

# Association between social network and functional disability in brazilian elderly

*Associação entre rede social e incapacidade funcional em idosos brasileiros*

*Asociación entre red social y discapacidad funcional en ancianos brasileños*

**Danielle Samara Tavares de Oliveira-Figueiredo<sup>1</sup>**

ORCID: 0000-0001-6513-6257

**Mariana Santos Felisbino-Mendes<sup>2</sup>**

ORCID: 0000-0001-5321-5708

**Gustavo Velasquez-Melendez<sup>2</sup>**

ORCID: 0000-0001-8349-5042

<sup>1</sup>Universidade Federal de Campina Grande. Cuité, Paraíba, Brazil.

<sup>2</sup>Universidade Federal de Minas Gerais. Belo Horizonte, Minas Gerais, Brazil.

## How to cite this article:

Oliveira-Figueiredo DST, Felisbino-Mendes MS, Velasquez-Melendez G. Association between social network and functional disability in brazilian elderly. Rev Bras Enferm. 2021;74(3):e20200770. <https://doi.org/10.1590/0034-7167-2020-0770>

## Corresponding author:

Danielle Samara Tavares de Oliveira Figueiredo  
E-mail: daniellesamara@hotmail.com



EDITOR IN CHIEF: Antonio José de Almeida Filho  
ASSOCIATE EDITOR: Ana Fátima Fernandes

**Submission:** 08-15-2020    **Approval:** 10-21-2020

## ABSTRACT

**Objective:** to verify the association between social network and functional disability in elderly Brazilians. **Methods:** a cross-sectional study with secondary data of 11,177 elderly people, available on Brazilian Institute of Geography and Statistics' website. Social network components were having trusted friends/relative, living with their spouse, practicing social activity, performing voluntary or paid work. The outcome was functional disability, measured by the difficulty in performing instrumental and basic activities of daily living. Logistic regression models were used. **Results:** disability prevalence for instrumental activities was 28.0% (95%CI: 26.7-29.4), and for basic activities, 15.5% (95%CI: 14.4-16.6). Not having components social network components was associated with greater chances of functional disability, especially among women. **Conclusion:** there was an association between not having social network components with functional disability. There are differences in this association according to sex. Strengthening actions that expand social network can reduce the chance of this outcome in elderly people.

**Descriptors:** Aged; Social Networking; Social Support; Activities of Daily Living; Physical Functional Performance.

## RESUMO

**Objetivo:** verificar associação entre rede social e incapacidade funcional em idosos brasileiros. **Métodos:** estudo transversal, com dados secundários de 11.177 idosos, disponíveis no site do Instituto Brasileiro de Geografia e Estatística. Os componentes da rede social foram: possuir amigos e familiares de confiança, viver com o cônjuge, praticar atividade social, realizar trabalho voluntário ou remunerado. O desfecho foi a incapacidade funcional, aferida pela dificuldade no desempenho de atividades instrumentais e básicas da vida diária. Utilizaram-se modelos de regressão logística. **Resultados:** a prevalência de incapacidade para atividades instrumentais foi 28,0% (IC95%: 26,7-29,4), e para atividades básicas, 15,5% (IC95%: 14,4-16,6). Não possuir componentes da rede social se associou a maiores chances de incapacidade funcional, especialmente entre as mulheres. **Conclusão:** houve associação entre não possuir componentes da rede social com incapacidade funcional. Há diferenças nessa associação segundo sexo. Fortalecer ações que ampliem a rede social pode reduzir a chance desse desfecho em idosos.

**Descritores:** Idoso; Rede Social; Apoio Social; Atividades Cotidianas; Desempenho Físico Funcional.

## RESUMEN

**Objetivo:** verificar la asociación entre red social y discapacidad funcional en ancianos brasileños. **Métodos:** estudio transversal, con datos secundarios de 11.177 ancianos, disponible en el sitio web del Instituto Brasileño de Geografía y Estadística. Los componentes de la red social fueron: tener amigos y familiares de confianza, convivir con el cónyuge, ejercer actividad social, realizar trabajo voluntario o remunerado. El resultado fue la discapacidad funcional, medida por la dificultad para realizar las actividades básicas e instrumentales de la vida diaria. Se utilizaron modelos de regresión logística. **Resultados:** la prevalencia de discapacidad para actividades instrumentales fue 28,0% (IC 95%: 26,7-29,4), y para actividades básicas, 15,5% (IC 95%: 14,4-16,6). No tener componentes de la red social se asoció con mayores posibilidades de discapacidad funcional, especialmente entre las mujeres. **Conclusión:** hubo asociación entre no tener componentes de la red social con discapacidad funcional. Existen diferencias en esta asociación según el sexo. Fortalecer las acciones que amplíen la red social puede reducir la posibilidad de este resultado en las personas mayores.

