

# Food consumption among older adults: differences between men and women

Consumo alimentar de pessoas idosas: diferenças entre homens e mulheres

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## Abstract

**Objective:** To describe the eating habits of older men and women who live in Brazilian state capitals and the Federal District.

**Methods:** This cross-sectional study was based on data from the *Surveillance System for Risk and Protective Factors for Chronic Diseases by Telephone Survey* (Vigitel, 2018) (n = 15 338 older adults, age ≥ 65 years). Diet was assessed as consumption of healthy foods (vegetables, fruits, natural juice, and natural/minimally processed foods) and unhealthy foods (soft drinks/artificial juice, soft drinks, and ultra-processed foods) weekly, daily, and/or the day before the interview. Food consumption prevalence was estimated according to sex, and associations were determined using the Wald test and adjusted logistic regression.

**Results:** The sample was 60.70% women. Women were more likely than men to consume raw vegetables, cooked vegetables, fruits, and juice and they were less likely to consume soft drinks during any given week. Regarding daily consumption, women were more likely than men to consume fruit and less likely to consume raw vegetables, juice, or soft drinks. On the day prior to the interview, more women reported having consumed natural or minimally processed foods more than men, except for beans and cereals. Regarding ultra-processed foods, the participants reported consuming more dairy drinks and bread than soft drinks, cookies, and processed meats.

**Conclusions:** Food consumption among older adults differs according to sex, indicating that nutritional education strategies aimed at promoting adequate and healthy eating are needed, especially among men.

**Keywords:** older adults; diet; food consumption; telephone survey surveillance system.

## Resumo

**Objetivo:** Descrever as práticas alimentares de homens e mulheres idosos residentes nas capitais brasileiras e no Distrito Federal (DF).

**Metodologia:** Estudo transversal realizado com dados do *Sistema de Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico* (Vigitel, 2018) (n = 15 338 idosos, idade ≥ 65 anos). A alimentação foi avaliada por meio do consumo de alimentos saudáveis (hortaliças, frutas, suco natural e alimentos *in natura*/minimamente processados) e de alimentos não saudáveis (refrigerante/suco artificial, tipo de refrigerante e alimentos ultraprocessados), considerando a frequência semanal, diária e/ou no dia anterior ao da entrevista. As prevalências de consumo alimentar foram estimadas segundo o sexo (feminino vs masculino) e as associações determinadas pelo teste de Wald, utilizando regressão logística ajustada.

**Resultados:** Na população estudada, 60,70% eram mulheres. Comparadas aos homens, as mulheres tiveram mais chance de consumir hortaliças cruas, hortaliças cozidas, frutas e suco natural e menos chance de consumir refrigerantes durante a semana. Quanto ao consumo diário, as mulheres apresentaram mais chance de consumir frutas e menos chance de consumir hortaliças cruas, suco e refrigerantes. No dia anterior, as mulheres relataram ter consumido alimentos *in natura*/minimamente processados com mais frequência, exceto feijão e cereais. Quanto aos ultraprocessados, informaram consumir mais bebidas lácteas e pães e menos refrigerantes, biscoito doce e embutidos.

**Conclusões:** Há diferenças no consumo alimentar de idosos segundo o sexo, mostrando a necessidade de estratégias de educação alimentar e nutricional visando à promoção da alimentação adequada e saudável, especialmente pelos homens.

**Palavras-chave:** idoso; dieta; consumo alimentar; sistema de vigilância por inquérito telefônico.

## INTRODUCTION

Due to population aging, special attention is needed to promote health and well-being.<sup>1</sup> Healthy eating is recognized as an essential pillar of healthy aging,<sup>1</sup> chronic non-communicable disease prevention, preserving physical and cognitive functionality, and improved quality of life.<sup>1,2</sup>

The eating habits of older adults are influenced by individual characteristics, such as age, sex, lifestyle habits, and health status, factors related to living conditions, such as education, income, and access to food and social and community support, in addition to changes inherent to aging.<sup>3,4</sup>

Regarding sex, the literature points out food consumption differences between men and women. Dietary pattern studies have shown that women have healthier eating patterns, characterized by the greater consumption of vegetables, fruit, fruit juice, milk, and whole foods.<sup>5,6</sup> A diet quality study of older adults from Viçosa, MG, found that, based on Revised Diet Quality Index scores, women were more likely to have an intermediate- or high-quality diet than men, including greater consumption of healthy foods.<sup>7</sup>

