment of overall health status (SAH) (outcome) among 7,712 Brazilian elderly interviewed in the National Health Survey 2013. A cross-sectional study that used Propensity Score (PS) to improve comparability between the group exposed and no exposed to social participation. Poisson regression was performed to determine the prevalence and association of interest using crude and adjusted by inverse probability of selection of PS. Social participation was reported by 25.1% (CI95%: 23.4-26.9) and was lower among poor older people, who depend on public transportation and live in more precarious contexts. Most did not SAH positively, but the proportion was higher when they had social participation (48.0%; CI95%: 46.0-51.0). There was a positive association of social participation with SAH positive. The association using the adjusted model (PR: 1.15; CI95%: 1.08-1.22) attenuated the estimated in the crude model. Elderly exposed were 15% more likely to provide a positive SAH. Despite low levels in Brazil, there was a positive association between of social participation and SAH, confirming that engagement in such activities provides important gains for the health and quality of life.*

Key words *The elderly, Social participation, Health status, Health Surveys, Propensity score*

Resumo *Estimar a prevalência da participação social (exposição) e sua associação com a autoavaliação positiva do estado de saúde (AAS) (desfecho) de 7.712 idosos entrevistados na Pesquisa Nacional de Saúde 2013. Trata-se de estudo transversal que usou o Escore de Propensão (EP) para melhorar a comparação entre o grupo exposto e não exposto a participação social. Realizou-se regressão de Poisson para determinar a prevalência e associação em estudo com o modelo bruto e ajustado pelo inverso da probabilidade de seleção do EP. A participação social foi referida por 25,1% (IC:95%: 23,4-26,9) e foi menor entre os idosos pobres, que dependem de transporte público e vivem em contextos mais precários. A maioria não avaliou positivamente sua saúde, mas a proporção foi maior quando tem participação social (48,0%; IC95%: 46,0-51,0). Houve associação positiva da participação social com a AAS positiva. A magnitude de associação usando o modelo ajustado (RP: 1,15; IC95%: 1,08-1,22) atenuou a estimada no modelo bruto. Idosos expostos tiveram 15% a mais de chance de referir AAS positiva. Apesar de baixa prevalência no Brasil, houve positiva influência da participação social na avaliação de saúde, confirmando que o engajamento social permite ganhos importantes para a saúde e qualidade de vida.*

Palavras-chave *Idosos, Participação social, Estado de saúde, Inquéritos de Saúde, Escore de propensão*

[1] Faculdade de Medicina, Universidade Federal do Maranhão (UFMA). Praça Gonçalves Dias 21, Centro. 65020-240 São Luís MA Brasil. brunodeoliveirama@gmail.com
[2] Coordenação do Curso de Medicina, UFMA. Pinheiro MA Brasil.
[3] Secretaria Municipal de Saúde de Cururupu. Cururupu MA Brasil.
[4] Departamento de Saúde Pública, UFMA. São Luís MA Brasil.

Introduction

Although population ageing is a global phenomenon, considerable heterogeneity exists across countries at different stages of development[1]. In Brazil, population aging occurs in a context of deep socioeconomic inequalities in conjunction with pronounced health risks and social and health needs[2-5]. Aging is characterized by a significant decline in social, physical and emotional functioning[2-6], which negatively affects social participation and interaction leading to the risk of social isolation and deterioration in quality of life and health status[4,5,7,8].

The recognition of the importance of living together in society for the health of the individual in the aging process has been highlighted in several studies and indicated that social participation *(*social sharing of individual resources through active involvement in collective social actions such as religious activities, hobby clubs, sports groups, cultural and political events*)* and maintaining interpersonal relationships are social determinants of physical and emotional health among older people[6-12], key indicators of successful aging[13,14] and predictor of mortality (all-cause and cause-specific)[15,16]. Strong social support networks and high levels of community life engagement are protective factors for maintaining good health and quality of life and have been shown to have a positive effect on various health indicators and wide-ranging benefits for active aging and the well-being of elderly people[6-10,14,17-20].

The mechanisms explaining the relationship between social participation and health indicators have been described as capable of occurring in multiple pathways[7,8,16,21]. For example, the physiological impact of social isolation is hypothesized to influence the neuroendocrine and immune systems. Also, social ties may encourage individuals to engage in health-promoting behaviours such as physical activity, seeking medical care, or to refrain from damaging ones such as smoking. The psychological effects of social connectedness may include feelings of self-efficacy, a sense of meaning and purpose, and better mental health. In particular, interactions that provide social support are thought to be facilitators of physical and emotional health and well-being.