**Descriptorios:** Anciano; Red Social; Apoyo Social; Actividades Cotidianas; Rendimiento Físico Funcional.

## INTRODUCTION

Functionality maintenance and disability prevention among elderly people are growing concerns, especially due to the rapid proportional increase of this population in the world and in Brazil<sup>(1-2)</sup>. Elderly people may be more susceptible to reduced functional performance due to the physiological decline secondary to age and, also, due to the high prevalence of multimorbidity<sup>(3)</sup>. Functional disability consists of difficulty or disability to perform Instrumental Activities of Daily Living (IADL) and/or Basic Activities of Daily Living (ADL), resulting in a complex relationship between health conditions, individual and environmental factors<sup>(4-5)</sup>.

IADLs express cognitive integrity and enable autonomy and independence, for example, managing one's own money, going out alone or taking medicine. ADL, on the other hand, are tasks of daily self-care, essential to human survival, such as dressing, eating, bathing, among others<sup>(6-7)</sup>. The occurrence of functional disability has been associated with dependence, worsening quality of life, reduced life expectancy, increased mortality, greater use and costs with health services, especially with prolonged hospitalizations and readmissions<sup>(8-10)</sup>.

Longitudinal evidence states that reduced social networks are associated with onset of functional disability in elderly people<sup>(11-12)</sup>. The greater participation of elderly people in social activities has been associated with lower chances and or risks of disability<sup>(13-14)</sup>. On the other hand, the types of social relationships, in addition to social network size, can be important predictors of functional decline and social vulnerability in elderly people<sup>(15)</sup>.

The social network consists of social relationships, interactions and links between individuals, being related to health and psychosocial mechanisms<sup>(13)</sup>. They are important determinants of active and successful aging<sup>(16)</sup> and the quality of life of elderly people<sup>(8)</sup>. Social networks can be divided into informal networks, which derive from bonds with friends and relative and formal networks, in which bonds are derived from social participation in leisure or in social production activities, such as paid or voluntary work<sup>(13)</sup>.

In the Brazilian population, the relationship between social network and functional disability has been little studied. There is little information about which type of social network (informal or formal) has the greatest impact on the health of elderly people. Some studies use composite indexes of participation and social network, which makes it impossible to examine the potential impact of different social network components on elderly people's functional performance<sup>(9,11)</sup>. Previous studies are limited to non-representative samples, and most of them analyze the relationship between morbidities and disability<sup>(3,17)</sup>.

There are also controversies about the role of sex in the association between social network and functional disability<sup>(8,14)</sup>. Studies show that the effect of not having social relationships for the occurrence of functional decline, especially for the performance of IADLs, is stronger for women<sup>(14-15)</sup>. On the other hand, previous research has not shown a differential association depending on sex<sup>(17)</sup>. Faced with a context of progressive population aging, investigating factors that are not only biological that may be related to functional disability can contribute to nursing and gerontology in order to propose actions and care that overlap with the biomedical model. The results of this study can be useful for nurses and health

teams in understanding the influence of social networks on the functionality of elderly people. This knowledge is important for the implementation of intersectoral community actions aimed at strengthening social networks and encouraging intergenerational social relations, especially within primary care. Furthermore, this study can contribute to public health, in order to provide subsidies for policies and programs to promote active and healthy aging, with a view to planning intersectoral actions aimed at expanding the participation of elderly people in society. Thus, it starts from the following research question: is there an association between social network and functional disability in elderly people?

## OBJECTIVE

To verify the association between social network and functional disability in elderly Brazilians.

## METHODS

### Ethical aspects

This research was carried out with secondary data available to the public domain on the website of the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística*) (<https://www.ibge.gov.br/>). The study complied with national and international guidelines for research involving human beings.

### Design, period, and place of study

This is an observational, cross-sectional study, which used secondary data from the Brazilian National Health Survey (PNS - *Pesquisa Nacional de Saúde*), being guided by the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) tool. PNS was carried out in all Brazilian states and the Federal District, and data collection took place between 2013 and 2014<sup>(18)</sup>. Thus, the present study was conducted with data on elderly people from all over Brazil, being representative for the 26 states and Federal District<sup>(18)</sup>.

### Population and sample: inclusion and exclusion criteria

The population was composed of 60,202 PNS participants<sup>(19)</sup>. A random sample of 11,177 elderly people was included in this study, who answered questions about activities of daily living; characteristics of social support; chronic diseases; sociodemographic aspects, among others. Simple random sampling was used, which minimizes the possibility of selection bias. Interviews answered by the head of the family were excluded, rather than by elderly people, on issues related to functionality, in order to minimize the occurrence of measurement bias. In multiple models, the sample number was 10,517 elderly people due to the presence of missing values in variables of chronic diseases, which were used as confounding variables in the adjusted logistic models.

