# The impact of lifestyle factors on disability-free life expectancy in Brazilian elderly in 2013.

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**Abstract**
The aim of this study is estimate and analyze the disability-free life expectancy (DFLE) among the Brazilian elderly population by sex consider the body mass index (BMI) and lifestyle as smoking and alcohol consumption. Functional capacity was evaluated through questions about basic activities of daily living (ADL). Functional disability was assessed as difficulty performing one or more ADLs. The disability-free life expectancy in elderly underweight (BMI <23 kg/m²), normal ( 23≤BMI<28 kg/m²), overweight (28≤BMI<30 kg/m²), obese (BMI≥30 kg/m²), smoking status (smoker or not) and alcohol consumption doesn't drink or drink with some frequency) was calculated using the Sullivan Method and prevalence estimates from data collected in 2013 through the National Health Survey (PNS). Overweight and obesity has a large effect on the disability-free life expectancy. Women overweight and obese live longer with disability than men. There is a higher prevalence of older women with obesity (approximately) 30%) than men (approximately 20%). In the case of men, smoking decreases the years free of functional disability. For example, average time without disability for 60 years old men was 16.8 years compare to 23.4 in women with the same age. Despite the higher prevalence of alcohol consumption among men (50% on men with 60 years old compare to 19% on women), women have lower disability-free life expectancy than men. Healthy behavior is associated with survival and how the elderly live the remaining years of life.
**Keywords:** life expectancy, disability free life expectancy, body mass index, life style of the elderly

## 1 Introduction

The increase in the elderly population it's a reality that requires changing political, economic and social strategies, so that have a health life expectancy by minimizing physical disabilities or special care needs (Souza et al, 2016).

Since the last decades of the past century, Brazil has witnessed a rapid and accentuated decline in its fertility rates, an unprecedented phenomenon in the country's history, and which stands out even in comparison with other countries, both in the developed world and among emerging countries. As what has happened in the majority of these countries, this decline, in conjunction with the fall in mortality rates, has resulted in population aging processes and higher longevity in the population.

Mortality in Brazil declined significantly from 1940 until the 1970s. This reduction in Brazilian mortality levels was much more rapid than that experienced by developed countries and its evolution over time has caused huge gains in the life expectancy of the population (Carvalho and Garcia, 2003). Life expectancy increased by 30 years between 1940 and 2000, from 37.6 to 64.8 years among men and from 39.4 to 72.6 years among women. The results of the Brazilian Demographic Census in 2010 indicate that life expectancy reached 73.48 years (IBGE, 2010). At

the same time, the number of people with disability is expected to increase, given the rapid growth rate of the elderly population and the rise in the prevalence of obesity and chronic disease (Snih et al., 2007).

Lifestyle has been study object in the last years, mainly in the context of longevity and aging well (Souza et al, 2016). Fast changes in the population's nutritional intake that have occurred in Brazil in recent decades have resulted in an increase in the prevalence of obesity (Popkin et al, 2012). In the past three decades, obesity rates in Brazil tripled among men and almost double among women (Monteiro et al., 2004).

Studies have shown that lifestyle factors such as smoking, alcohol consumption, and body weight can predict mortality in elderly people.

Some studies link the association between BMI and disability, in this cases, obesity has been associated with higher prevalence of disability in cross-sectional and longitudinal studies. This positive association has been found among middle and older aged adults. For example, older adults in the United States who gain weight over time have higher incidence of mobility limitations than those who maintain their weight (Snih et al., 2007; Lang et al., 2008; Vincent et al., 2010).

Study disability in the age group over 60 year is important, given the current context of population aging and an increasing prevalence of obesity. Moreover, obesity-associated disability is associated with significant burden in terms of both quality of life and health care costs in this age group (Alley and Chang, 2007).

There's no studies in Brazil that relates some lifestyle factors and disability-free life expectancy in elderly using the Sullivan Method. In this context, the aim of this study is estimate and analyze the disability-free life expectancy (DFLE) among the Brazilian elderly population by sex consider the body mass index (BMI) and lifestyle as smoking and alcohol consumption in Brazil at the year 2013.

## 2 Material and Methods

This study was developed based on data provided by the National Health Survey (PNS) and by the Life Tables from IBGE. The National Health Survey is a is a cross-sectional household interview survey with national coverage.

