



Low supply of social support as risk factor for mortality in the older adults



Tábatta Renata Pereira de Brito^{a,*}, Daniella Pires Nunes^b, Ligiana Pires Corona^c,
Tiago da Silva Alexandre^d, Yeda Aparecida de Oliveira Duarte^e

^a Federal University of Alfenas, Rua Gabriel Monteiro da Silva, 700, Centro, Alfenas, Minas Gerais, CEP: 37130-000, Brazil

^b Department of Nursing, Federal University of Tocantins, Quadra 109 Norte, Avenida NS-15, ALCNO-14, Plano Diretor Norte, Palmas 77001-090, Brazil

^c University of Campinas, R. Pedro Zaccaria, 1300, Caixa Postal 1068, Limeira, SP, CEP 13484-350, Brazil

^d Department of Gerontology, Federal University of São Carlos, Rod. Washington Luís, km 235, SP-310, São Carlos, SP, CEP 13565-905, Brazil

^e Department of Medical Surgical Nursing, School of Nursing University of São Paulo, Av. Dr. Enéas de Carvalho Aguiar, 419 - 05403-000, São Paulo, SP, Brazil

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ABSTRACT

Objectives: To determine the relationship between social support and mortality in older adults, independent of other health conditions.

Method: This was a longitudinal study using the database of the 2006 SABE Study (Heath, Well-being and Aging), composed of 1413 individuals aged 60 years and over, living in São Paulo/Brazil. The present study used a questionnaire constructed for the SABE Study, which was reviewed by experts of Latin America and the Caribbean. The social network was evaluated using the variables: social support received; social support offered; number of members in the social network. The covariates included were age, gender, living arrangements, marital status, income, education, comorbidity, depressive symptoms, cognition and functional difficulties. Death as an outcome was evaluated after four years of follow-up.

Results: From a total of 1413 older adults at baseline, 268 died in a mean follow-up period of 3,9 years (SE = 0,03). In the model adjusted offering social support and having networks composed of 9 or more members reduced the risk of death in the older adults.

Conclusions: This study suggest that older adult who are offered support can benefit from mutual exchanges since reciprocity in relationships improves psychological well-being and is indicative of the quality of relationships. Thus, the older adults are part of a group of people whose role is not only to receive, but also to provide help to others, and the support offered seems to be as important as that received.

1. Introduction

The term “social network” can be understood as a form of social bonding where different types of mutual aid link individuals to defined groups of relatives, friends or acquaintances (Bowling, 1997; McDowell & Newell, 1996; O’Reilly, 1988). The social network is the web of social relationships which an individual maintains, including their closest relationships (such as family and close friends) and more formal relationships (such as other individuals and groups) (Seeman, 1996). In addition to the structural aspects (size and composition), social networks are composed of functional aspects. The “social support” is the primary function of the networks and also promoting construction of themselves (Meneses, 2007).

Since the early 1950s several studies have attempted to explain the relationship between social support networks and the health status of individuals (Muramatsu, Yin, & Hedeker, 2010; Stephens, Alpass,

Towers, & Stevenson, 2011). A pioneering study on this subject by Émile Durkheim in 1897, demonstrated the link between the occurrence of suicides and the lack of a network of consistent relationships in society (Durkheim, 1951). Since then, many studies have linked the presence of social networks with different levels of health and disease. The effects of social support networks on older adults can be seen principally through their functional performance (D’Orsi, Xavier, & Ramos, 2011; James, Boyle, Buchman, & Bennett, 2011), quality of life (Atkins, Naismith, Luscombe, & Hickie, 2013; Gallegos-Carrillo, 2009), depression (Ciao, Weng, & Botticello, 2011), subjective well-being (Adams, Leibbrandt, & Moon, 2011), and cognitive decline (James, Wilson, Barnes, & Bennett, 2011). According to these authors, having only a few social contacts may promote the development of disability and decreased physical function, worsen the perception of quality of life, and consequently exacerbate depressive symptoms, while participating in social activities and maintaining multiple

* Corresponding author.