### Study protocol

The questionnaire used in the PNS data collection was prepared by professionals who are experts in population surveys

and by members of the various technical areas of the Ministry of Health<sup>(18)</sup>. Then, it was subjected to a pilot test carried out by means of a random selection of 46 census sectors and 644 households distributed in Acre, Espírito Santo, Goiás, Mato Grosso do Sul, Rio de Janeiro, and Sergipe States. Training was provided for 31 people, including interviewers and field workers. Afterwards, the procedures and the questionnaire went through corrections and adjustments to satisfactorily meet the research needs and also to avoid possible measurement bias<sup>(18)</sup>.

For data collection, handheld microcomputers were used by the interviewers. The latter received technical and theoretical training to conduct one-to-one interviews with residents of the selected households to compose the sample<sup>(18)</sup>. In this study, PNS questions contained in the following questionnaire modules were used: module D (educational characteristics of people aged 5 years and over); module E (work of household residents); module K (health of individuals aged 60 or over and characteristics of social support); module Q (chronic diseases).

The exhibits of interest in this study were formal and informal social network components. Concerning the formal social network components, the following variables were included: 1) Participation in social activity. It was considered that elderly people participated in social activity when they claimed to attend at least one of the following group activities: clubs for seniors or religious groups or community centers; 2) Performing paid work; 3) Performing voluntary work in the last 12 months<sup>(13)</sup>. These three variables were categorized in a dichotomous way (0 - yes; 1 - no).

Contacts with trusted friends and relative were considered as an informal social network. In this study, a friend or trusted relative is one that elderly people feel comfortable talking about different aspects of their lives. To this end, the following PNS questions were used: with how many friends do you feel at ease and can talk about almost everything? (without considering relatives or relatives). How many relatives or relatives do you feel comfortable with and can talk about almost everything? These two variables were categorized into: 0 - one or more friends or relative; 1- none friend or none relative. The variable lives with a spouse or partner was also used, whose answer options were 0 - yes or 1 - no.

The dependent variable was functional disability, determined by the self-report of difficulty or disability to perform ADL (eating, bathing, dressing, going to the bathroom, walking from room to room and lying and getting out of bed alone) and IADL (shopping, managing finances, taking medicine and going out alone)<sup>(4)</sup>.

Elderly people were considered to be disabled for IADL when they answered the options "cannot do it", "has great difficulty" or "has little difficulty" in at least one of the five IADLs. Likewise, they were considered to be disabled for ADL when they answered the options "can't do it" or "has great difficulty" or "has little difficulty" in at least one of the seven questioned ADLs. Those who answered the option "have no difficulty" were considered without functional problems.

The individual effects of variables that made up the formal and informal network were analyzed for functional disability occurrence. After that, to minimize the possibility of confusion bias, multiple logistic models were adjusted for confounding factors.

Confounding factors were considered: the age group, categorized as 60 to 69 years old; 70 to 79 years and 80 years or more; the level of education (12 years or more; 9 to 11 years and 0 to 8 years of study); health conditions, as measured by the presence of two or more chronic diseases (diabetes mellitus, hypertension, heart failure, stroke, asthmatic asthma or bronchitis, low back pain, sciatica or herniated disc, cancer, chronic kidney disease); depression.

### Analysis of results, and statistics

Descriptive analyzes and logistic regression models were performed, unadjusted and adjusted by confounders, stratified by sex. The forward criterion was used, in which all variables selected in the bivariate step ( $p < 0.20$ ) were inserted one by one in each logistic model. The association magnitudes were measured in Odds Ratio, with respective 95% confidence intervals. To adjust the final models, the Goodness-Of-Fit Test and the Wald Test were used. A significance level of 5% was adopted. The analyzes were performed with the aid of Stata 14.1, within the survey module, considering the complex sampling plan to obtain population estimates.

## RESULTS

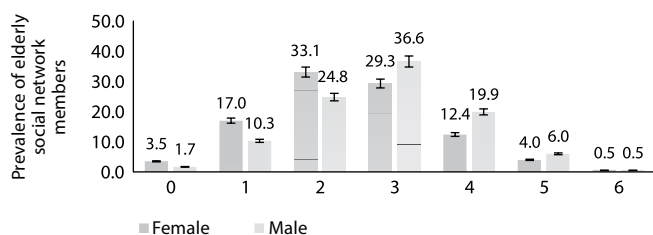
The majority was female (56.4%), white (53.6%), and aged between 60 and 69 years (56.4%) (Table 1). Most also had between 0 and 8 years of study (77.7%), were retired (76.3%), lived in an urban area (85.2%) and in the southeast (47.7%).

The prevalence of disability for IADL was 28.0%, and for ADL, 15.5%. As for elderly people's social network components, in general, it was observed that a large part had one or more friends (60.4%) and one or more relatives that they could trust (88.2%). Most did not live with their spouse (42.6%), did not participate in social activities, such as club for seniors, community and religious movements (74.9%) and did not exercise paid work (78.4%) or volunteer (90.4%) (data not shown).

