

IMPACT OF HOUSEHOLD ARRANGEMENT ON THE DEVELOPMENT OF THE FUNCTIONAL CAPACITY OF ELDERLY

IMPACTO DO ARRANJO DOMICILIAR NA EVOLUÇÃO DA CAPACIDADE FUNCIONAL DE IDOSOS

EFFECTOS DEL ARREGLO DOMICILIAR EN LA EVOLUCIÓN DE LA CAPACIDAD FUNCIONAL DE ADULTOS MAYORES

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ABSTRACT

Objective: to compare evolution of the functional capability of elderly people by living arrangements (alone, with other people and change of the living arrangement), controlling for other variables. **Material and method:** this was a population-based cohort study that occurred between 2005 and 2012 with 623 community-dwelling elderly people. A descriptive statistical analysis and mixed models were performed ($p < 0.05$). **Results:** in the graphic of trends, it was observed a functional decline in all groups. The elderly who lived alone showed higher scores of functional capability along the study. Nevertheless, it did not reach significance in the comparison among the groups. In analysis of mixed models, it was observed that the explicative variables of the functional decline were higher age (estimate=0,067; $p < 0,001$) as well as the number of morbidities (estimate=0,357; $p < 0,001$). **Conclusion:** the results suggest that the alterations of the organism and the gradual increase of morbidities impact on the functional decline of community-dwelling elderly over the years, regardless of the living arrangement.

Keywords: Aged; Family; Activities of Daily Living; Aging; Geriatric Nursing.

RESUMO

Objetivo: comparar a evolução da capacidade funcional entre os idosos que moravam sós, acompanhados e com mudanças do arranjo domiciliar, ajustando para outras variáveis. **Material e método:** trata de um estudo de coorte de base populacional realizado com idosos comunitários. Realizou-se análise estatística descritiva e modelos mistos ($p < 0,05$). **Resultados:** no gráfico de tendência, observou-se declínio funcional em todos os grupos. Os idosos que moravam sós apresentaram maiores escores de capacidade funcional no decorrer do estudo; porém, não se evidenciou diferença significativa na comparação entre os grupos. Na análise de modelos mistos, verificou-se que as variáveis explicativas do declínio funcional foram a maior idade (estimativa=0,067; $p < 0,001$) e o maior número de morbidades (estimativa=0,357; $p < 0,001$). **Conclusão:** os resultados sugerem que as alterações fisiológicas do organismo com o passar dos anos somadas ao aumento gradual das morbidades podem impactar no declínio funcional de idosos da comunidade, independentemente do arranjo domiciliar.

Palavras-chave: Idoso; Família; Atividades Cotidianas; Envelhecimento; Enfermagem Geriátrica.

RESUMEN

Objetivo: comparar la evolución de la capacidad funcional entre ancianos que vivían solos, acompañados y con cambios en el arreglo domiciliar, ajustando para otras variables. **Material y método:** se trata de un estudio de cohorte de base poblacional realizado con ancianos comunitarios. se realizó el análisis estadístico descriptivo y modelos mixtos ($p < 0,05$). **Resultados:** en el gráfico de tendencia, se observó declinación funcional en todos los grupos. Los ancianos que vivían solos presentaron mayores escores de capacidad funcional durante el estudio; sin embargo, no se evidenció diferencia significativa en la comparación entre los grupos. En el análisis de modelos mixtos se verificó que las variables explicativas de la declinación funcional fueron mayor edad (estimación = 0,067; $p < 0,001$) y mayor número de morbilidad (estimación = 0,357; $p < 0,001$). **Conclusión:** los resultados sugieren que las alteraciones fisiológicas del organismo con el paso de los años juntamente con el aumento gradual de las morbilidad pueden afectar el declive funcional de los ancianos de la comunidad, independientemente del arreglo domiciliar.

Palabras clave: Anciano; Familia; Actividades Cotidianas; Envejecimiento; Enfermería Geriátrica.

