Disability Trends of the Elderly in Brazil, 1998-2013

Luciana Correia Alves[1], Tiago da Silva Alexandre[2], Danan Gu[3]

Abstract

To examine changes over 15 years (1998–2013) of elderly disability in Brazil between 1998 and 2013. We used information from cross-sectional household data from 1998, 2003, 2008 and 2013. Data came from two surveys: Brazilian National Household Survey and National Health Survey. A random sample of 112,336 individuals aged 60 years or older were investigated. The dependent variable was disability in activities of daily living (ADL). We used multiple binary logistic regressions model to identify association between year and disability on ADL adjusted to age, sex, household situation, and number of chronic diseases and disability. We found that the trend of ADL disability has decreased between 1998 to 2013. Advancing age, female and number of chronic disease increased ADL disability. Urban area living was a protector factor. ADL disability among elderly has decreased over the last decade. Further study is required to identify possible causes behind the disability trends.

Keywords: Ageing, Activities of Daily Living, Disability, Trend, Population Based Study, Brazil

[1] Department of Demography, Population Studies Center Elza Berquó (NEPO), University of Campinas (UNICAMP), Brazil (luciana@nepo.unicamp.br)

[2] Faculty Member of Gerontology Department , Federal University of São Carlos

[3] United Nations Population Division, USA.

Introduction

Brazil has experienced a rapid and accentuated decline in its fertility rates in the last five decades. Mortality rates have declined significantly since 1940. The decline in fertility combined with the decline in mortality has resulted in population ageing processes and higher longevity in the population (Alves and Rodrigues, 2005). The Demographic Census in 2010 shows that life expectancy at birth reached 73.8 years (IBGE, 2010). Parallel, a process of epidemiological transition has also been verified in the population, resulting in important changes in the health profile of the population in Brazil, such as an increase in the number of disability.

The natural process of ageing is characterized by the diminution of the functional capacity that intensifies with the advancing age. Functional capacity is important in the scenario of population ageing and appears as a new paradigm of health. The loss of function, without adequate intervention planning, can lead to limitations, reduction of quality of life (Yuaso and Sguizzatto, 2002) and greater dependence among elderly. The rapid increase in the individuals aged 60 or more and the number of years lived by them, raise a huge debate about whether the additional years of life will be lived in conditions of functional independence or not. Therefore, the patterns and prevalence of chronic disability in the populations have significant implications for a range of public health, health care delivery system, social, and other public policies.

There is a growing body of research examining trends in physical disability in the elderly in both developed and in developing countries. The functional disability of the elderly can be determined by activities of daily living (ADL), by instrumental activities of daily living (IADL) and by physical mobility (Gu et al., 2009; Verbrugge et al., 2017).

In the existing literature, a decline in both prevalence and incidence of disability in activities of daily living (ADL) has been reported among older adults in high-income countries (Freedman et al., 2002; Gu et al., 2009; Hu, 2012; Feng et al., 2013; Martin et al., 2014; Liang et al., 2015).

Improvements in functional disability are not universal across countries and over time. Some studies suggest that ADL disability among elderly did not change much from the early 1980s to the late 2000s in the United States (Field and Jette, 2007; Freedman et al., 2004, 2013) and other countries. Other studies have reported a flat or a contrary pattern indicating that late-life disability has been increasing. Australia, Canada, the Netherlands, and the United Kingdom, levels of ADLs have fluctuated or remained stable, respectively, from 1990 to 2000 (Davis et al., 2003; Lafortune et al., 2007; Van Gool et al., 2011). Similarly, in Brazil, ADL has remained stable between 1998 and 2008 (Lima-Costa et al., 2011). According to Yu et al. (2016), trends in activities of ADL disability in older Chinese adults in Hong Kong between 2001 and 2012 has increased over the last decade.

The World Health Organization (WHO) estimates that at least 18.9% of the Brazilian population and 15.6% of the world's population are disability (World Health Organization, 2001). A smaller study in Brazil investigated the cohort differences in physical functioning levels among the older (cohort members born in 1916-1926 and in 1927-1937) participants of the Bambuí Cohort Study of Aging and the results suggested recent cohorts born between 1927 and 1937 had better physical functioning compared with their older counterparts born between 1916 and 1926 (Oliveira and Lima-Costa, 2011). A study using SABE Study investigated sex differences in the incidence rate of disability in ADL e IADL between the years of 2000 and 2006 in the residents of the city

of Sao Paulo. The incidence density of disability in instrumental activities of daily living was 44.7/1,000 person/years for women and 25.2/1,000 person/years for men. The incidence rate ratio between women and men was 1.77 (Alexandre et al., 2012; Alexandre et al., 2014).