When the prevalence of the simultaneity of social network components present among elderly people was observed, it was observed that women have a higher prevalence of none to three simultaneous social network components, suggesting a smaller network. Men, on the other hand, have a higher prevalence of three to five simultaneous components, suggesting that they have a greater social network (Figure 1).

It was observed that elderly women who do not live with their partner (Adjusted OR=1.89; 95% CI: 1.50-2.37), who do not participate in social activity (Adjusted OR=1.88; 95% CI: 1.48-2.39) and perform none voluntary work (Adjusted OR 1.81; 95% CI: 1.16-2.82) or paid (Adjusted OR=3.36; 95% CI: 2.26-4, 98) showed greater chances of being unable to perform IADL, when compared to elderly women who have the respective social components (Table 1).

Concerning the disability to perform ADL among women, only the variable "have friends they can trust" did not remain associated in multivariate analysis. For women, not having the other social network components was associated with disability to perform self-care activities, regardless of education, age group, depression or multimorbidity (Table 2).



Source: Brazilian National Health Survey, 2013.

**Figure 1** – Prevalence of the simultaneous presence of elderly Brazilians social network components, according to sex. Brazilian states and Federal District, Brazil, 2013

Among men, when also controlled by social network components, only two variables of formal social network remained associated with disability in IADL, namely: participation in social activity (adjusted OR=2.23 95% CI: 1.59-3.12) and paid work (adjusted OR=3.42; 95% CI: 2.34-5.00) (Table 3). In this male group, the only variable that remained associated with disability to perform ADL, in multivariate analysis, was not having paid work (adjusted OR=1.97; 95% CI: 1.20-3.22) (Table 4). In contrast, for women, the disability for ADL, in multivariate analysis, was associated with the absence of informal network components (not having relatives, not living with a spouse) and with the absence of formal network components (not participating in social activities), not performing paid and/or voluntary work) (Table 2).

**Table 1** – Prevalence and association of individual social network components with incapacity to perform instrumental activities in elderly Brazilian women, Brazilian states and Federal District, Brazil, 2013

Social network components	n*	%†	Disability for at least one of the instrumental activities					
			Unadjusted OR ‡	IC95%	Adjusted OR §	IC95%	Adjusted OR	IC95%
Have friends they can trust One or more (Ref.)								
None	1.050	37.3	1.59	1.34-1.90	1.36	1.11-1.66	1.19	0.96-1.47
Have relatives they can trust One or more (Ref.)								
None	276	34.9	1.2	0.93-1.54	1.33	1.00-1.77	1.13	0.84-1.54
Living with a partner Yes (Ref.)								
No	1.723	38.6	2.3	1.90-2.79	1.84	1.47-2.30	1.89	1.50-2.37
Participation in social activities Yes (Ref.)								
No	1.752	35.6	2.13	1.76-2.59	2.11	1.68-2.66	1.88	1.48-2.39
Paid work Yes (Ref.)								
No	2.116	34.7	5.86	4.15-8.29	3.48	2.30-5.25	3.36	2.26-4.98
Voluntary work Yes (Ref.)								
No	2.102	33.6	3.79	2.67-5.38	2.46	1.63-3.73	1.81	1.16-2.82

Source: Brazilian National Health Survey, 2013. \*Sample number; †Population proportion estimates; ‡Unadjusted odds ratio and 95% confidence interval; §Adjusted Odds Ratio by age group, education, depression and presence of chronic diseases with a 95% confidence interval; ||Adjusted Odds Ratio by age group, education level, depression, presence of chronic diseases and all social network variables, with a 95% confidence interval.

**Table 2** - Prevalence and association of individual components of the social network with disability to perform basic activities in elderly Brazilian women, Brazilian states and Federal District, Brazil, 2013

Social network components	n*	%†	Disability for at least one of the basic activities					
			Unadjusted OR ‡	IC95%	Adjusted OR §	IC95%	Adjusted OR	IC95%
Have friends they can trust One or more (Ref.)								
None	527	20.2	1.56	1.26-1.93	1.41	1.10-1.79	1.2	0.93-1.55
Have relatives they can trust One or more (Ref.)								
None	173	22.1	1.51	1.11-2.05	1.61	1.15-2.26	1.43	1.01-2.04
Living with a partner Yes (Ref.)								
No	852	19.9	1.83	1.44-2.33	1.45	1.11-1.90	1.43	1.09-1.87
Participation in social activities Yes (Ref.)								
No	905	19.3	2.29	1.77-2.97	2.36	1.78-3.13	2.09	1.56-2.80
Paid work Yes (Ref.)								
No	1.055	17.9	2.95	1.79-4.87	1.8	1.04-3.11	1.72	1.01-2.94
Voluntary work Yes (Ref.)								
No	1058	17.8	3.59	2.38-5.42	2.56	1.66-3.96	1.79	1.11-2.89

Source: Brazilian National Health Survey, 2013. \*Sample number; †Population proportion estimates; ‡Unadjusted odds ratio and 95% confidence interval; §Adjusted Odds Ratio by age group, education, depression and presence of chronic diseases with a 95% confidence interval; ||Adjusted Odds Ratio by age group, education level, depression, presence of chronic diseases and all social network variables, with a 95% confidence interval.