This disparity in eating habits can be explained by the way men and women relate to aspects of health and disease. Historically, individuals reproduce gender-based behaviors learned since childhood, e.g., men are seen as strong, virile, and invulnerable, distancing themselves from self-care and non-communicable disease prevention, while women are encouraged to take care of their health and the health of their families, seeking primary care services more frequently and being more attentive to the appearance of diseases.<sup>8</sup>

Differences in self-care are associated, in part, with higher mortality among older men, which increases with age due to lifelong exposure and continued unhealthy habits in old age.<sup>9</sup> Changes in the eating habits of older men may be contributing to reduced sex-related differences in morbidity and mortality.

Thus, this study aimed to describe the eating habits of older adults living in Brazilian state capitals and the Federal District and to more comprehensively explore the eating profile of older adults of both sexes in an effort to promote healthy and appropriate eating habits.

## METHODS

This cross-sectional analyzed microdata from the Surveillance System for Risk and Protective Factors for Chronic Diseases by Telephone Survey (Vigitel). In Brazil, Vigitel has been used since 2006 to monitor the main determinants of non-communicable diseases. The telephone survey takes place in Brazilian state capitals and the Federal District, with a reference population consisting of adults aged  $\geq 18$  years who live in households with at least one landline telephone.

Vigitel's sampling occurred in two stages: first, at least 5000 telephone lines were selected at random in each of the 27 state capitals, based on the electronic records of the nation's four largest companies. The drawing is systematic and is stratified by postal code. The lines are redrawn and organized into replicates of 200 lines, maintaining the proportion of lines per postal code. The eligible lines are recognized *pari passu* during the interviews. In the second stage, one adult from the contacted household is selected for inclusion.<sup>10</sup>

In all 27 Brazilian capitals, minimum samples of 2000 interviews were selected, considering a 95% confidence interval and a maximum error of 3 percentage points. The post-stratification weight attributed to each interviewed individual was used to adjust the estimates produced through the Vigitel sample to represent the total adult population of each state capital in 2018. The post-stratification weight, which considered the variables sex, age group, and education level, was calculated using the Rake method. The full description of the methodological details has been published elsewhere by the Ministry of Health.<sup>10</sup>

The data were obtained through telephone interviews based on an easy-to-apply questionnaire whose responses are recorded in electronic media.<sup>10</sup> The questionnaire consisted of approximately 90 questions organized into thematic modules.<sup>10</sup>

This study used data from participants aged  $\geq 65$  years, which included sociodemographic characteristics (sex, age, and education) and a food consumption profile associated with non-communicable diseases. The study's outcome variables were:

- Weekly consumption of raw and cooked vegetables, fruit, fruit juice, and soft drinks/artificial juice, classified as 0–2, 3–4, or  $\geq 5$  days, based on the following questions: “How many days a week do you usually eat a lettuce and tomato salad or a salad with any other RAW vegetables or legumes? How many days a week do you usually eat COOKED vegetables or legumes? How many days a week do you usually eat fruit? How many days a week do you usually drink fruit juice? How many days a week do you usually drink soft drinks or artificial juice? The answers were 1 or 2 days, 3 or 4 days, 5 or 6 days, every day, almost never, and never.

- Daily consumption of raw vegetables, cooked vegetables, fruit, fruit juice, and soft drinks/artificial juice. For vegetables, consumption was categorized into 1 or 2 times a day, while for other foods, consumption was categorized into 1, 2,  $\geq 3$  times, based on the following questions: “On a typical day, do you a salad, cooked vegetables or legumes: at lunch (once a day)? At dinner? At lunch and dinner (twice a day)? How many times do you eat fruit: once, twice,  $\geq 3$  times? How many cups of fruit juice do you drink per day: 1, 2, 3 or more? How many cups/cans of soft drinks/artificial juice do you usually drink per day: 1, 2, 3, 4, 5, 6?” The type of soft drink/artificial juice that

each interviewee usually drinks was also investigated, based on the question “What type?”, whose response options were: “normal, diet/light/zero calorie, or both”.