In contrast, to the ongoing awareness of the importance of disability surveillance in developed nations, less is known about how functional health changes over time for elders in developing societies where socioeconomic and medical conditions may experience comparatively more rapid changes in recent decades. In Brazil, there are few studies analyzing changes in the prevalence and incidence of disability in the elderly and their evolution over time. The great difficulty of measuring disability trends in the country can be attributed to the lack of longitudinal data. Therefore, most of the studies conducted in the country focus on the individual-level disablement process and its associated factors.

Given the significant impact of functional dependence on quality of life and the social care system, clarifying time trends in physical disability will have important implications for public health and policy development (Liang et al., 2017), since it enables the implementation of action for prevention, care and intervention appropriate to the reality of the country.

This study aimed to identify the trend of elderly disability in Brazil between 1998 and 2013.

Material and Methods

Data Source

We used information from cross-sectional household data from 1998, 2003, 2008 and 2013. Data came from two surveys: Pesquisa Nacional por Amostra de Domicílios (PNAD – Brazilian National Household Survey) and Pesquisa Nacional de Saúde (PNS – National Health Survey). PNAD is a cross-sectional household interview survey with national coverage, held annually, in order to obtain information on the household of individuals, migration, education, labour force, and fertility characteristics. In 1998, PNAD included a health supplement in its questionnaire, with information to be collected every five years, and 2008 was the most recent available information. In 2013, the National Health Survey (PNS), also a nationally representative household-based survey was carried out and collected health information. It also replaced PNAD's health supplement (IBGE, 2014).

A random sample of 112,336 individuals aged 60 years or older was investigated.

Measures

The dependent variable was disability in activities of daily living (ADL). In each wave, respondents were asked to self-report whether they had any difficulty with any of several. The following ADLs were surveyed in each of the four survey waves: bathing, toilet, eating. We characterized respondents as having a disability in ADL task if they reported difficulty, or received help for the task, or could not perform the task secondary to health reasons. The independent variables were age (continuous variable), sex, household situation (urban and rural), number of chronic diseases (0, 1, 2-3, 4 or more) and year (1998, 2003, 2008 and 2013).

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Statistical Analysis

Descriptive statistics were calculated for the all variables. Prevalence rate estimates were made incorporating the weights and the effect of the design of the sample. Multiple binary logistic regressions model was used to identify an association between year, age, sex, household situation, number of chronic diseases and disability on ADL. Odds Ratio (OR) and intervals of 95% confidence intervals (95% CI) were estimated by multiple binary logistic regressions model. All analyzes were performed using the Software R 3.3.1.

Results

Among the 124,974 elderly individuals interviewed for the all years, age ranged from 60 to 113 years (mean: 69.75 ± 7.84 years; median: 68.0 years). Tables 1 provides descriptive statistics for the all four survey-years. In particular, the population was predominantly female (56.1%), 82.6% were an urban area, and 33.2% had 2 to 3 chronic diseases in the period.

Table 1 – Relative distribution (%) of demographic and health conditions characteristics
of elderly in Brazil, 1998-2013

| Variables	n (124,974)	Relative distribution (%)
Age (years)		
60-64	39,460	31.6
65-69	30,955	24.8
70-74	23,121	18.5
75-79	15,428	12.3
80-84	9,211	7.4
85 or older	6,799	5.4
Sex		
Male	54,867	43.9
Female	70,107	56.1
Household situation		
Rural	21,791	17.4
Urban	103,183	82.6
Number of chronic diseases		
0	28,036	22.4
1	31,992	25.6
2-3	41,441	33.2
4 or more	10,867	8.7

Source: PNAD, 1998, 2003, 2008. PNS, 2013.
ADL = Activity of Daily Living.
Numbers and percentages that are missing refer to the category
without information.