**Table 3** – Prevalence and association of individual social network components with disability to perform instrumental activities in elderly males, Brazilian states and Federal District, Brazil, 2013

Social network components	n*	% †	Disability for at least one of the instrumental activities					
			Unadjusted OR ‡	IC95%	Adjusted OR §	IC95%	Adjusted OR	IC95%
Have friends they can trust								
One or more (Ref.)								
None	519	27.3	1.27	0.95-1.71	1.28	0.98-1.67	1.15	0.88-1.52
Have relatives they can trust								
One or more (Ref.)								
None	182	29.9	1.29	0.92-1.81	1.55	1.10-2.17	1.38	0.98-1.94
Living with a partner								
Yes (Ref.)								
No	447	31.4	1.3	0.97-1.75	1.46	1.08-1.98	1.34	0.99-1.82
Participation in social activities								
Yes (Ref.)								
No	936	26.3	1.28	0.85-1.92	2.30	1.62-3.25	2.23	1.59-3.12
Paid work								
Yes (Ref.)								
No	960	30.9	3.26	2.07-5.13	3.49	2.41-5.04	3.42	2.34-5.00
Voluntary work								
Yes (Ref.)								
No	1.033	24.7	1.69	0.88-3.22	1.37	0.73-2.58	1.07	0.56-2.02

Source: Brazilian National Health Survey, 2013. \*Sample number; †Population proportion estimates; ‡Unadjusted odds ratio and 95% confidence interval; §Adjusted Odds Ratio by age group, education, depression and presence of chronic diseases with a 95% confidence interval; ||Adjusted Odds Ratio by age group, education level, depression, presence of chronic diseases and all social network variables, with a 95% confidence interval.

**Table 4** – Prevalence and association of individual social network components with disability to perform instrumental activities in elderly males, Brazilian states and Federal District, Brazil, 2013

Social network components	n*	% †	Disability for at least one of the basic activities					
			Unadjusted OR ‡	IC95%	Adjusted OR §	IC95%	Adjusted OR	IC95%
Have friends they can trust								
One or more (Ref.)								
None	316	16	1.27	0.95-1.71	1.14	0.83-1.57	1.08	0.77-1.50
Have relatives they can trust								
One or more (Ref.)								
None	122	17.1	1.29	0.92-1.81	1.37	0.96-1.96	1.29	0.89-1.87
Living with a partner								
Yes (Ref.)								
No	268	16.7	1.3	0.97-1.75	1.21	0.87-1.69	1.15	0.82-1.60
Participation in social activities								
Yes (Ref.)								
No	547	14.7	1.28	0.85-1.92	1.18	0.76-1.84	1.12	0.72-1.76
Paid work								
Yes (Ref.)								
No	563	17.7	3.26	2.07-5.13	2.00	1.22-3.27	1.97	1.20-3.22
Voluntary work								
Yes (Ref.)								
No	615	14.6	1.69	0.88-3.23	1.26	0.60-2.64	1.19	0.57-2.47

Source: Brazilian National Health Survey, 2013. \*Sample number; †Population proportion estimates; ‡Unadjusted odds ratio and 95% confidence interval; §Adjusted Odds Ratio by age group, education, depression and presence of chronic diseases with a 95% confidence interval; ||Adjusted Odds Ratio by age group, education level, depression, presence of chronic diseases and all social network variables, with a 95% confidence interval.

## DISCUSSION

In general, for both sexes, it was found that formal network components play a large role in elderly people's functionality. Not participating in social activity was associated with greater chances of disability for IADLs in both sexes; therefore, they can potentially increase the chance of this outcome, regardless of age, educational level, having multimorbidity and depression. Other studies with transversal and longitudinal data, carried out in several countries, corroborate these findings<sup>(13-14,20-21)</sup>.

In this investigation, participation in social activity was considered when elderly people claimed to perform at least one group activity. It was evident that the lack of participation in

community or religious groups, or even in community centers, was a variable that increased the chances of disability among elderly people. These practices can play an important role in maintaining functionality through a variety of mechanisms. First, engaging in social activities requires the use of complex brain functions, which requires cognitive efforts that can mitigate neuronal functional decline, which occurs because of age<sup>(22)</sup>.