- Food consumption on the day before the interview. Natural/minimally processed foods were categorized as vegetables, fruit, milk, legumes, tubers, pumpkin or okra, cereals, eggs, and oilseeds. Ultra-processed foods (UPFs) were categorized as soft drinks, other sweetened beverages, dairy beverages, margarine, bread (white bread, hot dog buns, and hamburger buns), packaged snacks or crackers, cookies or packaged muffins, sweets/desserts, sausages, ready/semi-prepared meals and sauces. For each item, consumption was classified as “yes” or “no”. Consumption was verified by the question “Now I am going to list some foods, and I would like you to tell me if you ate any of them yesterday (from when you woke up until when you went to bed)”. Among the options, there were 12 subgroups of natural/minimally processed foods and 13 subgroups of UPFs, with responses of “yes” or “no”.

The analyses were performed according to sex (men or women), considering men as the reference category. The prevalence of food consumption was estimated, and the differences between men and women were verified using Pearson's  $\chi^2$  test (Rao-Scott). Logistic regression, adjusted for age and education, was used to obtain the odds ratios and respective 95% confidence intervals for food consumption according to sex, while associations were determined by the Wald test. A 5% significance level was used for the tests. The data were analyzed in Stata 15.1 (Stata Corporation, College Station, TX, USA), considering the weighting factors defined in the Vigitel survey.

Informed Consent was provided at the time of telephone contact. The study was approved by the National Ethics Commission for Research Involving Human Beings of the Ministry of Health (decision 65610017.1.0000.0008).

## RESULTS

Data from 15 338 older adults aged 65 to 106 years were analyzed. The study population was 60.70% women (95%CI 59.02–62.36), with a mean age of 73.68 years (95%CI 73.47–73.89) and a mean education level was 6.95 years (95%CI 6.80–7.11) on average.

As shown in Table 1, approximately one-third of the older adults regularly consumed raw and cooked vegetables and fruit juice  $\geq 5$  times a week, while two-thirds consumed fruit  $\geq 5$  times a week. Almost 14% consumed soft drinks/artificial juice more than twice a week. Women were more likely than men to consume raw and cooked vegetables, juice, and fruit than men. The opposite result was found for soft drinks/artificial juice, with women being less likely to consume them during than men.

The prevalence of raw and cooked vegetables (2 servings per day) and fruit ( $\geq 3$  servings per day) consumption did not reach 30.00% for the older adult group. The majority reported regular soda consumption, and almost 36.00% drank  $\geq 1$  glass of soda per day. Almost 40.00% of the older adults drank  $\geq 2$  cups of juice per day. The odds ratio for daily consumption of raw vegetables (2 servings), juice (2 cups), and soda ( $\geq 2$  cups) was lower in women than men. The odds of consuming  $\geq 2$  cups of fruit/day was approximately 30.00% higher in women vs. men (Table 1).

Table 2 shows the results for consumption of natural/minimally processed and ultra-processed foods on day before the interview. Women consumed vegetables, fruit, milk, tubers and oilseeds more frequently than men and beans and cereals less frequently than men. Of UPFs, women consumed dairy drinks and bread more frequently than men and soft drinks, cookies/crackers, and processed meats less frequently than men.

**TABLE 1.** Prevalence and odds ratios of weekly and daily food consumption among adults aged  $\geq 65$  years according to sex. Vigitel, 2018.

| Food consumption<br>(weekly frequency) | n      | Prevalence % |            |       | Adjusted OR <sup>†</sup><br>(95%CI) |
|----------------------------------------|--------|--------------|------------|-------|-------------------------------------|
|                                        |        | Total        | Men*       | Women |                                     |
| Raw vegetables (times)                 |        |              | p = 0.0081 |       |                                     |
| 0 – 2                                  | 4920   | 35.76        | 35.53      | 35.91 | 1                                   |
| 3 – 4                                  | 4016   | 28.65        | 31.55      | 26.84 | 0.86 (0.71 – 1.04)                  |
| ≥ 5                                    | 5651   | 35.58        | 32.91      | 37.25 | <b>1.21 (1.02 – 1.43)</b>           |
| Cooked vegetables (times)              |        |              | p < 0.0001 |       |                                     |
| 0 – 2                                  | 5584   | 38.68        | 47.39      | 33.22 | 1                                   |
| 3 – 4                                  | 4909   | 33.58        | 31.20      | 35.07 | <b>1.66 (1.39 – 1.97)</b>           |
| ≥ 5                                    | 4094   | 27.74        | 21.42      | 31.70 | <b>2.28 (1.90 – 2.74)</b>           |
| Fruit (times)                          |        |              | p < 0.0001 |       |                                     |
| 0 – 2                                  | 2166   | 15.58        | 20.96      | 12.11 | 1                                   |
| 3 – 4                                  | 2702   | 18.30        | 20.93      | 16.60 | 1.37 (1.09 – 1.71)                  |
| ≥ 5                                    | 10 470 | 66.12        | 58.12      | 71.30 | <b>2.18 (1.79 – 2.67)</b>           |

Continue...

