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High prevalence of inadequate dietary fiber consumption and associated factors in older adults: a population-based study

Elevada prevalência de inadequação do consumo de fibras alimentares em idosos e fatores associados: um estudo de base populacional

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ABSTRACT: ***Introduction:*** Several factors can lead to changes in dietary practices of the older adults; which contributes with nutritional recommendations not being met. ***Objectives:*** To estimate the prevalence of inadequate dietary fiber consumption and to identify associated factors. ***Methodology:*** Population-based, cross-sectional study that used data from a health survey in the municipality of Campinas, SP, Brazil, held in 2008/2009, in which 1,509 individuals aged 60 or older were assessed. Food consumption was estimated through a 24-hour recall, and the prevalence of inadequacy was calculated according to the Institute of Medicine's cut-off point for total fiber (30 g/day for men and 21 g/day for women). Associated factors were identified using the hierarchical Poisson regression model to estimate the prevalence, adjusted for block distal (sociodemographic) and proximal variables (health and lifestyle indicators). ***Results:*** Inadequate consumption was observed in 90.1% of the population, and after adjustments in the final model, this rate remained significantly higher among males (RP = 1.06), seniors with a partner (RP = 1.05), lower income (RP = 0.95), physically inactive (RP = 1.05) and those who would not like to change body weight (RP = 1.05). ***Conclusion:*** Considering that inadequacy of dietary fiber was very high, the whole 60-year-old or older population must be targeted for nutritional intervention in order to ensure adequate intake of this nutrient.

Keywords: Aged. Food consumption. Dietary fiber. Health surveys.

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RESUMO: ***Introdução:*** Vários fatores podem gerar mudanças nas práticas alimentares dos idosos, contribuindo para que as recomendações nutricionais não sejam atendidas. ***Objetivo:*** Estimar a prevalência de inadequação do consumo de fibras alimentares e seus fatores associados. ***Metodologia:*** Estudo transversal de base populacional que utilizou dados do Inquérito de Saúde no Município de Campinas, realizado em 2008/2009, no qual foram analisados 1.509 indivíduos ≥ 60 anos. O consumo alimentar foi estimado por meio do recordatório de 24 horas, e foi calculada a prevalência de inadequação de acordo com o ponto de corte para fibras totais do Institute of Medicine de 30 g/dia para homens e 21 g/dia para mulheres. Os fatores associados foram identificados utilizando modelo hierárquico de regressão de Poisson para estimativa das razões de prevalência, ajustados por variáveis de bloco distal (sociodemográficos) e bloco proximal (condições de saúde e indicadores de estilo de vida). ***Resultados:*** A inadequação do consumo de fibras alimentares foi observada em 90,1% da população, significantemente maior no sexo masculino (RP = 1,06), em idosos com parceiro (RP = 1,05), de menor renda (RP = 0,95), inativos fisicamente (RP = 1,05) e naqueles que não gostariam de mudar o peso corporal (RP = 1,05). ***Conclusão:*** Considerando que a inadequação de fibras alimentares foi muito elevada, toda a população de 60 anos ou mais deve ser alvo de intervenção nutricional para garantir o aporte adequado desse nutriente.

Palavras-chave: Idoso. Consumo alimentar. Fibras alimentares. Inquéritos de saúde.

INTRODUCTION

In older adults, several biological, social and psychological factors can lead to changes in eating practices[1]. The aging process per se brings various physiological changes, such as sensory alterations in smell and taste, impairment of chewing capacity, gastric emptying and neuroendocrine changes associated with early satiety and reduced appetite and eating pleasure[2,3]. Added to these are psychosocial factors such as retirement, widowhood, children leaving home, reduced purchasing power, which favor isolation and solitude, and the difficulty of preparing meals and eating foods[1].

These factors contribute to older adults not having a nutritionally adequate diet meeting the daily recommendation of dietary fiber intake, which is 30 g for men and 21 g for women, over the age of 50, on a diet of 2,000 kcal per day, according to the Dietary Reference Intakes (DRIs) values of the Institute of Medicine[4].

Dietary fibers are classified as soluble and insoluble. Soluble fibers are viscous and easily fermentable in the large intestine[5], may delay gastric emptying and affect insulin secretion and action[6]. In contrast, insoluble fibers have limited fermentation in the large intestine and are not soluble in water, which leads to an increase in the volume of faeces[5], besides activating the release of hormones involved in the regulation of food intake into the intestine[6].