Self-assessment of overall health status (SAH) is one of the most widely used indicators for measuring the health status of elderly people and social participation in community life[4,6-9,11-20]. This indicator reveals the integrated and subjective perceptions of the elderly in relation to their health[6,2,22,23], is an independent and strong predictor of morbidity and mortality[22,23] and a multifactorial marker of quality of life[22]. However, until recently there was no nationwide data on this theme and studies of the prevalence of the social participation of old people in community activities and its association with SAH using nationally representative samples are therefore still rare in Brazil. Moreover, the data provided by the few local level studies that have been conducted[3,4,6,24,25] is generally inconsistent, partially due to the different methods and indicators used to explore social interaction and interpersonal relationships[3,4]. Also, social participation among the elderly is not a random phenomenon, as it depends on a set of individual and contextual socioeconomic, demographic and health characteristics. Thus, controlling the systematic differences in the distribution of attributes among the elderly groups and focusing directly on the determinants of social participation are still methodological issues that research on the relationship between social participation and health states need to address[6,7,22]. Thus, it is important to adopt more robust methods of analysis, such as propensity score weighting, which provides a more accurate estimate of prevalence and the association between given variables in comparison groups with different individual and contextual characteristics[26,27].

This because, it is possible that there are important differences between the profiles of the elderly who have social participation in activities in the community of those who do not participate, and that this participation can positively favor the engagement of the elderly to healthier lifestyles and the self-assessment health.

This present study used data from the 2013 National Health Survey (NHS) to explore the prevalence of social participation in community activities (exposed) and its association with positive self-assessment of overall health (outcome) status among older people in Brazil.

Methods

Data Source

The 2013 National Health Survey (NHS) was conducted by the Brazilian Institute of Geography and Statistics (IBGE, acronym in Portuguese) in partnership with the Ministry of Health[27,28].

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NHS sampling plan

NHS sampling plan was developed by conglomerates in three stages of selection. In the frst stage, Primary Care Units (UPA) were selected by simple random sampling, consisting of censos tracts or sets of census tracts (when the tracts counted with few households). In the second stage, a fixed number of households were selected by simple random sampling for each UPA (from 10 to 14). In each household sampled, one resident with ≥18 years was selected, also by simple random sampling, to take part in the third stage of selection[27,28].

Sample was calculated at approximately 80,000 households. Information were collected on 62,986 households. The calculation took into account average values, variances, and the e ects of the sampling plan, assuming a nonresponse rate of 20%[27,28]. The weights of the households and all its residents were calculated by the product of the weight of the UPA in question and the inverse of the probability of selection of the household within the UPA. The weights were adjusted to correct nonresponses and to calibrate the estimates according to population totals known from other sources. The selection of the resident who answered to the individual interview was done by simple random sampling. Thus, the weight of the selected resident was calculated by the product of the weight of the household by the number of eligible residents (equivalent to the inverse of the probability of selection). More details can be consulted in another study[27,28].

Data collection was carried out with the use of handheld computers (personal digital assistant), programmed to critique the received values. This household survey consists of three questionnaires designed to obtain information on the living conditions and health of the Brazilian population: a household questionnaire; an individual questionnaire, answered by all household members; and a second individual questionnaire answered by a randomly selected sample of the adult household members (≥18 years)[27]. The present study uses the data generated by the latter questionnaire applied to the randomly selected adult household members who were aged ≥65 years (n=7,712).

Exposure and outcome variables

To measure the effect of social participation, two comparison groups were created: (a) the exposed group, comprising older people (n=1,906) who reported that they participate in community activities; and (b) the unexposed group, comprising those who reported that they do not participate in community activities (n=5,806). Social participation in community activities was determined based on the response to the following question in the NHS questionnaire: "Do you participate in organized social activities, such as clubs, community or religious groups, social centers for the elderly, etc.?" (Yes=1 or No=0).

The health outcome used for the purpose of this study was self-assessment of overall health status (SAH) based on the following response categories: *very good*, *good*, *normal*, *bad*, and *very bad*. For the purposes of this study the indicator was dichotomized into negative self-assessment (*normal/bad/very bad*) and positive self-assessment (*very good/good*), in accordance with conventional practice[6,22,23].