TABLE 1. Continuation.

| Food consumption<br>(weekly frequency) | n      | Prevalence % |                      |       | Adjusted OR <sup>†</sup><br>(95%CI) |
|----------------------------------------|--------|--------------|----------------------|-------|-------------------------------------|
|                                        |        | Total        | Men*                 | Women |                                     |
| Juice (times)                          |        |              | <b>p = 0.0466</b>    |       |                                     |
| 0 – 2                                  | 7535   | 55.18        | 55.85                | 54.74 | 1                                   |
| 3 – 4                                  | 2893   | 17.48        | 18.86                | 16.59 | 0.90 (0.74 – 1.09)                  |
| ≥ 5                                    | 4910   | 27.34        | 25.29                | 28.67 | <b>1.17 (1.00 – 1.37)</b>           |
| Soft drink/artificial juice (times)    |        |              | <b>p &lt; 0.0001</b> |       |                                     |
| 0 – 2                                  | 13 738 | 87.26        | 84.20                | 89.25 | 1                                   |
| 3 – 4                                  | 727    | 5.77         | 7.82                 | 4.44  | <b>0.54 (0.39 – 0.74)</b>           |
| ≥ 5                                    | 873    | 7.97         | 7.98                 | 6.31  | <b>0.74 (0.58 – 0.96)</b>           |
| Food consumption<br>(daily frequency)  | n      | Prevalence % |                      |       | Adjusted OR <sup>†</sup><br>(95%CI) |
|                                        |        | Total        | Men*                 | Women |                                     |
| Raw vegetables (times)                 |        |              | <b>p = 0.0053</b>    |       |                                     |
| 1                                      | 11 017 | 78.55        | 75.63                | 80.41 | 1                                   |
| 2                                      | 2178   | 21.45        | 24.37                | 19.59 | <b>0.77 (0.64 – 0.94)</b>           |
| Cooked vegetables (times)              |        |              | p = 0.1153           |       |                                     |
| 1                                      | 10 608 | 72.30        | 70.57                | 73.35 | 1                                   |
| 2                                      | 3067   | 27.70        | 29.43                | 26.65 | 0.88 (0.74 – 1.05)                  |
| Fruit (times)                          |        |              | <b>p = 0.0012</b>    |       |                                     |
| 1                                      | 6799   | 45.90        | 50.06                | 43.27 | 1                                   |
| 2                                      | 5290   | 35.60        | 32.79                | 37.37 | <b>1.32 (1.12 – 1.54)</b>           |
| ≥ 3                                    | 2690   | 18.50        | 17.15                | 19.36 | <b>1.34 (1.09 – 1.64)</b>           |
| Juice (cups)                           |        |              | p = 0.0779           |       |                                     |
| 1                                      | 6669   | 60.22        | 57.75                | 61.81 | 1                                   |
| 2                                      | 2836   | 27.17        | 29.57                | 25.62 | <b>0.82 (0.68 – 0.99)</b>           |
| ≥ 3                                    | 1439   | 12.62        | 12.68                | 12.58 | 0.95 (0.75 – 1.20)                  |
| Type of soft drink/artificial juice    |        |              | p = 0.3441           |       |                                     |
| Normal                                 | 3024   | 66.09        | 66.97                | 65.38 | 1                                   |
| Diet/light                             | 1216   | 25.72        | 26.10                | 25.42 | 1.02 (0.77 – 1.36)                  |
| Both                                   | 410    | 8.18         | 6.93                 | 9.20  | 1.36 (0.92 – 2.02)                  |
| Soft drink/artificial juice (cups)     |        |              | <b>p &lt; 0.0001</b> |       |                                     |
| 1                                      | 3062   | 64.24        | 56.27                | 70.76 | 1                                   |
| 2                                      | 1125   | 26.51        | 32.02                | 22.00 | <b>0.56 (0.42 – 0.74)</b>           |
| ≥ 3                                    | 385    | 9.25         | 11.71                | 7.24  | <b>0.51 (0.34 – 0.76)</b>           |

\* reference category used for comparison; †odds ratio (OR) adjusted for age and education. 95%CI: 95% confidence interval; n: number of individuals in the unweighted sample; p: p-value of Pearson's  $\chi^2$  test (Rao-Scott); bold: p < 0.05.