Second, engaging in social activities can increase recreational activities that reduce the risks of depression and anxiety associated with future cognitive disorders<sup>(22)</sup>. Moreover, pleasure in social relationships relieves stress and, consequently, reduces the production of cortisol. This decreases the risk of cognitive decline<sup>(22)</sup>. Another mechanism that can explain the lack of practice of social activities



and greater chances of disability would be the improvement of physical and psychosocial condition that these activities promote, in addition to preventing social isolation and generating benefits for active aging and improving the quality of life<sup>(14,21,23-24)</sup>.

Among the formal social network components, not having paid work was, in general, the activity that showed the greatest magnitude of association for disability in IADL and ADL in both sexes, even after control by potential confounders. Previous studies have observed a protective effect of paid work for functional declines and a risk effect for disability among retired elderly people<sup>(24-25)</sup>.

Paid work, as a social activity of production, can provide an increase in income, ties of cooperation and interaction, a greater number of social contacts and a greater social contribution<sup>(24,26)</sup>. Additionally, it involves competitive stimulation which, to some extent, can be beneficial, as it determines work goals that keep workers active, contributing to maintain functional capacity<sup>(27)</sup>.

In this study, not doing voluntary work also increased the chances of functional disability for the performance of IADL by 81% among women, a result not found among men. An investigation carried out in Japan also showed that not practicing voluntary work increases the chances of difficulties for IADL, but only for men<sup>(14)</sup>. Due to the positive biopsychosocial mechanisms of voluntary work, not practicing this activity can be associated with depressive symptoms, worse health perception, less social integration and, consequently, be associated with disabilities, higher mortality and occurrence of dementia<sup>(14,28)</sup>.

Furthermore, informal social network absence can play an important role in functional deterioration, especially among women. In this investigation, women who do not live with their spouse were more likely to be disabled in IADL and ADL than those who live. However, among elderly men, this difference was not significant.

The absence of a partner in old age can be associated with disabilities, because, when becoming a widower, elderly people increase the probability of poor health, increasing the chance of hospitalization by 70%, and those who divorce are more likely to live in homes for elderly people, consequently being able to reduce their social network<sup>(29)</sup>. These elderly people without a partner have less relative support, being able to use health services more, as the presence of a partner could replace formal caregivers and, also, could help maintain social bonds, maintaining functionality<sup>(29)</sup>.

The relationship between not having trusted relatives and functional disability was only observed among women. Throughout their lives, they are more dependent on household support for assistance with domestic activities, preparing meals and caring for their children. Relatives can be a source of physical-emotional support, and this helps to relieve tensions, stress and division of tasks. Women who do not have trusted relatives can accumulate these social roles attributed to the female gender, which could explain their greater susceptibility to disability in old age compared to those who have this type of relative support.

Likewise, in this study, not having trusted friends increased the chance of functional disability for IADL and ADL among women in models adjusted by confounders. On the other hand, when adjusting the models also for other social network components, there was no association. This relationship was also not evident among men. In a cohort, it was observed that maintaining friendship relationships outside the home was a protective factor for

functional loss, due to the mechanisms of mutual affection and leisure involved in these relationships<sup>(27)</sup>.

This study adds to the previous ones, as it found that formal social networks can have a greater contribution in elderly people's functionality. This means that those who are not socially engaged can increase the chances of acquiring functional disability. In this investigation, it was also found that, for elderly women, the lack of informal networks (especially relative and spouse) is also associated with disabilities, for men, these associations were not significant after adjustments by confounders.

### Study limitations

Some limitations of this study need to be considered. First, a self-reported disability measure was used, subject to some degree of inaccuracy in the prevalence of the outcome. However, this metric has been used frequently in epidemiological investigations, allowing comparisons with other studies<sup>(20)</sup>. It is added that direct measures are difficult to be applied in large populations.

There were also limitations inherent to the cross-sectional design, as it allows for the existence of reverse causality, since disability can also influence the establishment of social relationships. However, other studies, including longitudinal and theoretical models of functionality/disability and social determination of health, support and ratify some of the results found in the present investigation<sup>(14,24,30)</sup>. In addition, most participants in this research were independent, which presumes the ability to interact socially.

### Contributions to nursing, health, and public policy

The findings of this study may contribute to the field of gerontological nursing, as it broadens the understanding that healthy aging and the prevention of disabilities also involve psychosocial factors, such as elderly people's social networks. This knowledge is useful to improve health care and assistance, going beyond the hegemonic biomedical model. These results can help public policy managers and health professionals to prioritize actions and services that enhance elderly people's social support network, especially the relationships derived from social participation.