Control Covariates

Control covariates included sex (male, female); age (years); color/race (white, nonwhite); marital status (married, single); household reference person (yes, no); level of schooling (no schooling/primary incomplete, primary completed/higher incomplete, higher complete, ignored); currently working (yes, no); total household income in R$ (in quintiles); physical, intellectual, hearing, or visual disability (yes, no); number of chronic diseases (physical or mental); health plan (yes, no); household registered in the Family Health Strategy (yes, no); household location (urban, rural); macro region (North, Northeast, Center-West, Southeast, and South); number of residents in the household; number of household appliances in the household; number of vehicles in the household. Two interaction terms were also added: household registered in the FHS (Family Health Strategy) with urban house hold, and age with person with a chronic disease more health plan. These terms were tested considering theoretical conceptions about the joint influences of these variables in the exposure to participation in community activities by the elderly. As well, interaction terms have been used to increase the estimated probability in propensity score and so the common support area[26,29].

Statiscal Analysis

Two-stage propensity score weighting was used to control for lack of group homogeneity in relation to individual and contextual socioeconomic, demographic, and health covariates. Initially, the propensity score (PS) was taken as the conditional probability of an individual being exposed (receiving treatment), or for the purposes of this study participating in community activities, based on the observed covariates[26,29]. It is represented by a single variable that simultaneously considers all the potential confounding variables. Thus, individuals with the same propensity score have the same distribution of observed covariates, regardless of their exposure conditions[29-33].

The PS was estimated using binary logistic regression with the maximum likelihood method. This probability ranges from 0 to 1. Thus, each sample member had a conditional probability of (a propensity for) being exposed (social participation in community activities) based on the set of covariates tested in the proposed model. Thus, it is sought to reduce the dimensionality of a set of confounders to a single measure, and it is allowed that the units of analysis with similar EP have, on average, similar probabilities of receiving the treatment and distribution of the covariates. In the logistic regression that estimated the PS, it was decided for using the set of variables based on the theoretical conception of their importance. This method of estimation of the propensity score has been used by other authors[26,29-32].

With this, after estimating the PS, this was then used to calculate the inverse probability of selection (IPS), applying a probability of selection to each sample member (1/IPS those the exposed group and 1/(1 - IPS) for unexposed group to make the two groups homogenous and comparable[30-34]. As it was verified extreme weights derived from the PS, there was considered the use of stabilized weights in the construction of the IPS. For both groups we estimated the proportion (mean of numeric variables) and standard error of the selected covariates to make up the model for estimating the PS before and after inverse probability weighting in order to determine the pattern of distribution of covariates across the groups. In order to verify the imbalance of the covariate before and after weighting[29,31] it was estimated the standardized mean diferences, and variance analysis was performed using the *F-test*, where a p-value of >0.05 is considered to show homogeneity of variance[30,31]. Box plots were elaborated to illustrate the pattern of distribution of estimated probabilities before and after weighting[30,31]. The *F-test* statistic has been widely used as a way to verify the differences in the variances between the comparison groups, and to measure the loss and the extent of homogeneity between them[29-31,34].

Prevalence and 95% confidence intervals (CI95%) were estimated for positive self-assessment of overall health status according to variable exposure before and after weighting. Differences in the distribution of these frequencies were estimated using Pearson's chi-squared test with a significance level of p<0,05.

The association between social participation and positive self-assessment of overall health status (SAH) was estimated based prevalence ratio (PR) and respective 95% confidence intervals (CI95%) calculated using Poisson regression (crude and weighted by PS).

The analyses were performed using the SPSS® software package (version 23, SPSS Inc, Chicago, Illinois), which incorporates the effects of complex sample designs such as that of the 2013 NHS into all stages of analysis, including the estimation of the propensity score.

Ethical Aspects

The NHS was approved by the National Research Ethics Committee and all participants signed an informed consent form[27].