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INTRODUCTION

The fast aging of the population has led to the redirection of public policies to attend to the demands of the elderly people. Given the peculiarities of this population segment, health strategies should be organized and planned with a central focus on the preservation of functional capacity.¹

However, it is relevant to identify the possible risk factors that potentiate the process of functional incapacitation in the course of aging for these strategies to become more effective.² Experts in the area have synthesized the functional decline in explanatory models and already consider this process as a multifactorial condition, not limited to chronic diseases.³ Among the factors that influence the functional capacity of the elderly people, the home arrangement has been the object of study among researchers.⁴⁻⁸

It is important to highlight some contexts that may help to understand the different relationships between the home arrangement and the functional capacity. On the one hand, if the elderly individuals living alone may have a greater chance of functional decline due to poor health status because they do not have the help to meet the needs of care and perform daily activities, on the other hand, these elderly individuals maintain better functional performance in the aging process, since this can be a fundamental characteristic to live alone.⁹ Still another perspective, in situations of difficulty in developing some activity, the family can also play a restrictive role due to the mistakes made by the elderly individual, aggravating its process of functional decline.

In the literature, the question is: what is the modality of home arrangement that contributes most to preserving the evolution of the functional capacity of the elderly person? Previous studies on the impact of the home arrangement on the functional decline of the elderly showed contradictory results,⁴⁻⁸ denoting the need to deepen this situation through research. It should be noted that these studies did not analyze the data in more than two points of the follow-up and also did not use a statistical method of longitudinal analysis. It is believed that the results of this study will contribute to elucidate the relationship of the home arrangement and the evolution of the functional capacity, providing subsidies for directing health actions of the elderly in the community.

The objective of the study was to compare the evolution of functional capacity among the elderly person who lived alone, accompanied and with changes in the home arrangement, adjusted for other variables.

MATERIAL AND METHODS

This is a population-based cohort study developed with community-dwelling elderly people in the municipality of Uberaba, Brazil, from 2005 to 2012.

The study population consisted of elderly people living in the municipality. The sampling process was carried out in 2005, with an initial sample (2892 elderly), considering 95.0% confidence, 80.0% power of the test, a margin of error of 4.0% for the interval estimates and an estimated proportion of $p=0,5$ for the proportions of interest.

Based on this initial sample, information from 2,683 elderly people was obtained in 2005, as a result of refusals. Subsequently, in 2008 and 2012, the elderly were again interviewed. In 2008, interviews were conducted with 1,425 individuals and in 2012, with 623. The sample loss during follow-up occurred for several reasons, such as the elderly being hospitalized; have changed address; have gone to death; or not to be found after three interviews with the interviewer, among others, as shown in Figure 1.

The elderly of the final sample were divided into three groups according to the dynamics of the household arrangement in the follow-up period: group 1 (alone) – elderly who remained alone throughout the follow-up; group 2 (accompanied) – elderly people who lived with them throughout the follow-up; and group 3 (change in the home arrangement) – elderly individuals who changed the home arrangement in the follow-up period (Figure 1).

Data collection was carried out at the household of the elderly individuals. The stratified proportional sampling technique was used to select them, considering the different neighborhoods as strata.

Before starting the interview, the cognitive evaluation of the elderly was done through the Mini Mental State Examination (MMSE),¹¹ validated for the Brazilian reality. The cutoff point is considered according to the education level of the elderly: 13 for illiterates, 18 for one to 11 years of study and 26 for over 11 years of study. The elderly people with cognitive deficit were excluded from the study.

Figure 1 below demonstrates the algorithm for the description of the final study sample.

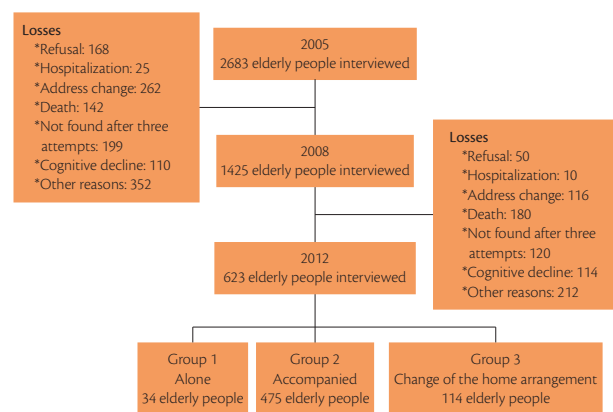


Figure 1 - Algorithm for the description of the final study sample.