We estimated the disability-free life expectancy for the Brazilian elderly population in 2013 based on the construction of life tables which combined mortality information and lifestyles factors as anthropometric measure (body mass index), smoking status and alcohol consumption. Functional capacity was evaluated through questions about basic activities of daily living (ADL). Functional disability was assessed as difficulty performing one or more ADLs. The disability-free life expectancy in elderly underweight (BMI $<23$ kg/m²), normal ( $23 \leq BMI < 28$ kg/m²), overweight ($28 \leq BMI < 30$ kg/m²), obese ($BMI \geq 30$ kg/m²), smoking status (smoker or not) and alcohol consumption doesn't drink or drink with some frequency) was calculated using the Sullivan Method (Sullivan, 1971).

## 3 Results and Discussion

The results of underweight, normal weight, overweight, obesity, smoking and alcohol consumption prevalence and disability-free life expectancy by BMI, smoking and alcohol consumption are presented in this section.

Table 1 presents the prevalence of weight by Body Mass Index and lifestyle factors among elderly Brazilians in 2013. This data reveals that there are more women with obesity than men for all ages. Besides that, the consumption of alcohol and smokers is higher among men.

Table 2 and 3 shows the estimates of total life expectancy (TLE), disability-free life expectancy (DFLE) and percentage of years with DFLE by age and sex in 2013. Women aged 60 could expect to live on average 3.5 years longer than men.

Futhermore, Table 2 shows that among the range of the BMI, obesity has the most impact on DFLE for both men and women. Women in the age of 60 expect to live 69.6% free of functional disability from the total 23 years of total life expectancy they would still expect to live. Among men, at age 60, the impact is somewhat lower, with 77.9% of the years free of functional disability compared to 19.9 years of total life expectancy. For all body weight categories, women suffer a greater influence on their life expectancy free of functional disability than men. This study confirms earlier findings that women were more vulnerable to the harmful effects of obesity (CAO, 2016).

Table 3 shows the results on DFLE when considering the consumption of alcohol and smoking. In the case of smoking, the influence is greater among men than in women up to the age group of 80-84 years. In the group above 85 years, this difference don't exist when considering TLE, that is, whereas men at 60 years of age expect to live 78.9% of the remaining years free from functional disability and women at the same age expect to live 89, 0% of remaining years free of disability. At the age of 85, men expect to live from the remaining years only 52.6% disability-free and women 51.5%.

In relation to alcohol consumption, there is a greater influence among women compared to men, with a difference of 16.3 percentage points when reaching 80 years. Men expected to live 56.8% of the remaining years free of functional disability while women expected to live 40.5% of the remaining years free of disability.

Aging is related to increased fat mass and there is growing evidence of the detrimental impact of obesity on disability in older cohorts.

**Table 1.** Prevalence of disability, underweight, normal weight, overweight and obesity, smoking and alcohol consumption among older adults in Brazil by sex and age, 2013.

| Sex and Age | Body Mass Index | | | | | Lifestyle factors | |
|---|---|---|---|---|---|---|---|
| | Disability | Underweight | Normal weight | Overweight | Obesity | Smoking | Alcohol |
| Total | 15.5 | 21.7 | 41.1 | 13.9 | 23.4 | 12.6 | 24.1 |
| 60 | 9.0 | 18.4 | 41.9 | 13.7 | 26.0 | 18.1 | 32.3 |
| 70 | 15.5 | 20.6 | 43.1 | 14.7 | 21.6 | 10.2 | 19.5 |
| 80 | 34.6 | 31.5 | 41.9 | 10.6 | 15.9 | 5.0 | 14.4 |
| Men | 14.2 | 24.4 | 43.8 | 13.9 | 17.9 | 17.0 | 38.2 |
| 60 | 9.0 | 21.0 | 44.7 | 12.9 | 21.5 | 23.6 | 49.9 |
| 70 | 14.3 | 21.4 | 44.7 | 15.6 | 18.3 | 13.9 | 32.5 |
| 80 | 29.0 | 35.7 | 45.1 | 7.2 | 12.0 | 9.0 | 23.9 |
| Women | 16.5 | 19.6 | 39.0 | 13.8 | 27.6 | 9.3 | 13.1 |
| 60 | 9.8 | 16.4 | 39.8 | 14.4 | 29.4 | 13.9 | 19.0 |
| 70 | 16.4 | 19.9 | 41.8 | 14.0 | 24.3 | 7.2 | 8.9 |
| 80 | 38.5 | 28.6 | 39.7 | 13.0 | 18.6 | 2.2 | 7.8 |

Source: PNS, IBGE.