### CONCLUSION

Not having formal and informal social network components was associated with disability to perform IADL and ADL in elderly Brazilians, regardless the presence of multimorbidity and sociodemographic factors, such as age group and education. Specifically, do not participate in group social activities, clubs for seniors or community, religious and/or community centers and do not perform productive activities, such as paid work, can play a predominant role and independent of other characteristics in the deterioration of functionality of elderly men and women. Probably, the influence of not having informal social network members (trusted relatives and living with a spouse) may have a greater impact on elderly women.

### ACKNOWLEDGMENT

We would like to acknowledge the Minas Gerais State Research Support Foundation (FAPEMIG - *Fundação de Amparo à Pesquisa*

do Estado de Minas Gerais) (grant PPM0071316). The Nursing Post-Graduation Program, Nursing School, Universidade Federal de Minas Gerais, and the Coordination for the Improvement of Higher

Education Personnel (*Coordenação de Aperfeiçoamento de Pessoal de Nível Superior*). Interinstitutional Doctorate Project (DINTER). Agreement 002/15-00 (UFMG/UFCEG Agreement) of 12/03/2015.

## REFERENCES

1. World Health Organization. Ageing and health [internet]. 2018 [cited 2018 Oct 09]. Available from: <https://www.who.int/news-room/fact-sheets/detail/ageing-and-health>
2. Miranda GMD, Mendes ACG, Silva ALD. Population aging in Brazil: current and future social challenges and consequences. *Rev Bras Geriatr Gerontol*. 2016;19(3):507-19. <https://doi.org/10.1590/1809-98232016019.150140>
3. Costa-Filho AM, Mambrini JVM, Malta DC, Lima-Costa MF, Peixoto SV. Contribution of chronic diseases to the prevalence of disability in basic and instrumental activities of daily living in elderly Brazilians: the National Health Survey (2013). *Cad Saúde Pública*. 2018;34(1):e00204016. <https://doi.org/10.1590/0102-311x00204016>
4. Vebrugge LM, Jette AM. The disablement process. *Soc Sci Med*. 1994;38(1):1-14. [https://doi.org/10.1016/0277-9536\(94\)90294-1](https://doi.org/10.1016/0277-9536(94)90294-1)
5. World Health Organization (WHO). International Classification of Functioning, Disability and Health. [Internet]. 2001 [cited 2018 Nov 14]. Available from: <http://www.who.int/classifications/icf/en/>
6. Katz S, Morris WS. Functional assessment in geriatrics: a review of progress and directions. *J Am Geriatr Soc*. 1989;37(3):267-72. <https://doi.org/10.1111/j.1532-5415.1989.tb06820.x>
7. Lawton MP, Brody EM. Assessment of older people: self-maintaining and instrumental activities of daily living. *Gerontol*. 1969;9(3):179-86. [https://doi.org/10.1093/geront/9.3\\_Part\\_1.179](https://doi.org/10.1093/geront/9.3_Part_1.179)
8. Ćwirlej-Sozańska AB, Wiśniowska-Szurlej A, Wilmowska-Pietruszyńska A, Sozański B. Factors associated with disability and quality of life among the oldest-old living in community in Poland: a cross-sectional study. *Ann Agric Environ Med*. 2020;1-8. <https://doi.org/10.26444/aem/115020>
9. Nielsen LM, Kirkegaard H, Ostergaard LG, Bovbjerg K, Breinholt K, Maribo T. Comparison of self-reported and performance-based measures of functional ability in elderly patients in an emergency department: implications for selection of clinical outcome measures. *BMC Geriatr*. 2016;16(1):199. <https://doi.org/10.1186/s12877-016-0376-1>
10. Forjaz MJ, Rodriguez-Blazquez C, Ayala A, Rodriguez-Rodriguez V, Pedro-Cuesta J, Garcia-Gutierrez S, et al. A chronic conditions, disability, and quality of life in older adults with multimorbidity in Spain. *Eur J Intern Med*. 2015;26(3):176-81. <https://doi.org/10.1016/j.ejim.2015.02.016>
11. Brito TRP, Nunes DP, Duarte YAO, Lebrão ML. Social network and older people's functionality: health, well-being, and aging (SABE) study evidences. *Rev Bras Epidemiol*. 2018;21(suppl 2):e180003. <https://doi.org/10.1590/1980-549720180003.supl.2>
12. Schafer MH. (Where) Is Functional Decline Isolating? disordered environments and the onset of disability. *J Health Soc Behav*. 2018;59(1):38-55. <https://doi.org/10.1177/0022146517748411>
13. Escobar-Bravo MA, Puga-Gonzalez D, Martín-Baranera M. Protective effects of social networks on disability among older adults in Spain. *Arch Gerontol Geriatr*. 2012;54(1):109-16. <https://doi.org/10.1016/j.archger.2011.01.008>
14. Tomioka K, Kurumatani N, Hosoi H. Age and gender differences in the association between social participation and instrumental activities of daily living among community-dwelling elderly. *BMC Geriatr*. 2017;17(1):99. <https://doi.org/10.1186/s12877-017-0491-7>
15. Cappelli M, Bordonali A, Giannotti C, Montecucco F, Nencioni A, Odetti P, et al. Social vulnerability underlying disability among older adults: a systematic review. *Eur J Clin Invest*. 2020;50(6):e13239. <https://doi.org/10.1111/eci.13239>
16. Maia CML, Castro FV, Fonseca AMG, Fernández MIR. Redes de apoio social e de suporte social e envelhecimento ativo. *Int J Dev Sci*. 2016;1(1):293-303. <https://doi.org/10.17060/ijodaep.2016.n1.v1.279>
17. Yokota RTC, Moura L, Andrade SS, Sá NN, Nusselder WJ, Van Oyen H. Contribution of chronic conditions to gender disparities in disability in the older population in Brazil, 2013. *Int J Public Health*. 2016;61(9):1003-12. <https://doi.org/10.1007/s00038-016-0843-7>
18. Damascena GN, Szwarcwald CL, Malta DC, Souza-Jr PRB, Vieira MLFP, Pereira CA, et al. O processo de desenvolvimento da Pesquisa Nacional de Saúde no Brasil, 2013. *Epidemiol Serv Saúde*. 2015;24(2):197-206. <https://doi.org/10.5123/S1679-49742015000200002>
19. Souza-Jr PRB, Freitas MPS, Antonaci GA, Szwarcwald. Sampling Design for the National Health Survey, Brazil. 2013. *Epidemiol Serv Saúde*. 2015;24(2):207-16. <https://doi.org/10.5123/S1679-49742015000200003>
20. Hsiao-Wei YU, Duan-Rung C, Tung-Liang C, Yu-Kang, Va-Mei C. Disability trajectories and associated disablement process factors among older adults in Taiwan. *Arch Gerontol Geriatr*. 2015;60(1):272-80. <https://doi.org/10.1016/j.archger.2014.12.005>
21. Kanamori S, Kai Y, Aida J, Kondo K, Kawachi I, Hirai H, et al. Social participation and the prevention of functional disability in older Japanese: the JAGES cohort study. *PLoS ONE*. 2014;12(9):e99638. <https://doi.org/10.1371/journal.pone.0099638>
22. Flatt JD, Hughes TF. Participation in social activities in later life: does enjoyment have important implications for cognitive health? *Aging Health*. 2013;9(2):149-58. <https://doi.org/10.2217/ahe.13.11>