For the characterization of sociodemographic data, morbidity and functional capacity, part of the Brazilian Questionnaire for Functional and Multidimensional Assessment (BOM-FAQ) was used. In the evaluation of functional capacity, the questionnaire is composed of activities of daily living and from it, the elderly person informs the degree of difficulty to perform self-care activities (if he cannot; if it is difficult; if it is very difficult; and it is not difficult).¹² In this instrument, the functional capacity score was calculated. This measure was derived from the sum of the score of the activities of daily life, being the score: 1 (he cannot perform it), 2 (with little difficulty), 3 (with great difficulty) and 4 (without difficulties). Thus, the general functional capacity score ranged from 12 to 48, with the highest scores being associated with better functional capacity.

The questionnaire for the assessment of morbidities contains 26 items that evaluate whether the individual has morbidity (rheumatism, arthritis/arthrosis, osteoporosis, asthma/bronchitis, tuberculosis, embolism, arterial hypertension, poor circulation, heart problems, diabetes mellitus, obesity, Parkinson's, urinary incontinence, fecal incontinence, arrest and womb, sleeping problem, cataract, glaucoma, spinal problems, kidney problem, accident/trauma sequel, malignant tumors, benign tumors, vision problem and others).¹²

The variables investigated were gender (male and female); age range (60|-70, 70|-80 and 80 or more); marital status (with and without partner); education level in year of study (no education, 1-4 and >5); home arrangement (only, accompanied and change of arrangement); monthly individual income, in minimum wages (<1, 1-3 and >4); number of self-reported morbidities and functional capacity score.

Spreadsheets were built in the Excel® program. The data collected in each period were processed in a microcomputer in double entry to verify the consistency between the two databases. Then, the consistency of the fields was processed: when inconsistent, they were verified in the original interview and performed their correction. For analysis, the database was exported to the software Statistical Package for Social Science version 22.0. In this research, the variables of interest in the three databases (years 2005, 2008 and 2012) were obtained, constituting a single bank for performance of the data analysis.

A descriptive statistical analysis was performed by absolute and percentage frequency distributions. The mean functional capacity scores were calculated per follow-up period to analyze the evolution of functional capacity of the elderly. In this sense, the evolution of functional capacity was analyzed from the means of the functional capacity scores in the three follow-ups. These data were presented using profile graphs for descriptive exploratory analysis.

The mixed models analysis was used to compare the evolution of the functional capacity scores and the three groups

according to the home arrangement. Firstly, the evolution of the functional capacity scores (2005, 2008 and 2012) as dependent variable and the dynamics of the home arrangement as independent variable were inserted into the model. Then, the variables for adjustment were inserted into the adjusted model, being gender, income and education level with baseline data and age and number of morbidities at the three collection points. The level of significance (α) was 5% and the tests were considered significant when $p < \alpha$.

The study complied with the formal requirements contained in national and international standards for research involving human beings. The projects were approved by the Human Research Ethics Committee of the Federal University of Triângulo Mineiro, under Protocols 553, 2005, 897 in 2008, and in 2012 under 265. The elderly people were contacted at home, at which time the objectives and relevant information were presented. After the consent and signature in the Free and Informed Consent Term by the participant, the interview was conducted.

RESULTS

The study sample had 623 elderly people divided into three groups according to the dynamics of the household arrangement during the study (2005-2012): 34 (5.5%) remained alone, 475 (76.2%) lived with them and 114 (18.3%) presented a change in the home arrangement.

Table 1 shows the distribution of sociodemographic and economic variables according to the groups, in the baseline (2005). In the three groups, it was possible to observe predominance of female elderly, in the age group of 60-70 years old, with 1-4 years of study and with 1-3 minimum wages.