E-mail addresses: tabatta.brito@unifal-mg.edu.br (T.R.P. de Brito), dpiresnunes@yahoo.com.br (D.P. Nunes), lillypires@gmail.com (L.P. Corona), tsfisioalex@gmail.com (T. da Silva Alexandre), yedaenf@usp.br (Y.A. de Oliveira Duarte).

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relationships can improve functional performance. Social networks have been found to have protective effects on mortality, and involvement in numerous social networks with strongly established ties is associated with decreased mortality (Blazer, 1982; Holt-Lunstad, Smith, & Layton, 2010; Julianne, Timothy, & Layton, 2010; Kaplan et al., 1988; McLaughlin, Leung, Dobson, & Almeida, 2011; Seeman et al., 1993).

The first large study on social relationships and mortality reported data from a probabilistic sample of 2229 men and 2496 women, who were between 30 and 69 years of age, living in Alameda County, California. In this study, the low social support index was considered a significant predictor of mortality (Berkman & Syme, 1979). House, Robbins, & Metzner (1982) and Schoenbach, Kaplan, Fredman, & Kleinbaum (1986) replicated and expanded the results of the Alameda County study and showed that the level of social support received was inversely related to mortality. In 1987, Seeman, Kaplan, Knudsen, Cohen, & Guralnik, 1987 published the mortality data from seventeen years of the Alameda County study, demonstrating the relative importance of social ties as predictors of survival among the older adults. Still in this vein, important review studies have consistently shown the increased risk of death among individuals with a low number of and low-quality social relationships (House, Landis, & Umberson, 1988). Although some studies (Holt-Lunstad, Smith, & Layton, 2010; Julianne, Timothy, & Layton, 2010; McLaughlin, Leung, Dobson, & Almeida, 2011) have shown a relationship between social support and mortality, little is known about this relationship in older adults Brazilians (people aged 60 years or more). Understanding this relationship may assist in the implementation of public policies to promote the reorganization of family roles and help the State to confront the new living arrangements that are being established. The aim of this study is to determine the relationship between social support and mortality in older adults, independent of other health conditions.

2. Method

Data came from the Health, Well-being and Aging study (SABE). SABE is a panel study that began in 2000 with a representative cohort of 2143 participants living in Sao Paulo, Brazil, aged 60 years and over. Detailed description of the study and sampling has been published previously (Lebrão, 2003). The baseline sample was obtained with a two-stage stratified sampling method, following the framework of the 1996 National Household Survey based on geographic areas of the city, either an oversample of 75 years and over group.

In 2006, the original cohort was contacted, and 1115 people were re-interviewed. Losses were due to 649 deaths, 178 refusals, 139 individuals who were not located, 51 address changes, and 11 institutionalizations. An additional cohort of 298 individuals 60 to 64 years of age was included to compensate for the aging in the population base of the study and maintain its representative for the entire age range (60 years or older). Considering the participants who remained in the cohort and those who entered the 2006 wave, 1413 older adults were interviewed. The sampling weights assigned in 2000 were recalculated to ensure the representativeness of the 2006 sample in relation to the population 60 years or older living in the city of Sao Paulo (Moura, Andrade, Duarte, Lebrão, & Antunes, 2015). The sampling technique used in the SABE study has been described in full detail elsewhere (Silva, 2003). The present study was conducted with baseline characteristics measured in 2006, and the outcome measured in 2010.

2.1. Mortality

Mortality data were confirmed through files of the state and municipal mortality system in Brazil. For the present analyses, follow-up time was defined as the period from the first visit in 2006 until the day of death or the last contact date.

2.2. Social network and Social Support

Considering the multidimensional nature of the theoretical concepts of social network and support, there is no consensus in the literature regarding the most appropriate instrument to measure (Hutchison, 1999). The present study used a questionnaire constructed for the SABE Study, which was reviewed by experts of Latin America and the Caribbean (Lebrão, 2003). The social network was evaluated using the variables: “social support received”, “social support offered”, and “number of members in the social network.” The older adults who received at least one type of social support (financial, material, out-of-home tasks, housework, personal care, companionship, and emotional support) from at least one member of the network (members residing in the same household as the older adults individual, children who did not live in the same household as the older adults individual, and other relatives and friends) was coded as “yes” in the variable “social support received”. Likewise, the older adults who offered at least one type of social support to at least one other member of the network was coded as “yes” in the variable “social support offered”. The variable “number of members in the network” was subdivided into four categories according to distribution quartiles. The cutoff point for each category was established according to the first, second, and third distribution quartiles.