TABLE 2. Prevalence and odds ratios for foods consumed on the day before the interview among adults aged ≥ 65 years according to sex. Vigitel, 2018.

| Food consumption in the last 24 hours    | Prevalence % |       |       | P                  | Adjusted OR*<br>(95%CI)   |
|------------------------------------------|--------------|-------|-------|--------------------|---------------------------|
|                                          | Total        | Men   | Women |                    |                           |
| Natural and/or minimally processed foods |              |       |       |                    |                           |
| Vegetables                               | 75.35        | 73.88 | 76.30 | 0.1067             | <b>1.18 (1.01 – 1.38)</b> |
| Fruit                                    | 83.97        | 81.94 | 85.28 | <b>0.0152</b>      | <b>1.29 (1.06 – 1.58)</b> |
| Milk                                     | 69.28        | 64.40 | 72.44 | <b>&lt; 0.0001</b> | <b>1.42 (1.23 – 1.65)</b> |
| Beans                                    | 72.32        | 79.50 | 67.67 | <b>&lt; 0.0001</b> | <b>0.54 (0.46 – 0.63)</b> |
| Roots and tubers                         | 61.10        | 58.39 | 62.85 | <b>0.0130</b>      | <b>1.22 (1.06 – 1.42)</b> |
| Cereals                                  | 83.10        | 85.39 | 81.63 | <b>0.0075</b>      | <b>0.75 (0.61 – 0.91)</b> |
| Meat                                     | 84.74        | 86.16 | 83.82 | 0.0970             | 0.86 (0.69 – 1.07)        |
| Eggs                                     | 38.40        | 40.26 | 37.19 | 0.0753             | 0.89 (0.77 – 1.02)        |
| Oilseeds                                 | 15.31        | 13.83 | 16.26 | <b>0.0479</b>      | <b>1.30 (1.07 – 1.57)</b> |

Continue...

TABLE 2. Continuation.

| Food consumption in the last 24 hours | Prevalence % |       |       | P                  | Adjusted OR*<br>(95%CI)   |
|---------------------------------------|--------------|-------|-------|--------------------|---------------------------|
|                                       | Total        | Men   | Women |                    |                           |
| Ultra-processed foods                 |              |       |       |                    |                           |
| Soft drinks                           | 14.59        | 17.22 | 12.90 | <b>0.0005</b>      | <b>0.70 (0.58 – 0.85)</b> |
| Sweetened beverages                   | 17.48        | 17.19 | 17.67 | 0.7267             | 1.02 (0.85 – 1.23)        |
| Sweetened dairy drinks                | 19.86        | 17.77 | 21.22 | <b>0.0172</b>      | <b>1.27 (1.06 – 1.52)</b> |
| Margarine                             | 37.71        | 35.65 | 39.05 | 0.0610             | 1.15 (0.98 – 1.33)        |
| Breads                                | 24.66        | 23.25 | 25.58 | 0.1214             | <b>1.17 (1.00 – 1.38)</b> |
| Salty crackers                        | 23.77        | 23.73 | 23.79 | 0.9686             | 0.98 (0.83 – 1.16)        |
| Cookies                               | 16.53        | 17.95 | 15.61 | 0.0529             | <b>0.82 (0.69 – 0.97)</b> |
| Sweets                                | 16.23        | 16.50 | 16.05 | 0.7444             | 1.02 (0.83 – 1.25)        |
| Processed meat                        | 16.94        | 21.21 | 14.17 | <b>&lt; 0.0001</b> | <b>0.62 (0.51 – 0.74)</b> |
| Ready/semi-ready dishes and sauces    | 10.61        | 11.79 | 9.84  | 0.0712             | 0.83 (0.67 – 1.03)        |

\* odds ratio (OR) adjusted for age and education. p: p-value of Pearson's  $\chi^2$  test (Rao-Scott); 95%CI: 95% confidence interval; bold: p < 0.05.