Results

The average age of the sample (n=7,712 older people ≥65 years) was 72 years (68-78), while the prevalence of social participation was 25.1% (CI95%: 23.4-26.9). In relation to the group of elderly people exposed to social participation, those not exposed presented a higher proportion of men, older people (≥80 years), nonwhite, no married, and household references, and were more likely to have primary completed/higher incomplete schooling, no work, live with other people, be in the lowest income quintiles, have a lower average number of chronic diseases, not have a health plan, live in rural areas and the Northeast of the country, and not own vehicles, most likely to be registered in the FHS and lower ownership of health plans (Table 1). Significant differences were observed in the standardized means differences before PS weighting in most categories of covariates, but differences were strongly reduced after PS weighting, reaching values close to zero. As well, the results of the *F-test* showed a reduction in the magnitude and loss of statistical significance of covariance across

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Table 1. Socioeconomic, demographic and health characteristics of older people (≥ 65 years; N = 7,712) and participation in social community activities before and after propensity score weighting[1], NHS[2]. Brazil, 2013.

Covariates	Sample before propensity score weighting				Sample after propensity score weighting			
	Participation in social activities in the community				Participation in social activities in the community			
	Yes (n=1,906)	No (n=5,806)	Standardized mean differences[3]	F-test[4]	Yes (n=8,031)	No (n=8,022)	Standardized mean differences[3]	F-test[5]
	% (Standard error)[3]	% (Standard error)[3]			% (Standard error)	% (Standard error)		
Female	64.0 (2.1)	54.0 (1.1)	0.253	59.56*	61.0 (0.5)	60.0 (0.5)	0.005	0.60
Old-aged (≥80 years)	14.0 (1.2)	22.0 (1.0)	0.014	55.95*	19.0 (0.4)	19.0 (0.4)	-0.005	0.03
Nonwhite	43.0 (2.0)	46.0 (1.2)	-0.157	6.59*	50.0 (0.6)	49.0 (0.6)	0.004	0.78
Married	53.0 (2.0)	49.0 (1.2)	0.081	8.6*	40.0 (0.5)	40.0 (0.5)	0.021	0.18
Household reference	67.0 (2.0)	64.0 (1.1)	0.015	4.3**	75.0 (0.5)	74.0 (0.5)	0.000	0.40
Schooling			0.066					
No schooling/primary incomplete	59.0 (2.1)	59.0 (1.1)	0.047	0.25	55.0 (0.6)	53.0 (0.6)	0.001	4.87**
Primary complete /higher incomplete	12.0 (1.2)	9.0 (0.6)	0.092	15.73*	11.0 (0.3)	12.0 (0.4)	0.005	2.87
Higher complete	3.0 (1.9)	7.0 (0.8)	0.148	58.61*	9.0 (0.3)	10.0 (0.3)	0.003	3.38
Ignored (No information)	16.0 (1.4)	26.0 (0.1)	-0.230	71.72*	25.0 (0.5)	25.0 (0.5)	-0.007	0.00
Currently working	16.0 (1.5)	13.0 (0.7)	0.042	9.89*	14.0 (0.4)	16.0 (0.4)	-0.001	2.67
Living alone	19.0 (1.2)	16.0 (0.6)	0.055	8.49*	31.0 (0.5)	32.0 (0.5)	-0.010	1.60
Total household income (R$)								
1st Quintile(0 to 709)	10.0 (0.9)	12.0 (0.6)	-0.078	9.0*	20.0 (0.4)	19.0 (0.4)	-0.020	0.45
2nd Quintile(710 to 1,354)	9.0 (0.9)	10.0 (0.7)	-0.027	4.29**	12.0 (0.4)	12.0 (0.4)	0.013	0.09
3rd Quintile(1,355 to 2,032)	26.0 (1.6)	28.0 (1.0)	-0.035	2.06	27.0 (0.5)	27.0 (0.5)	0.008	0.30
4th Quintile(2,033 to 3,599)	29.0 (1.9)	25.0 (1.0)	0.033	8.19*	19.0 (0.4)	21.0 (0.5)	0.000	3.78
5th Quintile(3,600 to 437,307)	27.0 (1.9)	24.0 (1.3)	0.101	5.0**	21.0 (0.5)	21.0 (0.5)	-0.000	0.18
Disability	24.0 (1.8)	24.0 (1.0)	-0.039	0.08	23.0 (0.5)	23.0 (0.5)	-0.003	0.62
Average number of chronic diseases[6]	2.20 (0.06)	1.9 (0.04)	0.139	41.1*	1.86 (0.018)	1.89 (0.018)	0.009	0.84
Health plan	38.0 (2.2)	29.0 (1.2)	0.197	59.56*	33.0 (0.5)	32.0 (0.5)	0.000	0.37
Registered in the FHS (Family Health Strategy)	53.0 (2.1)	58.0 (1.3)	-0.048	15.39*	57.0 (0.6)	55.0 (0.6)	0.005	4.29**

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Table 1. Socioeconomic, demographic and health characteristics of older people (≥ 65 years; N = 7,712) and participation in social community activities before and after propensity score weighting[1], NHS[2]. Brazil, 2013.