Studies have shown that dietary fibers produce beneficial effects on health by reducing the risk of occurrence and complications of coronary artery disease, stroke, hypertension, diabetes mellitus and gastrointestinal problems[5] such as constipation, hemorrhoids,

hiatal hernia, diverticulitis and colon cancer. They can also contribute to the prevention and treatment of obesity by lowering blood cholesterol and regulating blood glucose after meals[7].

Especially among older adults, adequate dietary fiber intake can improve overall health, taking into account the increased burden of chronic noncommunicable diseases, as well as decreased levels of physical activity and the so-called food monotony, which increase intestinal constipation[6].

Therefore, the objective of this study was to estimate the prevalence of inadequate consumption of dietary fiber and associated factors in older adults aged 60 years or more.

METHODOLOGY

POPULATION AND SAMPLE

This is a cross-sectional, population-based study that gathered information from 1,509 non-institutionalized older adults (≥ 60 years old) who participated in the Campinas Municipal Health Survey (ISACAMP) conducted between 2008 and 2009.

ISACAMP comprised three age groups: adolescents (10-19 years), adults (20-59 years) and older adults (60 years and over). Its sample calculation was made by conglomerates in two stages. In the first stage, 50 census tracts of the urban area of the municipality were drawn, with probability proportional to size (number of households). In the second stage, a sample of households was drawn, considering that the total number of interviews per sector should not exceed 20 per age group (adolescents, adults and older adults). More details on the sample process are described in the literature8.

This research was submitted to the Research Ethics Committee of *Universidade Estadual e Campinas* (UNICAMP), and was approved on January 4, 2015, under the Certificate of Presentation for Ethical Assessment (CAEE) n. 51336015.8.0000.5404.

STUDY VARIABLES

The information was collected through a structured questionnaire, applied by interviewers trained directly to the selected subjects, or to the caregiver/family member if they were unable to respond, in situations such as low consciousness level, speech difficulties, hearing loss, among others.

To assess food consumption, the 24-Hour Record (R24h) was used, a method consisting in collection and quantification of all foods and beverages ingested throughout the day before the interview[9]. To improve the quality of information collected, interviews were aided by a photo album for food surveys[10]. Food quantities were recorded in household measurements and then transformed into grams or milliliters to be included in the Nutrition Data System

for Research 2007 software (Nutrition Coordinating Center, University of Minnesota). The analysis for data consistency was performed by checking the R24h presenting energy less than 800 kcal and more than 3500 kcal, to assure no typing error was present, and then included in the analysis.

The dependent variable was consumption of total dietary fibers (soluble and insoluble), estimated in average intake (grams) according to the report of food consumption in 24 hours prior to the interview. The parameters used for fiber quantification were based on the main sources of this nutrient: fruits, vegetables and whole grains. Consumption was considered inadequate when below the cut-off point for total fibers, according to the Institute of Medicine, from 30 g/day for men and 21 g/day for women over 50, on a 2,000 kcal diet[4].

The independent variables considered in the analyzes of factors associated with the consumption of dietary fiber were:

- Demographic and socioeconomic data: sex; age (60-74 years and ≥75 years), marital status (with partner and without partner), and per capita family income in minimum wages (<1, between 1 and 2, and > 2 minimum wages);
- Health conditions: number of self-reported chronic diseases (hypertension, diabetes, heart disease, cancer, rheumatism/arthritis/arthrosis, osteoporosis and circulation problems), categorized into: none, 1 or 2, and 3 or more diseases;
- Lifestyle indicators: practice of leisure physical activity assessed by the International Physical Activity Questionnaire (IPAQ), considering individuals who practice at least 150 minutes per week, distributed in at least three days[11]; smoking (categorized as never smoked, smoker and former smoker); interest in changing weight (yes or no); and hours of daily sleep (<7, between 7 to 9 hours, and > 9 hours).

STATISTICAL ANALYSIS

In the descriptive analysis, mean and standard errors were calculated for continuous variables and proportions for categorical variables. The differences between groups were calculated with the test of equality between Wald averages and the χ^2 test with Rao-Scott correction, which take into account sample weights for population estimates. The prevalence of inadequate total fiber consumption was calculated on the basis of less than 30 g/day for men and 21 g/day for women[4].