Table 1 - Distribution of sociodemographic and economic variables in the elderly people, according to the dynamics of the home arrangement

| Variables | Dynamics of the home arrangement | | |
|----------------------------------|----------------------------------|----------------------|-----------------|
| | Alone n (%) | Accompanied n (%) | Change n (%) |
| Gender | | | |
| Female | 28 (82.4) | 308 (64.8) | 87 (76.3) |
| Male | 6 (17.6) | 167 (35.2) | 27 (23.7) |
| Age group (years old) | | | |
| 60-70 | 19 (57.6) | 291 (61.3) | 68 (59.3) |
| 70-80 | 11 (33.3) | 155 (32.6) | 38 (33.6) |
| ≥80 or more | 3 (9.1) | 29 (6.1) | 8 (7.1) |
| Education level (years) * | | | |
| 0 | 6 (17.6) | 104 (21.9) | 27 (23.9) |
| 1-4 | 23 (67.6) | 260 (54.9) | 62 (54.9) |
| >5 | 5 (14.7) | 110 (23.2) | 24 (21.2) |

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Table 1 - Distribution of sociodemographic and economic variables in the elderly people, according to the dynamics of the home arrangement

| Variables | Dynamics of the home arrangement | | |
|----------------------------------|----------------------------------|----------------------|-----------------|
| | Alone n (%) | Accompanied n (%) | Change n (%) |
| Individual income (minimum wage) | | | |
| <1 | 4 (11.8) | 107 (22.8) | 17 (15.2) |
| 1 3 | 27 (79.4) | 302 (64.2) | 85 (75.9) |
| >3 | 3 (8.8) | 61 (13.0) | 10 (8.9) |

(*)Missing data: change group (1).

In the descriptive exploratory analysis of the trend graph, it was observed that all groups showed a decline in functional capacity throughout the study. It was also found that the elderly who remained alone had the highest scores of functional capacity throughout the study. It should be noted that those who lived with the patients were the only group that maintained the functional capacity scores lower than the general population.

The evolution of the functional capacity scores of the sample of this study can be analyzed in the graph of Figure 2.

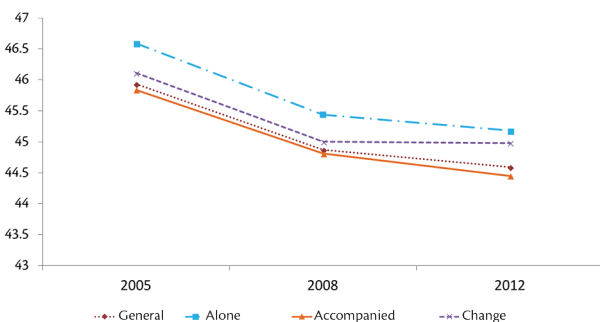


Figure 2 - Evolution of the scores of general functional capacity and according to the dynamics of the home arrangement in the follow-up period.

When analyzing the comparison between the groups as shown in Table 2, it was shown that, even after adjustment, there was no difference in the functional capacity evolution of the elderly who remained alone compared to those followed up (estimate=-0.934, p=0.075), and to those who changed the household arrangement (estimate=-0.490, p=0.381).

In the adjusted model, the variables explaining the decline in mean functional capacity scores during follow-up were the highest age (estimate=0.067, p<0.001) and the highest number of morbidities (estimate=0.357, p< 0.001).

DISCUSSION

Based on the representative cohort of the elderly individual in the community, it was verified that all three groups showed

a tendency to functional decline, supporting other population-based surveys in Brazil and in the world.^{13,14} This result is due to the cumulative multifactorial process that contributes to the functional decline, including the physiological changes of the organism added to the gradual increase of morbidities.¹⁵

Table 2 - Mixed models to verify the association between the evolution of functional capacity scores and the home arrangement

| Variables | Initial model | | Adjusted model | |
|-------------------------------|------------------------------|-------|------------------------------|--------|
| | Estimate (Standard Error) | P | Estimate (Standard Error) | P |
| Home Arrangement | | | | |
| Alone* | 0 | - | 0 | - |
| Accompanied | -0,701 (0,428) | 0,102 | -0,934 (0,523) | 0,075 |
| Dynamics | -0,372 (0,471) | 0,429 | -0,490 (0,558) | 0,381 |
| Sex | | | | |
| Male | - | - | -0,347 (0,265) | 0,19 |
| Female* | - | - | 0 | - |
| Age years) | - | - | 0,067 (0,016) | <0,001 |
| Income (minimum wages) | | | | |
| <1 | - | - | 0,774 (0,410) | 0,059 |
| 1 3 | - | - | 0,321 (0,325) | 0,324 |
| >3* | - | - | 0 | 0 |
| Schooling (years of study) | - | - | -0,045 (0,027) | 0,101 |
| Number of morbidities | - | - | 0,357 (0,030) | <0,001 |

(*)Reference category; (**)Analysis adjusted for gender, age, marital status, education level, income and number of morbidities.