Covariates	Sample before propensity score weighting				Sample after propensity score weighting			
	Participation in social activities in the community			F-test[4]	Participation in social activities in the community			F-test[5]
	Yes (n=1,906) % (Standard error)[3]	No (n=5,806) % (Standard error)[3]	Standardized mean differences[3]		Yes (n=8,031) % (Standard error)	No (n=8,022) % (Standard error)	Standardized mean differences[3]	
Urban Location of household	88.0 (1.0)	84.0 (0.7)	0.139	16.79*	81.0 (0.4)	81.0 (0.4)	0.007	0.05
Macro region								
North	5.0 (0.8)	5.0 (0.3)	-0.065	0.0	14.0 (0.4)	15.0 (0.4)	0.011	3.07
Northeast	22.0 (1.3)	26.7 (0.9)	-0.073	20.28*	31.0 (0.5)	30.0 (0.5)	-0.009	0.28
Center-West	5.0 (0.5)	6.0 (0.3)	0.022	2.16	12.0 (0.4)	10.0 (0.3)	-0.000	8.31*
Southeast	49.0 (1.9)	48.0 (1.1)	0.031	0.68	30.0 (0.5)	29.0 (0.5)	-0.005	0.74
South	19.0 (1.4)	14.0 (0.6)	0.096	28.23*	13.0 (0.4)	16.0 (0.4)	0.007	7.0*
Average number of household appliances	7.92 (0.06)	8.18 (0.04)	-0.120	43.65*	8.35 (0.017)	8.34 (0.017)	-0.013	0.01
Average number of vehicles (car and motorbike)	2.53 (0.06)	2.39 (0.02)	0.123	43.33*	2.31 (0.008)	2.33 (0.008)	0.007	1.21
Interaction terms								
H0ousehold registered in the FHS*urban household	44.0 (2.1)	47.0 (1.2)	0.013	3.9**	44.0 (0.6)	42.0 (0.6)	0.007	3.2
Age*person_with_a_chronic disease*health_plan	66.15 (4.63)	47.68 (2.77)	0.172	44.03*	51.26 (1.12)	52.74 (1.18)	-0.001	0.39
Total	25.0 (0.9)	75.0 (0.9)	---	---	50.0 (0.4)	50.0 (0.4)	---	---

Notes: [1]Inverse probability of selection of the estimated propensity score; [2]National Health Study; [3]Estimates made incorporating all characteristics covered by the complex sampling design of the NHS. Brazil, 2013; [4]Analysis of variance: *F-test* = F-test of the squares of two samples; [5]Analysis of variance: *F-test* = F-test of the squares of two samples after weighting using the estimated propensity score according to the covariates presented in the table; [6]Chronic diseases reported by health professionals (high blood pressure, type 1 diabetes, cholesterolaemia, heart disease, stroke, asthma, arthritis, back problems, WMSD, depression, mental disorders, pneumonia, cancer, kidney disease and other chronic morbidities). *0.0001; **$p < 0.05$.

the two groups after weighting. Homogeneity of variance was shown for the majority of covariates that were imbalanced before weighting. But, since the sample size is large, the possibility of obtaining a significant *F-test* should be considered (Table 1).

Less than half of the sample gave a positive assessment of their overall health status. However, the prevalence of positive assessment was significantly higher in the exposed group. After weighting, the prevalence of positive self-assessment changed from 47.7% (CI95%: 44.0-51.5; p=0.002) for 48.0% (CI95%: 46.0-51.0; p<0.001), without considering the differences in the distribution of covariates between the two groups (Table 2).

Figure 1 demonstrates that the PS has a similar distribution across both groups, confirming that propensity score weighting balanced the socioeconomic, demographic and health variables across the two groups.