Factors associated with inadequate total fiber consumption were identified by a hierarchical Poisson regression model with estimates of crude and adjusted prevalence ratios (PR). In these models, the dependent variable was inadequate fiber intake, and the independent variables were tested in blocks, inserted in the following order: distal block (demographic and socioeconomic factors) and proximal block (health conditions and lifestyle indicators).

In the first stage of the multiple model, we included demographic and socioeconomic variables that presented $p<0.20$ in the bivariate analysis; those considered significant ($p<0.05$) were maintained in the model. In the second stage, the variables related to health conditions

and lifestyle were added, so the final model only held those presenting $p<0.05$. Analyzes were performed in the Stata software version 12, considering sample weights to ensure the representativeness of the population in the city of Campinas.

RESULTS

Among the households selected for interviews, we had a loss of 6.5%, due to difficulty in finding a resident in the residence. Of the 1,558 older adults identified, 2.5% did not agree to participate in the survey, so the total number of interviews was 1,519. In relation to R24h, ten subjects refused to respond to it, and the sample of 1,509 people was then analyzed. The proportion of older adults who were unable to answer the questionnaire and had an auxiliary informant (caregivers) was 6% (n=88).

Most of the participants were women (60%), in a predominantly younger age group, from 60 to 74 years old (76%), who had partners (55%) and income below a minimum wage (41%), had one or two non-communicable chronic diseases (47%), non-smokers (68%), no desire to change body weight (59%) and sleep between 7 and 9 hours a day (67%).

The prevalence of inadequate intake of dietary fiber was 90.1% in the population studied, with average 13.5 g. Table 1 shows the mean values of total, soluble and insoluble fibers according to the independent variables of the study. The consumption was higher among females, in individuals aged 75 years or more, who had no partners, and who received more than two minimum wages. Lower values were observed among inactive older adults, the smokers, those who were not interested in changing their weight, and who sleeping more than 9 hours a day.

Table 2 shows the results of inadequacy per study variables. Inadequate consumption of dietary fibers was very high in this population, and even higher among men, subjects who had a partner, and in older adults with lower income. Regarding lifestyle variables, the prevalence was higher among physically inactive subjects, as well as smokers, those reporting not wanting to change body weight (gain or lose), and those who reported the more sleep hours per day.

After adjusting for the final model (Table 3), the factors associated with the higher prevalence of inadequate consumption of total dietary fiber were: being a male, having a partner, having lower income, being physically inactive, not having a desire to change body weight, and sleeping more than nine hours daily. Age in years and number of chronic diseases were not significant.

DISCUSSION

In this study, a high inadequacy of dietary fiber consumption was identified in the subjects evaluated, reaching 90.1% of inadequacy, with the average 13.5 g/day being much

Table 1. Mean and 95% confidence intervals (95%CI) of dietary fiber intake among older adults according to demographic, socioeconomic, health conditions and lifestyle indicators (n=1,509), Health Survey of the Municipality of Campinas (ISACAMP), 2008-2009.

Variables and categories	Total DF Mean (95%CI)	p*	Soluble DF Mean (95%CI)	p*	Insoluble DF Mean (95%CI)	p*
Total	13.51 (12.64; 14.38)	-	3.44 (3.16; 3.71)	-	9.94 (9.33; 10.56)	-
Sex						
Female	13.13 (12.22; 14.03)	-	3.47 (3.17; 3.76)	-	9.54 (8.89; 10.20)	-
Male	14.01 (12.84; 15.19)	0.113	3.39 (3.06; 3.72)	0.562	10.48 (9.60; 11.36)	0.039
Age range (years)						
60–74	13.46 (12.46; 14.46)	-	3.38 (3.08; 3.68)	-	9.95 (9.21; 10.68)	-
> 75	13.64 (12.59; 14.69)	0.755	3.58 (3.22; 3.94)	0.249	9.93 (9.17; 10.69)	0.969
Marital status						
No partner	13.82 (12.72; 14.92)	-	3.60 (3.25; 3.95)	-	10.09 (9.29; 10.09)	-
With partner	13.27 (12.31; 14.23)	0.318	3.31 (3.02; 3.60	0.072	9.83 (9.15; 10.52)	0.529
Income (minimum wages)						
< 1	12.01 (11.02; 13.00)	-	2.93 (2.62; 3.24)	-	8.97 (8.24; 9.70)	-
1–2	13.49 (12.31; 14.67)	0.024	3.34 (2.97; 3.71)	0.055	10.01 (9.13; 10.89)	0.035
> 2	15.55 (14.53; 16.57)	< 0.001	4.21 (3.85; 4.58)	< 0.001	11.19 (10.48; 11.90)	< 0.001
Chronic diseases						
0	14.09 (12.87; 15.30)	-	3.49 (3.10; 3.88)	-	10.44 (9.54; 10.33)	-
1–2	13.57 (12.36; 14.78)	0.339	3.48 (3.12; 3.85)	0.973	9.94 (9.07; 10.80)	0.210
> 3	13.09 (12.28; 13.90)	0.437	3.34 (3.05; 3.63)	0.466	9.67 (9.04; 10.30)	0.116

Continue...