## DISCUSSION

Our results showed food consumption disparities among older adults according to sex. Vegetable, juice, and fruit consumption was more frequent among women, while soda/artificial juice consumption was more frequent among men. The odds of consuming fruit more than once a day were higher among women, and the odds of consuming raw vegetables (twice a day) were higher among men. The prevalence of vegetable and fruit consumption in the sample was generally low, and almost 36% drank  $\geq 2$  cups of soda per day. On the day before the interview, women had a higher rate of natural or minimally processed food consumption, but a lower rate of bean and cereal consumption.

A Brazilian study found that women and older adults have a higher prevalence of regular fruit and vegetable consumption and a lower prevalence of regular of sweetened beverage consumption than men.<sup>11</sup> Other studies on the dietary patterns of older Brazilians have found that women have a healthier diet, characterized by greater consumption of raw and cooked vegetables, fruit, chicken, fruit juice, and milk, while the diet of men was more unhealthy.<sup>5,6</sup>

The fact that women have a healthier diet than men has been attributed to several cultural and behavioral factors. In the city of São Paulo, women were found to have a healthier lifestyle than men (43.8 vs. 26.7%; p = 0.0001) based on the interaction of five domains: food consumption, physical activity, smoking, alcohol abuse, and alcohol dependence.<sup>12</sup> Women use health services more frequently<sup>13</sup> and, in general, are more careful with their health and diet than men. In a study of older adults in Pelotas, RS, being female and being guided by a health professional about healthy habits were associated with greater adherence to a healthy eating pattern.<sup>6</sup> A Swedish study found that women more often

avoided foods and additives (preservatives/colorants) perceived as unhealthy and reported learning about a healthy diet, being concerned about food quality, and prioritizing a healthy lifestyle.<sup>14</sup>

According to Brazilian National Health Survey data, older adults generally have a more adequate diet than other age subgroups.<sup>11</sup> However, in recent years, changes have been observed in the Brazilian population's diet. A comparison of the 2008/2009 and the 2017/2018 National Food Surveys indicated lower consumption of rice, beans, beef, bread, fruit, dairy products, processed meats, and soft drinks and an increase in sandwich consumption, regardless of sex and age.<sup>15</sup> Between 2013 and 2019, the National Health Survey identified lower regular consumption of beans, fish, and sugary drinks and higher regular consumption of fruit and red meat among adults, the latter at a maximum of 3 times a week.<sup>11</sup> In this study, women's consumption of beans and cereals on the day before the interview was lower than men. In Brazil in 2008/2009 and 2017/2018, bean consumption fell by 17.2% and rice consumption fell by 11.8% among older adults.<sup>16</sup> The decrease in bean consumption was more pronounced than that of rice, with no significant differences between sexes.<sup>15</sup> The decline in bean consumption has been explained by factors such as greater consumption of UPFs, as well as of meat and eggs,<sup>17</sup> a lack of time to cook, reduced family size, a reduced planting area for commodities such as soybeans, corn, and wheat, which are used to produce UPFs and animal feed, resulting in higher prices.<sup>18</sup> Regarding the differences in bean consumption by sex, the lower prevalence in women may be due to the replacement of meals with snacks, greater dietary variety, and concern with body weight.

The *Dietary Guidelines for the Brazilian Population* recommend daily consumption of beans or other legumes, preferably

at lunch and dinner. Beans are an important source of proteins, vitamins, complex carbohydrates, and dietary fiber and are a nutritional complement to dishes based on rice or other cereals. Bean consumption can be encouraged by simple culinary techniques, such as presoaking to reduce cooking time, cooking them in a pressure cooker, mashing some to thicken the broth, and freezing small portions to facilitate daily consumption.<sup>19</sup> Adequate protein intake should be encouraged to avoid the loss of muscle mass and strength, prioritizing plant-based food sources to control low-grade chronic inflammation.<sup>20-22</sup>

Women consumed more roots and tubers and oilseeds on the day before the interview than men. Over the last ten years, tuber consumption has generally increased among older adults.<sup>16</sup> Regular consumption of tubers, which include cassava/yucca, sweet potato, taro, and yam, is important for older adult health, since they are a source of energy, dietary fiber, vitamins, and minerals, in addition to being versatile foods that can be cooked, fried, or baked and used in soups, salads, purees, and pasta.<sup>19</sup>