The results show that the prevalence rate did not change importantly between 1998 and 2008. There is a clear decline in 2013. For each year, the women had a higher prevalence rate in comparison those who were sex male (Graphic 1). The prevalence of disability increased with advancing age in all years. The years 1998 and 2008 presented very similar value (Graphic 2).
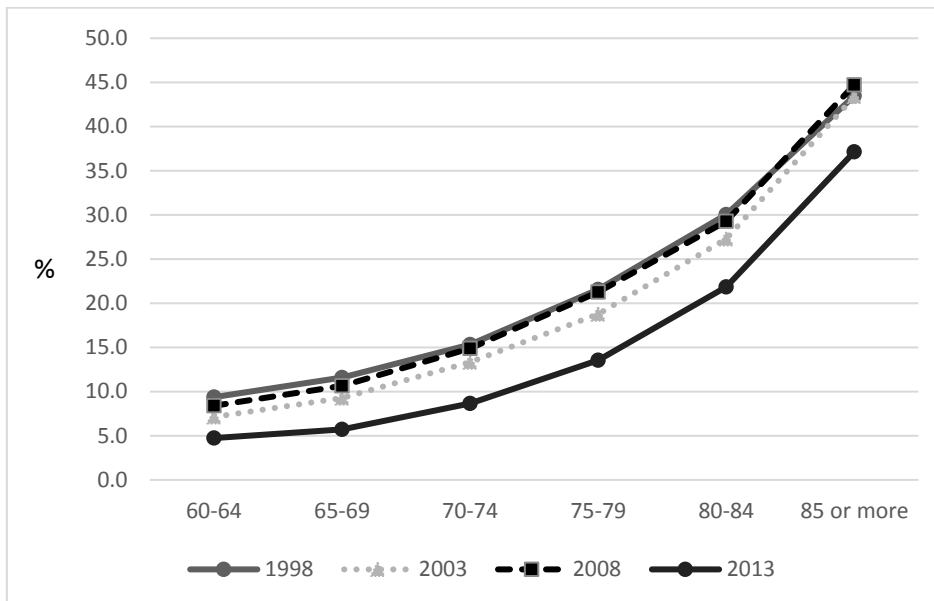
Graphic 1: Prevalence of the ADL Disability in Brazilian elderly, 1998-2013
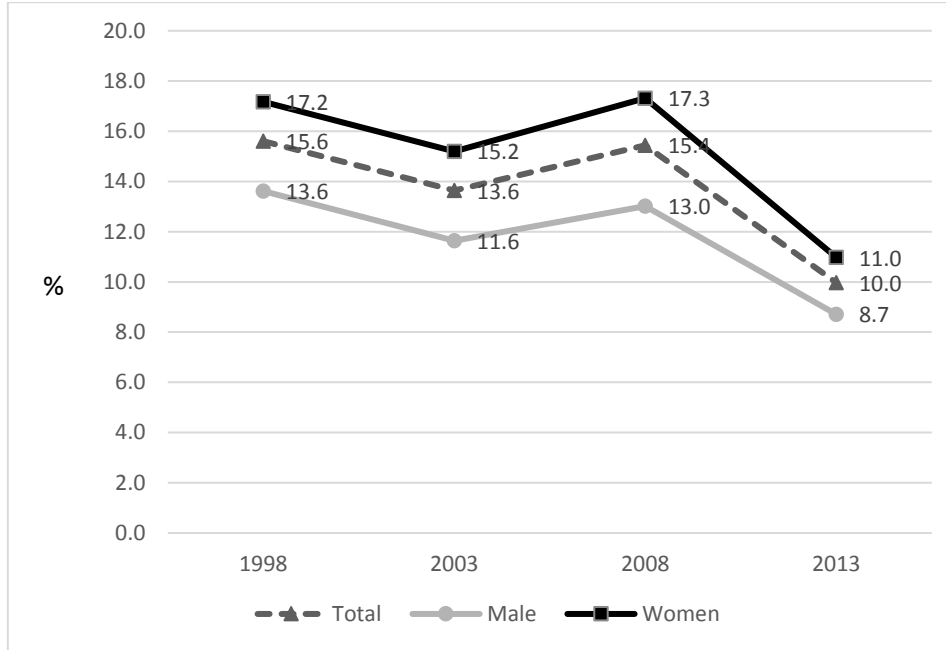
Source: PNAD, 1998, 2003, 2008. PNS, 2013.
ADL = Activity of Daily Living

Graphic 2: Prevalence of the ADL Disability in Brazilian elderly by age, 1998-2013

Source: PNAD, 1998, 2003, 2008. PNS, 2013.
ADL = Activity of Daily Living

Table 2 shows the odds ratio to ADL disability trends, adjusted for age, sex, household situation and number of chronic diseases among Brazilian elderly. In the period analyzed, the model's results adjusted to age and sex showed that ADL disability levels hava decreased between 2003 to 2013 compared to the year of reference (1998). Results of the models control to age, sex, household situation and number of chronic disease found that ADL disability increased in 2008 in Brazil, but the association was not statistically significant (p>0.05). However, the results suggest remarkable declines in ADL disability levels in Brazil since the beginning of the 2010s. Advancing age had odds 8% higher to ADL disability. Female had a 11% larger odds compared to men (OR=1.11) (p<0,01). Urban area living was a protector factor. The elderly that urban area living had a much higher propensity for ADL disability (OR=0.90). Regarding health conditions, those with 4 or more chronic diseases had a odds 4.45 times greater of disability than those who had not the disease.