It can be seen from the graph of Figure 1 that older adults living alone had the highest functional capacity scores in the three study periods. It is inferred that the preservation of functional capacity over the years is an essential characteristic for living in this condition. Some authors suggest that physical dependence is a determinant of transition from home arrangement,¹⁶ that is, many older people stop living alone and move in with their family or in a formal care institution. Although living alone can represent an achievement of aging, elderly people in this mode of arrangement eventually have daily care needs, a situation aggravated by the absence of a family member/caregiver.

In Brazil and in the world, the most common home arrangement in the elderly is the correlation with the family,^{5,17} corroborating this study. However, there has been an increase in the number of elderly people living in single-person households over the years.¹⁸ It is important to mention that there is still no consensus of which household structure most contributes to the health of the elderly.⁵ Several theories about the family system and the types of home arrange-

ment throughout history have suggested the protective role of the family in the living conditions of the elderly person, especially in societies whose policies of care for this population have not yet been consolidated.¹⁸

In this study, the findings do not support the hypothesis that the home arrangement can influence the health conditions of the elderly regarding the evolution of functional capacity. On the other hand, other previous studies have shown an association between the home arrangement and functional disability in the elderly people, and some have suggested a protective role for the family in case of functional disability,⁴ while others suggest an inverse perspective.⁵⁻⁸

With these described studies, the home arrangement should not be neglected in planning the health care of the elderly person. During the clinical practice, the primary care professional should verify the offer of support available to the elderly in the home, so they can identify needs, they can contact a family and social support network. It is important to note that in Brazil there is a limitation of alternative measures of formal care and/or financial resources that allow the elderly to remain in their own homes. In this scenario, families assume responsibility for the care of this population. For those who do not have this informal help, institutionalization eventually becomes the main alternative.⁹ These data contribute to the state's discussion and review of social protection policies for the elderly, with responsibility for care with the family.

Especially at more advanced ages, it is urgent to implement these policies in practice, since chronological age favors functional decline according to the results of this research. This finding has also been widely reported in the scientific literature.^{2,13,14} Another explanatory variable of functional decline was the highest number of morbidity corroborating a study in Brazil¹⁴. It is consensual that the physiological alterations of aging associated with the pathological processes causes the functional decline in the elderly population.¹⁵

Despite the sample loss during the study follow-up, this study is characterized as a representative cohort in which all the elderly who met the inclusion criteria in the three data collection periods were interviewed. It is also emphasized that the statistical analysis used in this study was adjusted to the main factors associated with functional capacity according to the explanatory model adopted.³ Although this precaution was taken, it is believed that the absence in the difference between the groups as regards to functional capacity is related to other social characteristics that were not evaluated in this study, such as social support, access to health services, family dynamics, among others. Other cohort studies are suggested to deepen the influence of the home arrangement on the functional capacity of the elderly, adding other variables that may exert a mediating role.

CONCLUSION

From the results evidenced, there was a tendency for functional decline in the three groups evaluated. The elderly who lived alone had the highest scores of functional capacity during the study, but there were no differences in comparison with the other groups. The explanatory variables of functional decline were the increase in age and the greater number of morbidities.