**Table 2.** Total Life Expectancy, disability-free life expectancy, and percentage of years with disability-free life expectancy among older adults in Brazil by body mass index (BMI), 2013.

| Sex and Age | TLE | Underweight | | Normal weight | | Overweight | | Obesity | |
|---|---|---|---|---|---|---|---|---|---|
| | | DFLE | % | DFLE | % | DFLE | % | DFLE | % |
| Men | | | | | | | | | |
| 60-64 | 19.9 | 15.8 | 79.4 | 16.5 | 83.1 | 15.8 | 79.8 | 15.5 | 77.9 |
| 65-69 | 16.4 | 12.5 | 76.4 | 13.2 | 80.1 | 12.5 | 76.1 | 12.1 | 73.9 |
| 70-74 | 13.3 | 9.4 | 70.9 | 10.0 | 75.3 | 9.2 | 69.5 | 9.6 | 72.3 |
| 75-79 | 10.5 | 6.8 | 64.2 | 7.3 | 68.9 | 6.4 | 61.0 | 7.0 | 66.2 |
| 80-84 | 8.3 | 4.5 | 54.1 | 4.8 | 58.1 | 4.0 | 48.6 | 4.7 | 56.8 |
| 85+ | 6.4 | 2.8 | 43.3 | 2.8 | 42.8 | 1.6 | 24.9 | 2.5 | 39.0 |
| Women | | | | | | | | | |
| 60-64 | 23.4 | 18.7 | 79.8 | 18.2 | 77.9 | 17.1 | 73.1 | 16.3 | 69.6 |
| 65-69 | 19.5 | 14.8 | 75.7 | 14.5 | 74.4 | 13.3 | 68.2 | 12.8 | 65.5 |
| 70-74 | 15.9 | 11.3 | 71.3 | 10.9 | 68.6 | 9.6 | 60.2 | 9.4 | 59.4 |
| 75-79 | 12.6 | 8.0 | 63.3 | 7.8 | 61.7 | 6.6 | 52.1 | 6.5 | 51.2 |
| 80-84 | 9.8 | 4.8 | 48.4 | 4.9 | 49.5 | 3.5 | 35.5 | 4.0 | 40.5 |
| 85+ | 7.7 | 2.2 | 29.2 | 2.1 | 28.0 | 1.7 | 21.6 | 1.8 | 23.3 |

Source: PNS, IBGE. TLE: Total Life expectancy; DFLE: Disability-free life expectancy.

**Table 3.** Total Life Expectancy, disability-free life expectancy and percentage of years with disability-free life expectancy among older adults in Brazil by smoking and alcohol consumption, 2013.

| Sex and Age | TLE | Smoking | | Alcohol Consumption | |
|---|---|---|---|---|---|
| | | DFLE | % | DFLE | % |
| Men | | | | | |
| 60-64 | 19.9 | 15.7 | 78.9 | 17.3 | 87.1 |
| 65-69 | 16.4 | 12.4 | 75.7 | 13.9 | 84.4 |
| 70-74 | 13.3 | 9.4 | 71.2 | 10.9 | 81.8 |
| 75-79 | 10.5 | 6.7 | 63.9 | 8.0 | 76.2 |
| 80-84 | 8.3 | 4.1 | 49.3 | 5.8 | 69.6 |
| 85+ | 6.4 | 3.4 | 52.6 | 3.6 | 56.1 |
| Women | | | | | |
| 60-64 | 23.4 | 20.8 | 89.0 | 19.3 | 82.4 |
| 65-69 | 19.5 | 17.1 | 87.9 | 15.6 | 80.1 |
| 70-74 | 15.9 | 13.5 | 85.0 | 12.0 | 75.5 |
| 75-79 | 12.6 | 10.2 | 80.8 | 9.0 | 71.5 |
| 80-84 | 9.8 | 7.1 | 71.9 | 5.8 | 58.8 |
| 85+ | 7.7 | 3.9 | 51.5 | 2.5 | 31.7 |

Source: PNS, IBGE. TLE: Total Life expectancy; DFLE: Disability-free life expectancy.

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