2.3. Covariables

Socio-demographic characteristics. Age, gender, marital status, income and education of the older adult. Age was grouped in three 10-year categories, with individuals aged 80 years or older combined into a single group. Marital status was classified as married (married individuals or those in a stable relationship) and not married (divorced, separated, single/never married or widowed individuals). Insufficient income (question “Do you consider that you have enough money to cover your daily expenses?” yes/no); Education (number of years that the older adult participant had attended school, categorized as: 0/illiterate, 1–3 years, 4–7 years, ≥ 8 years). The living arrangements were grouped based on co-residence between generations: the older adult living alone; living only with a spouse; living with children and no grandchildren (with or without the presence of a spouse and/or sons in law/daughters in law); living with children and grandchildren (with or without the presence of a spouse and/or sons in law/daughters in law); other arrangements composed of relatives or non-relatives.

Health status. The presence of comorbidity was evaluated according to the number of diseases self-reported by the older adult subject (no disease, one disease, two or more diseases). Disability was assessed using the modified version of the Katz Activity of Daily Living scale (ADLs) (Katz, Ford, Moskowitz, Jackson, & Jaffe, 1963), and the Lawton Instrumental Activities of Daily Living scale (IADLs) (Lawton & Brody, 1969). Respondents were asked if they had difficulty in performing activities of daily living (ADLs) tasks (transferring, toileting, bathing, dressing, feeding and walking) (Hughes, Edelman, Singer, & Chang, 1993). Despite its importance in terms of functionality among older adults, incontinence was not included in the ADLs because it does not necessarily imply physical limitations (Guralnik & Simonsick, 1993). For IADLs, respondents were asked whether they were able to perform eight activities (use a telephone, shop, prepare meals, perform light housework, take medications, manage money, do heavy housework and use transportation) (Lawton, 1971). Older adults who reported difficulty in at least one activity were considered as having a disability. Cognitive status was assessed using the modified version of the Mini Mental State exam (MMSe) due to the low level of schooling of the Brazilian elderly population (Folstein, Folstein, & Mchugh, 1975). Participants with a cutoff score of ≤ 12 were considered to have cognitive impairment (Icaza & Albala, 1999). Depressive symptoms were assessed using the geriatric depression Scale (Almeida & Almeida, 1999; Sheikh & Yesavage, 1986). Participants with a score of ≥ 6 were considered to have depressive symptoms (Almeida & Almeida, 1999).

2.4. Statistical analyses

All the deaths which occurred during the 4 years of follow-up were examined. Differences in baseline characteristics between the survivors or those who had died or been lost to follow-up were assessed using the Wald test and the chi-square test with the Rao and Scott correction. For all analyses $p < 0.05$ was used to indicate statistical significance. The survival curves were analyzed according to the Kaplan-Meier method to explore the impact of the characteristics of the home support network on survival. Differences between curves were evaluated using the log-rank test. The assumption of proportional hazards was verified graphically by means of a log-log plot of the response variable. Unadjusted and adjusted hazard ratios (HR) and 95% confidence intervals (CI) for mortality according to the characteristics of the home support network were calculated using Cox proportional hazard models. As the data came from multistage cluster sampling, sample weights were employed in all the analyses. The Stata 11.0[®] program (StataCorp, College Station, TX) was used for all data analysis.

3. Results

From a total of 1413 older adults at baseline, 268 died in a mean follow-up period of 3,9 years (SE = 0,03). The majority of the sample was women (59,4%), with aged between 60 and 69 years (58,7%), married (57,4%), with 4–7 years of schooling (38,6%), independent to perform ADL and IADL (77,3% and 69,0%, respectively) and having two or more diseases (55,0%) (Table 1).