REFERENCES

1. Dias EG, Duarte YAO, Almeida MHM, Lebrão ML. As atividades avançadas de vida diária como componente. *Rev Ter Ocup*. 2014[cited 2016 Aug 20];25(3):225-32. Available from: <https://www.revistas.usp.br/rto/article/view/75910/91967>
2. Virtuoso Junior JS, Guerra RO. Incapacidade funcional em mulheres idosas de baixa renda. *Ciênc Saúde Coletiva*. 2011[cited 2016 Aug 20];16:2541-8. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1413-81232011000500024
3. Zunzunegui MV. Evolución de la discapacidad y la dependencia: una mirada internacional. *Gac Sanit*. 2011[cited 2016 Aug 20];25:12-20. Available from: <http://www.sciencedirect.com/science/article/pii/S0213911111003311>
4. Dong X, Chang E, Simon MA. Physical function assessment in a community-dwelling population of US chinese older adults. *J Gerontol*. 2014[cited 2016 Aug 20];9(S2):31-8. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/25378446>
5. Wang H, Chen K, Pan Y, Jing F, Liu H. Associations and impact factors between living arrangements and functional disability among older chinese adults. *PLoS ONE*. 2013[cited 2016 Aug 20];8(1):1-7. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/23342030>
6. Zhou Z, Mao F, Ma J, Hao S, Qian ZM, Elder K, et al. A longitudinal analysis of the association between living arrangements and health among older adults in China. *Res Aging*. 2016[cited 2016 Aug 20];1-26. Available from: <http://journals.sagepub.com/doi/abs/10.1177/0164027516680854>
7. Saito E, Ueki S, Yasuda N, Yamazaki S, Yasumura S. Risk factors of functional disability among community-dwelling elderly people by household in Japan: a prospective cohort study. *BMC Geriatr*. 2014[cited 2016 Aug 20];14:93. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4158357/>
8. Weissman JD, Russel D. Relationships between living arrangements and health status among older adults in the United States, 2009-2014: findings from the National Health Interview Survey. *J Appl Gerontol*. 2018[cited 2016 Aug 20];37(1):7-25. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/27353832>
9. Camargos MCS, Rodrigues RN, Machado CJ. Idoso, família e domicílio: uma revisão narrativa sobre a decisão de morar sozinho. *Rev Bras Estud Popul*. 2011[cited 2016 Aug 20];28:217-30. Available from: https://www.rebep.org.br/revista/article/view/93/pdf_87
10. D'orsi E, Xavier AJ, Ramos LR. Work, social support and leisure protect the elderly from functional loss: EPIDOSO Study. *Rev Saúde Pública*. 2011[cited 2016 Aug 20];45:658-92. Available from: http://www.scielo.br/scielo.php?pid=S0034-89102011000400007&script=sci_arttext&tlng=en
11. Bertolucci PHF, Brucki SMD, Campacci SR, Juliano Y. O mini-exame do estado mental em uma população geral: impacto da escolaridade. *Arq Neuropsiquiatr*. 1994[cited 2016 Aug 20];52:1-7. Available from: http://www.scielo.br/scielo.php?pid=S0004-282X1994000100001&script=sci_abstract&tlng=pt
12. Ramos LR, Toniolo J, Cendoroglo MS, Garcia JT, Najas MS, Perracini M, et al. Two-year follow-up study of elderly residents in S. Paulo, Brazil: methodology and preliminary results. *Rev Saúde Pública*. 1998[cited 2016 Aug 20];32:397-407. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0034-89101998000500001

13. Alexandre TS, Corona LP, Nunes DP, Santos JLF, Duarte YA, Lebrão ML. Gender differences in incidence and determinantes of disability in activities daily living among elderly individuals: SABE study. *Arch Gerontol Geriatr*. 2012[cited 2016 Aug 20];55:431-7. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/22546518>
 14. Kim DH, Newman AB, Lipsitz LA. Prediction of severe, persistent activity of-daily-living disability in older adults. *Am J Epidemiol*. 2013[cited 2016 Aug 20];178:1085-93. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/23785110>
 15. Brown RT, Pierluissi E, Guzman D, Kessel ER, Goldman E, Sarkar U, *et al*. Functional disability in late-middle-aged and older adults admitted to a safety-net hospital. *J Am Geriatr Soc*. 2014[cited 2016 Aug 20];62:2056-63. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/25367281>
 16. Prickett KC, Angel JC. Transitions in living arrangements among older Mexican Americans: the dynamics of dependency and disadvantage. *Res Aging*. 2017[cited 2016 Aug 20];39(3):396-417. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/26658456>
 17. Rabelo DF, Neri AL. Tipo de configuração familiar e condições de saúde física e psicológica em idosos. *Cad Saúde Pública*. 2015[cited 2016 Aug 20];31(4):874-84. Available from: http://www.scielo.br/scielo.php?pid=S0102-311X2015000400874&script=sci_abstract&tlng=pt
 18. Manfredini M, Breschi M. Living arrangements and the elderly: an analysis of old-age mortality by household structure in Casalguidi, 1819–59. *Demography*. 2013[cited 2016 Aug 20];50:1593-613. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/23686383>
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