Finally, the results obtained from both the crude and weighted logistic regression models show that there was a positive association between participation in community activities and positive health assessment. However, the magnitude of the association obtained using the weighted model (PR: 1.15; CI95%: 1.08-1.22) indicates that it is necessary an adjustment of measure of the association obtained by the crude model (PR: 1.21; CI95%: 1.14-1.28). Thus, considering the homogeneity of variance across groups after weighting, the exposed group were 15% more likely to provide a positive assessment of their overall health status (Table 3).

Discussion

Around a quarter of the elderly people mentioned that they participated in community activities and those that participated these activities were more likely to provide a positive assessment of their overall health status than those who were unexposed to these activities. In concordance with the results of other studies, the present study observed important differences in the individual and contextual socioeconomic, demographic, and health characteristics of older people who participate in community activities and those who do not[3,6,8,9,12,14,18,19,35], suggesting common characteristics associated with this practice. In general, it was observed that unexposed older people had worse socioeconomic conditions, depended more on public transport and health services, and lived in settings associated with greater material deprivation and social infrastructure. Studies show that older people who are more vulnerable from socioeconomic and health point of view are more likely to live in areas where the access to such services and opportunities is irregular and precarious[9,12,13,35,36]. Furthermore, cumulative disadvantage over the life course can hinder adhesion to or maintenance of social participation in community activities in old age[6,11].

The prevalence of social participation in community activities still varies widely between countries. In the present study, this prevalence was lower than that found by a study of elderly Chinese people living in the United States[18], elderly from Ghana[7], Canada[6,8], United States[13], Japan, Australia, Germany, the United Kingdom, Switzerland and Denmark, albeit showing that social participation declined over time and with age[3,6-8,24] and varies by sex[8].

In Brazil, few studies have investigated social engagement and participation among the elderly. A study conducted in 2007 with 361 older people (≥60 years) in a health district in the southeast of the city of Belo Horizonte observed that 26% reported participating in group recreation or artistic activities[4], while a study carried out in 2008 with

Table 2. Prevalence and CI95% of positive overall health self-assessment and participation in community activities among older people ≥ 65 years (N = 7,712) before and after propensity score weighting[1], NHS[2]. Brazil, 2013.

Participation in community activities	Positive self-assessment of overall health[3]					
	Before propensity score weighting			After propensity score weighting		
	%	CI95%	p-value	%	CI95%	p-value
Yes	47.7	44.0-51.5	0.002	48.0	46.0-51.0	0.001
No	40.8	38.6-41.1		40.0	39.0-41.0	
Total	42.5	40.6-43.0	---	43.8	42.7-44.9	---

Notes: [1]Inverse probability of selection of the estimated propensity score; [2]National Health Survey; [3]Positive assessment based on the aggregation of the answers good and very good. CI95%: 95% confidence interval.