No statistically significant difference was observed between the baseline characteristics of the older adults re-interviewed in 2010 including those who had died, and the characteristics of those lost during the monitoring period.

In the univariate analysis, there were statistically significant differences between the survival curves for the following variables: gender, age, education, marital status, ADL disability, IADL disability, comorbidity, cognitive impairment, social support received, social support offered and number of members in the network. (Tables 2 and 3).

Table 4 displays the results of Cox proportional hazards model for mortality. In the model adjusted for gender, age, living arrangements, comorbidity, cognitive impairment, depressive symptoms, ADL and IADL disabilities, offering social support (HR = 0.66), having networks composed of 9–11 members (HR = 0.67) and having networks composed of 12 or more members (HR = 0.58) reduced the risk of death in the older adults.

4. Discussion

As in other studies, an association was observed between the social support network and mortality in older adults (Holt-Lunstad, Smith & Layton, 2010; Hill, Uchino, Eckhardt, & Angel, 2016; Julianne, Timothy, & Layton, 2010; McLaughlin, Leung, Dobson, & Almeida, 2011). The risk of death among the older adults was lower among those who offered support and who had networks composed of nine or more members, regardless of gender, age, living arrangements difficulty in performing ADLs, number of reported illnesses, cognitive impairment and depressive symptoms. However, any comparisons between the results should be made with caution, since there was a large difference in how the social support was measured in these studies.

It should be emphasized that research focusing on the role of support offered to the older adults is scarce in the literature. The studies cited above, both those that showed the impact of the networks on death, did not consider the social support received and offered separately. However, reciprocity in relationships has been associated with higher levels of physical and mental health, which may help to explain our results. Older adult who are offered support can benefit from mutual exchanges since reciprocity in relationships improves

Table 1

Characteristics of total sample at baseline and by status in the older adults residents of Sao Paulo, Brazil (2006) n = 1413.

Variables	Baseline (%)
Age	
60–69 years	58.7
70–79 years	30.1
80 years or over	11.2
Gender	
Female	59.4
Male	40.6
Education	
Illiterate	15.7
1 to 3 years	26.5
4 to 7 years	38.6
8 years or more	19.2
Insufficient Income	
No	44.9
Yes	55.1
Marital status	
Married	57.4
Not married	42.6
ADLs disability	
No	77.3
Yes	22.7
IADLs disability	
No	69.0
Yes	31.0
Comorbidity	
No diseases	16.9
one disease	28.1
two or more diseases	55.0
Cognitive impairment	
No	87.8
Yes	12.2
Depressive symptoms	
No	85.7
Yes	14.3
Living arrangements ^a	
Live alone	13.3
Only with spouse	23.9
With children	28.9
With children and grandchildren	19.4
Other arrangements	14.5

^a Living with children (living with children and no grandchildren with or without the presence of a spouse and/or sons in law/daughters in law); living with children and grandchildren (with or without the presence of a spouse and/or sons in law/daughters in law); other arrangements (composed of relatives or non-relatives).

psychological well-being and is indicative of the quality of relationships. A lack of reciprocity in relationships can cause feelings of dependence, indebtedness and inferiority which lead to stress reactions and negatively affect the health of the individuals involved, which is perhaps the factor that increases the risk of death (Chandola, Marmot, & Siegrist, 2007; Siegrist, 2005; Vaananen et al., 2005).

Moreover, it would be in the interest of individuals, throughout life, to assume both the role of providers and recipients of support, as part of their process of social interaction (Dowd, 1975). Thus, the older adults are part of a group of people whose role is not only to receive, but also to provide help to others, and the support offered seems to be as important as that received, according to the results of this study.

It was observed that having networks composed of nine or more members increased the survival of the older adults. Living with many people can increase the possibility of establishing tension relations due to the proximity of members, which has negative repercussions. As networks are also composed of other family members and friends, larger networks can increase the possibilities of exchange, without necessarily increasing the tension between its members, since the proximity between the members is smaller and relationships with friends tend not to obey the same obligations as family relationships.

Other studies have shown that larger networks are beneficial as they

Table 2
Characteristics of older adults residents of Sao Paulo, Brazil, by death, 2006–2010. (n = 1413).