Table 2 - Odds Ratio to ADL disability trends, adjusted for age, sex, household situation and number of chronic diseases among Brazilian Elderly.

Variable	Odds Ratio	95%CI	Odds Ratio	95%CI
Year				
1998	1.00	-	1.00	-
2003	0.82	0.79-0.86	0.89	0.85-0.94
2008	0.94	0.90-0.98	1.02	0.98-1.07
2013	0.55	0.53-0.59	0.61	0.57-0.66
Age (continuous)	1.09	1.08-1.09	1.08	1.08-1.09
Sex				
Male	1.00	-	1.00	-
Female	1.28	1.24-1.32	1.11	1.11-1.20
Household situation				
Rural	-	-	1.00	-
Urban	-	-	0.90	0.86-0.95
Number of chronic Disease				
0	-	-	1.00	-
1	-	-	1.38	1.30-1.46
2-3	-	-	2.21	2.10-2.33
4 or more	-	-	4.45	4.18-4.74
Intercept	-7.695	p<0.01	-8.028	p<0.01

Source: PNAD, 1998, 2003, 2008. PNS, 2013.
      ADL = Activity of Daily Living

Discussion

This study examined the disability between 1998 and 2013 adjusted for age, sex, household situation and for chronic conditions. We found that the trend of ADL disability has decreased between 1998 to 2013. When adjusted for others demographic factors and health conditions, we do not find an association in 2008 in our study. The most important improvements in ADL disability was in 2013. This finding corroborates with other studies that have shown a decline of disability in activities of daily living (ADL) among older adults (Freedman et al., 2002; Gu et al., 2009; Hu, 2012; Feng et al., 2013; Martin et al., 2014; Liang et al., 2015).

The men had the lowest decline of ADL disability. The other studies show that women have higher probability to present higher functional loss than men in Brazil (Giacomin et al., 2008; Alves et al., 2010; Alexandre et al., 2012). Women have a greater prevalence of disability than men under many conditions. During the epidemiologic transition, men and women may experience different trends. There is the gender paradox in health (Lamb, 1997). Women enjoy greater longevity but worse health. With increased longevity, women as a group usually tend to have a higher overall prevalence or incidence of diseases and disability than men (Gu, Gomez-Redondo and Dupre, 2015). Other hypothesis would be the women's ability to report a higher number of health conditions compared to men of the same age (Giacomin et al., 2008).

As shown in others studies, older age is associated with poor functional capacity (Guralnik et al., 1993; Alexandre et al., 2012). Studies involving American elderly individuals also reveal that the average pattern of functional decline increases with age, although it does not occur linearly (Beckett et al., 1996).

We find that Brazilians elderly who living in urban areas are less likely to have ADL disability. It is important to emphasize the burden on the differentiated exposures in rural areas, there are also difficulties in accessing health services and the strong association that the rural environment has as a lack of infrastructure services, such as basic sanitation and formal education (Guimarães et al., 2018). Elderly who live in urban areas present better life conditions, greater availability and access to prevention and primary or specialized medical assistance services (Alves et al., 2010).

Our study confirms the negative impact of chronic disease on disability in Brazil. Indeed, non-communicable diseases are the major causes of morbidity and mortality in the country. Although our results show this relationship between the increases in the

number of chronic diseases as factors strongly related to disability, the trend of disability fell during the period analyzed. In the last year, Brazil has experimented a substantial investment and improvement in the Brazilian National Health System (SUS). Overall, our findings support the expansion of morbidity hypothesis for older adults in Brazil between 1998 and 2013. The gains in life expectancy are predominantly through the technological advances that have been made in extending the life of those with the disease. Living longer exposes more people to the non-fatal diseases and complications (Alves and Arruda, 2017). Even controlled by chronic diseases, our results showed the reduction in the trend of disability.

Conclusions

This study points to a decline in ADL disability among the elderly in Brazil over time. The planning of effective preventive and management strategies for reducing disability in the elderly population should be based on the fact that there are gender differences and variations in the determinants of disability. Moreover, addressing chronic disease and urban/rural disparities should be the main target of these strategies.

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