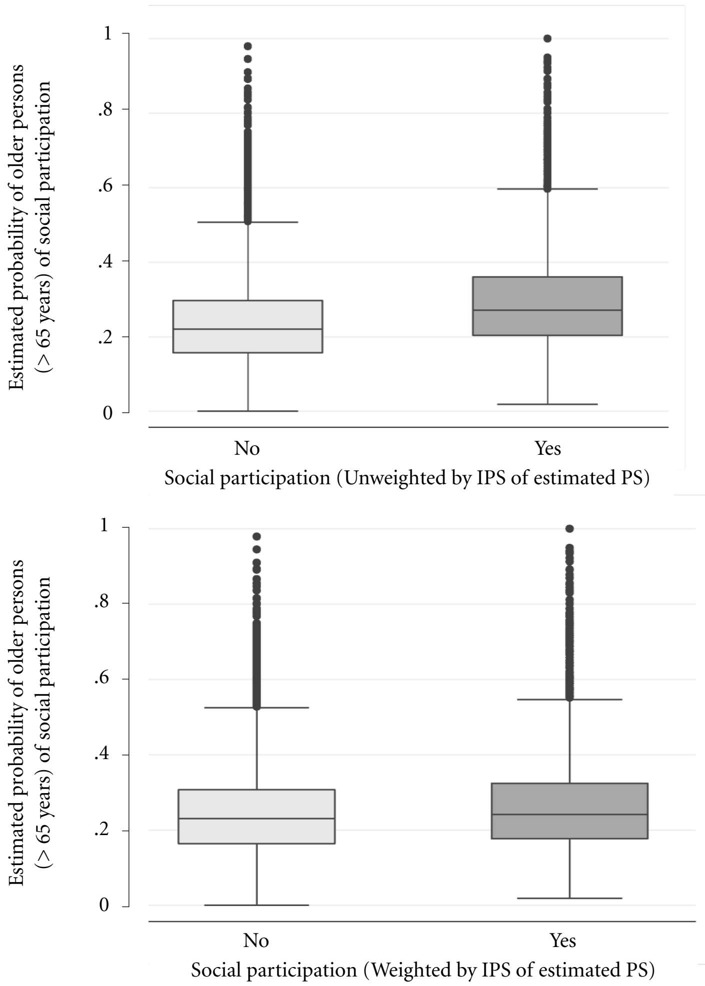

Figure 1. Probability of older people (≥ 65 years; N = 7,712) participating in community activities based on the covariates used to estimate PS[1], before and after weighting using IPS[2], NHS[3]. Brazil, 2013.

Notes: [1]Propensity score; [2]Inverse probability of selection; [3]National Health Survey.

Table 3. Association between participation in community activities and positive overall health self-assessment in older people (≥ 65 years; N = 7,712) using crude and weighted Poisson regression[1], NHS[2]. Brazil, 2013.

Participation in community activities	Positive overall health self-assessment[3]			
	Crude analysis		Weighted using IPS of estimated PS	
	PR	CI95%	PR	CI95%
Yes	1.21	1.14-1.28*	1.15	1.08-1.22*
No	1.00	----	1.00	----

Notes: [1]Inverse probability of selection of the estimated propensity score by covariates: sex, age (years), color/race, marital status, household reference person, level of schooling, currently working, total household income in reals (in quintiles), physical, intellectual, hearing, or visual disability; number of chronic physical or mental diseases, health plan, household registered in the FHS (Family Health Strategy), urban household location, macro region number of residents in the household, number of household appliances in the household, number of vehicles in the household, and two interaction terms (household registered in the FHS with urban house hold, and age with person with a chronic disease more health plan); [2]National Health Survey; [3]Positive assessment based on the aggregation of the answers good and very good. CI95%: 95% confidence interval; PR: Prevalence Ratio.

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89 older persons living in Juiz de Fora in the State of Minas Gerais (MG) showed that 52.8% were active members of community groups[25]. More recently, a study included 935 surviving elderly from the cohort of the city of Bambuí-MG, presented a prevalence of 17.4%[15]. Other study analyzed prevalence rates and gender and age differences in indicators of active aging in elders participating in the *Campinas Municipal Health Survey in Campinas*, São Paulo State (2014-2015). The prevalence varied from 23.3% and 89.0% depending on the type of activity, but it only differed statistically between the sexes in participation in religious activity ($p<0.001$), between age groups no differences[14]. Lastly, study conducted in a representative sample of the Brazilian population aged 50 years and older and who lived in urban areas (n=7,935) observed prevalence of social participation 81.8% for women and 82.0% for men[35].

Such differences could be explained not only by differences in values, beliefs and social norms across countries, regions, states and cities but also by access to community services, elderly care and support networks, which can vary considerably by context. Another explanation may be differences in type of activities, in the criteria and research methods used to determine social participation, which can fragment or aggregate the dimensions of social life and result in differing prevalence rates[3,12,35]. However, despite variations between countries that may affect the interpretation of our findings, the present study was the first of its kind in Brazil: to estimate the prevalence of social participation using a nationally representative sample of urban and rural elderly; to use propensity score weighting to overcome observed differences in homogeneity across study groups; and to capture the association between social participation and positive SAH.

SAH status has been used by different studies as a key indicator for assessing and monitoring old people's health[2,6,16]. Studies conducted in other countries have also shown the association between SAH and social participation[3,6-9,13,17-20]. The prevalence of positive SAH in this study was similar the other research[2,4,6], but our study points similar the international studies that the prevalence of positive SAH was higher among the elderly who participate in social activities in the community[6,7,8,11]. These results are also consistent with researches that the social engagement and the nature of social relations positively affect the overall health status and well-being of the elderly independent of individual and contextual socioeconomic, demographic and health factors.