Variables	Death (% ^a)	Log-rank test p	Unadjusted Model HR (95% IC)
Age			
60–69 years	26.14	0.000	1.00
70–79 years	35.22		2.72(1.72–4.32)
80 years or over	38.64		9.08(6.01–13.7)
Gender			
Female	52.13	0.000	1.00
Male	47.87		0.65(0.51–0.83)
Education			
Illiterate	25.85	0.000	1.00
one to three years	20.41		0.62(0.45–0.87)
4–7 years	39.64		0.54(0.39–0.74)
8 years or more	14.10		0.50(0.33–0.75)
Insufficient Income			
No	55.27	0.895	1.00
Yes	44.73		1.01(0.79–1.30)
Marital Status			
Married	49.80	0.000	1.00
Not married	50.20		1.51(1.18–1.94)
ADLs disability			
No	44.70	0.000	1.00
Yes	55.30		2.98(2.34–3.81)
IADLs disability			
No	29.50	0.000	1.00
Yes	70.50		3.27(2.50–4.26)
Comorbidity			
No disease	14.61	0.008	1.00
one disease	19.15		1.01(0.65–1.58)
two or more diseases	66.24		1.52(1.03–2.22)
Cognitive impairment			
No	61.69	0,000	1,00
Yes	38.31		3,79(2,96–4,86)
Depressive symptoms			
No	82.67	0,574	1,00
Yes	17.33		1,12(0,74–1,70)

^a Proportions were calculated considering the weight of the sample.

Table 3
Characteristics of older adults residents of Sao Paulo, Brazil, by living arrangements, social network and death, 2006–2010. (n = 1413).

Variables	Death (% ^a)	Log-rank test p	Unadjusted Model HR (95%IC)
Living arrangements^b			
Live alone	17.21	0.861	1.00
Only with spouse	20.52		1.02(0.68–1.52)
With children	26.53		1.04(0.72–1.52)
With children and grandchildren	21.58		1.21(0.82–1.80)
Other arrangements	14.16		1.05(0.68–1.62)
Social support received			
No	5.58	0.025	1.00
Yes	94.42		1.89(1.08–3.32)
Social support offered			
No	28.47	0.000	1.00
Yes	71.53		0.51(0.39–0.66)
Number of members in the network			
1–5	37.86		1.00
6–8	29.24	0.416	0.88(0.66–1.18)
9–11	19.02	0.168	0.79(0.57–1.10)
12 or more	13.88	0.001	0.45(0.28–0.71)

^a Proportions were calculated considering the weight of the sample.

^b Living with children (living with children and no grandchildren with or without the presence of a spouse and/or sons in law/daughters in law); living with children and grandchildren (with or without the presence of a spouse and/or sons in law/daughters in law); other arrangements (composed of relatives or non-relatives).

Table 4
Cox Proportional Hazards Model predicting mortality during a 4 years follow-up period among older adults residents in Sao Paulo, Brazil (2006–2010).

Variable	Adjusted Model ^a HR (95%CI)
Social support offered	
No	1.00
Yes	0.66(0.48–0.91)
Number of members in the network	
1–5	1.00
6–8	0.94(0.69–1.29)
9–11	0.67(0.46–0.97)
12 or more	0.58(0.35–0.96)

^a Adjusted model by gender, age, living arrangements, comorbidity, cognitive impairment, depressive symptoms, ADLs disability and IADLs disability.

represent a greater possibility of exchanges of support (Seeman et al., 1993; Youm et al., 2014).

As already observed in the research by Lena and Kua (2011), the findings of this study suggest that confidence in the informal care provided by the traditional living arrangements may not be the best option for dealing with the growing demand for care that accompanies the aging Brazilian population. Government policies which support families and offer a variety of care options are needed.

The strengths of this study are the fact that it was a study carried out with a large sample of older adult community residents, representative of the older adult population of the city of Sao Paulo (one of the great metropolitan areas of the world), in addition to being pioneering in Latin America by studying the older adults survival in relation to their support network. A limitation lies in the fact that satisfaction variables related to the support received and offered were not included in the analysis.

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