23. Campos ACV, Ferreira EF, Vargas AMD. Determinants of active aging according to quality of life and gender. *Ciênc Saude Coletiva*. 2015;20(7):2021-237. <https://doi.org/10.1590/1413-81232015207.14072014>
  24. Fujiwara Y, Shinkai S, Kobayashi E, Minami U, Suzuki H, Yoshida H, et al. Engagement in paid work as a protective predictor of basic activities of daily living disability in Japanese urban and rural community-dwelling elderly residents: an 8-year prospective study. *Geriatr Gerontol Int*. 2016;16(1):126-34. <https://doi.org/10.1111/ggi.12441>
  25. Westerlund H, Kivimäki M, Singh-Manoux A, Melchior M, Ferrie JE, Pentti J, et al. Self-rated health before and after retirement in France (GAZEL): a cohort study. *Lancet*. 2009;374(9705):1889-96. [https://doi.org/10.1016/S0140-6736\(09\)61570-1](https://doi.org/10.1016/S0140-6736(09)61570-1)
  26. Staudinger UM, Finkelstein R, Calvo E, Sivaramakrishnan K. A global view on the effects of work on health in later life. *Gerontologist*. 2016;56(Suppl 2):S281-92. <https://doi.org/10.1093/geront/gnw032>
  27. D'orsi E, Xavier AJ, Ramos LF. Work social support and leisure protect the elderly from functional loss: EPIDOSO Study. *Rev Saúde Públ*. 2011;45(4):1-7. <https://doi.org/10.1590/S0034-89102011000400007>
  28. Hayley G, Liana M. Volunteering in the Community: Potential Benefits for Cognitive Aging. *J Gerontol B Psychol Sci Soc Sci*. 2018;73(3):399-408. <https://doi.org/10.1093/geronb/gbx134>
  29. Goda GS, Shoven JB, Slavov SN. Does widowhood explain gender differences in out-of-pocket medical spending among the elderly? [Internet]. Cambridge (MA): National Bureau of Economic Research; 2011 [cited 2019 Aug 25];19(2):152-60. Available from: <http://www.nber.org/papers/w17440.pdf>
  30. Geib LTC. Social determinants of health in the elderly. *Ciênc Saúde Coletiva*. 2012;17(1):123-33. <https://doi.org/10.1590/S1413-81232012000100015>
-