Between the explanations for this association are that high levels of social support (interactions with friends and relatives and frequenting social centers and community groups, religions, organizations or civil associations) can act to improve quality of life and are protective factor for health[6,3,11]. It is argued that active social participation in associational activities may promote access to vital health-related information, which may enhance health-promoting choices and SAH[7]. Socially isolated individuals have at increased risk for poor health outcomes because of their limited access to resources such as medical care, information, and emotional support[21].

Formal or informal local community support provides access to resources, good, services and assistance that can complement or meet the needs of the elderly and their families[3,13,36]. Limited social support can therefore mean that elderly people have less capacity to cope with adversity and lead to negative health behaviors (for example, social isolation, physical inactivity, functional disability, and depression)[3,6,13,36] until all-cause and cause-specific mortality[15,16]. Social participation in community activities can strengthen social support networks, even among people from more underprivileged backgrounds, mitigating hardship and acting as a protective factor against health[12,13,20,36]. However, the majority of studies remain based on stratified analysis and multivariate regression[6,9,12,13,20,31]. One of the disadvantages of this approach is that these methods have inherent limitations when it comes to determining homogeneity across exposed and unexposed groups. We therefore believe that the findings of this study can help to improve the understanding of the relationship between participation in community activities and positive SAH status of older people in Brazil.

On the other hand, it is important to highlight some of the study's limitations. First, social participation in community activities can vary according to the number, duration and type of activity or service, interpersonal relations and social setting in which they occur. This diversity may partially reflect differing needs among the older persons who participate in the activities, as well as the size and source of their resources. But the dichotomous classification of this variable assumes that variations in exposure to this variable are irrelevant or too small to alter the observed effects. Furthermore, cross-sectional studies are limited in their ability to determine direction of causality, because the interaction between social relations and health is bidirectional and may change over the life course: a decline in health status restricts social relations, while a reduction in the latter is a repetitive and prospective predictor of mortality and acute morbidity. However, in the case of this study it seems unlikely that older people first make a positive assessment of their health and then become interested in frequenting clubs, community or religious groups, or social centers for the elderly. Rather, we believe that the health benefits result from social participation. Our results are consistent with some longitudinal studies have found similar results[8,9,37]. One of the limitations of the NHS is that it did not select older people living in temporary or makeshift accommodation, who may be more vulnerable (not participating in social activities), and long-term care facilities (where the elderly may be exposed to good or poor quality activities depending on the facility)[27].

Despite these limitations, the weighted model used by this study provides a useful alternative method for guaranteeing a higher degree of internal validity and ensure that results are representative of the vast majority of the country's elderly population, which has similar characteristics to the variables observed by this study. Population-based studies have also used propensity score weighting to ensure greater compatibility between exposed and no exposed groups[26,30]. This method provides an unbiased estimate of the exposure effect close to that which would be obtained from the random assignment of individuals to study groups, as in randomized studies[27,30,33,34]. Indicated that it is necessary an adjustment of measure of the association obtained by the crude model, which can be overestimated because of the lack of homogeneity between the comparison groups.

This is important, because without propensity score weighting the group that participated in social community activities would not be comparable to the group that did not participate, given the distinct individual and contextual opportunities and propensities related to social and community engagement. Therefore, health studies need to consider these differences in the profiles of elderly people who engage in these activities.

Thus, these limitations do not detract from the importance of the findings of this study in relation to social and community engagement among the elderly, since they were obtained using probability sampling to produce a sample that is representative of the Brazilian population across all regions of the country, enabling an accurate estimate of the phenomenon under study and showing that population aging in Brazil is a dynamic, complex, heterogeneous, and inequitable process.

Conclusion

The findings show that, despite generally low levels of social participation in community activities among older people in Brazil, there is a positive association between participation and positive self-assessment of overall health status, confirming that engagement in these activities provides important gains for the health, well-being and quality of life of this population group. The government and civil society organizations should therefore work together to promote the participation of elderly people in clubs, community and religious groups, and social centers for the elderly in order to increase social interaction, strengthen social and emotional support, and extend the benefits of social participation to a greater proportion of Brazil's growing elderly population.

Collaborations

BLCA Oliveira participated in the design, data analysis, interpretation of results, writing of the manuscript. SF Lima, ASV Costa, AM Silva and MTSSB Alves performed results interpretation and manuscript writing. All authors approved the final version of the article.

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