Only 15.31% of our sample reported eating nuts on the day before the interview. The *Dietary Guidelines for the Brazilian Population* encourage consumption of this food group due to its antioxidant content, which helps prevent diseases, in addition to being a source of minerals, vitamins, dietary fiber, and unsaturated fats. However, data from 2017 and 2018 indicate low consumption of nuts among older Brazilians (1.4%).<sup>16</sup> Cubas-Basterrechea et al.<sup>23</sup> also found low nut consumption (40.2%) among older Spaniards. This may be related to several factors, such as cost, the notion that they promote weight gain due to their high fat content, and chewing problems and dysphagia, which can impede consumption. However, certain strategies can encourage nut consumption, such as grinding them and adding them to foods that are easy to chew and swallow, such as yogurt.<sup>23,24</sup>

In the present study, women had higher consumption of dairy drinks and breads and lower consumption of soft drinks, cookies/crackers, and processed meats than men. All of the above are considered UPFs, containing little or no whole food, dietary fiber, or micronutrients and being rich in sugars and fats.<sup>25</sup> Surveys have found that staple foods, such as rice and beans, are being replaced by increased UPF consumption, although the *Dietary Guidelines for the Brazilian Population* emphasize the importance of avoiding UPFs.<sup>15,16</sup> These foods are harmful to health, being associated in the literature with outcomes such as diabetes, hypertension, and obesity.<sup>26</sup>

Sandoval-Insausti et al.<sup>27</sup> followed older adults for 3.5 years, observing that UPF consumption increases the risk of frailty syndrome. High UPF consumption has also been associated with

dyslipidemia among older Spaniards,<sup>8</sup> in addition to a decline in renal function in a cohort of older adults followed for six years.<sup>29</sup>

At this stage of life, physiological, psychological, and social changes occur that directly affect food choices and nutrition.<sup>19,30</sup> Considering these changes, as well as changes in eating patterns (i.e., increased consumption of UPFs), nutritionists or other health professionals must encourage their older patients to plan and adhere to a healthy diet.<sup>19,31</sup> *Dietary Guidelines for the Brazilian Population* usage protocols, including one for older adults, were developed to prepare professionals working in primary health care for individual nutritional guidance. The QualiGuia project seeks to implement initiatives to improve nutritional care and continuing health education based on these protocols.<sup>19</sup> When providing nutritional guidance to older adults, it is extremely important for health professionals to consider the territory in which the patient lives, since this will affect which foods are produced and sold, as well as local food customs and traditions.<sup>32</sup>

The present study had certain limitations, such as its cross-sectional design, which precludes inferences of causality; the use of simplified screening instruments, which do not provide thorough dietary details and are subject to memory bias, which can occur in this population.

However, as strengths, the study is representative of the older Brazilian population living in state capitals and the Federal District, which allowed us to determine their food consumption according to sex. Another strength was the use of telephone surveys, which are low-cost and allow a quick situational assessment of the population.

## CONCLUSIONS

This study found sex-based differences in food consumption among older Brazilians who reside in state capitals. The eating habits of women were healthier, including greater consumption of vegetables, fruit, milk, tubers, and oilseeds, while men consumed more UPFs (soft drinks, processed meats, and cookies), in addition to more frequent raw and cooked vegetable consumption during the day (twice).

According to our results, the eating habits of older adults, especially men, require improvement. Thus, nutritional education strategies are needed to promote healthy eating habits for older adults, their families, and their caregivers, such as cooking workshops, discussion groups, measures to encourage meals at the table and with company, and guidance on access to food and nutrition security facilities (retail and market stalls that sell food at affordable prices, food banks, community gardens, solidarity kitchens, and restaurants). The role of

nutritionists is important in improving the eating habits of older adults, thus reducing the development and worsening of non-communicable diseases and providing them with a better quality of life.

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### DECLARATIONS

#### Conflicts of interest

The authors declare no conflict of interest.

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#### Author contributions

Lidiane Barbosa Santiago: formal analysis, conceptualization, data curation, writing – first draft, writing – review and editing, methodology, visualization. Priscila Maria Stolses Bergamo Francisco: writing – review and editing, methodology. Monize Cocetti: writing – review and editing. Daniela de Assumpção: formal analysis, conceptualization, data curation, writing – first draft, writing – review and editing, methodology, visualization.

#### Ethics approval and informed consent

The study was approved by the Ministry of Health's National Ethics Committee for Research involving Human Beings (decision 65610017.1.0000.0008).

#### Data Availability Statement

The Vigitel 2018 database, which is public domain with open access, is available at <https://svs.aids.gov.br/download/Vigitel/>.

#### Reporting Standards Guidelines

STROBE checklist: cross-sectional studies.

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