Table 1. Continuation.

Variables and categories	Total DF Mean (95%CI)	p*	Soluble DF Mean (95%CI)	p*	Insoluble DF Mean (95%CI)	p*
Physical activity						
Active	15.34 (14.17; 16.50)	-	4.02 (3.64; 4.39)	-	11.20 (10.36; 12.03)	-
Inactive/ insufficiently active	12.64 (11.79; 13.49)	< 0.001	3.16 (2.89; 3.43)	< 0.001	9.35 (8.74; 9.96)	< 0.001
Smoking						
Non smoker	13.70 (12.75; 14.64)	-	3.55 (3.24; 3.86)	-	10.11 (9.57; 10.65)	-
Former smoker	14.51 (12.98; 16.03)	0.292	3.64 (3.17; 4.12)	0.716	10.07 (9.32; 10.82)	0.233
Smoker	10.65 (9.53; 11.78)	< 0.001	2.40 (1.99; 2.80)	< 0.001	8.42 (7.66; 9.19)	< 0.001
Desire to change weight						
Yes	14.41 (13.12; 15.69)	-	3.68 (3.29; 4.06)	-	10.61 (9.67; 11.55)	-
No	12.92 (12.08; 13.77)	0.016	3.28 (2.99; 3.56)	0.035	9.51 (8.92; 10.08)	0.018
Sleep (hours/day)						
< 7	14.29 (13.10; 15.48)	-	3.81 (3.35; 4.26)	-	10.33 (9.53; 11.12)	-
7–9	13.48 (12.52; 14.44)	0.146	3.42 (3.15; 3.69)	0.064	9.94 (9.23; 10.66)	0.309
> 9	12.91 (11.66; 14.16)	0.049	3.11 (2.73; 3.51)	0.003	9.66 (8.74; 10.58)	0.215

Note: mean values (g); * χ^2 test.

lower than recommendations of the Institute of Medicine[4], given the size of the sample. In addition, greater inadequacy was observed among males, with partner, low income segments, who were not physically active at leisure times, smokers, those who did not want to change their body weight (gain or lose), and those who slept more than 9 hours daily.

These results resemble international data. A study that used data from the National Health and Nutrition Examination Survey (NHANES) over 10 years (2001-2010) reported the average consumption of dietary fibers below recommendations, being on average 16.1 g/day in the older population (50 years and over)[12]. Brazil lacks studies that have proposed to analyze food consumption by older adults.

Table 2. Prevalence of inadequate total fiber consumption (%), 95% confidence interval (95% CI) and prevalence ratio (RP) according to socioeconomic, health and lifestyle characteristics (n=1,509), Health Survey of the Municipality of Campinas (ISACAMP), 2008-2009.

Variables and categories	n	Inadequate* (95%CI)	RP	p**
Sex				
Female	899	87.1 (83.6; 89.9)	-	-
Male	611	94.4 (91.5; 96.3)	1.08	< 0.001
Age range (years)				
60–74	1,094	90.6 (87.9; 92.8)	-	-
> 75	416	89.1 (85.1; 92.1)	0.98	0.298
Marital status				
No partner	672	86.7 (82.5; 89.9)	-	-
With partner	838	92.9 (90.3; 94.9)	1.07	0.002
Income (minimum wages)				
< 1	619	93.5 (90.7; 95.5)	-	-
1–2	459	89.0 (84.4; 92.3)	0.95	0.017
> 2	434	87.0 (83.3; 90.0)	0.93	0.002
Chronic diseases				
0	284	89.3 (85.2; 92.4)	-	-
1–2	704	91.2 (86.9; 94.2)	1.02	0.394
> 3	500	89.4 (86.2; 92.0)	1.00	0.963
Physical activity				
Active	478	86.5 (83.1; 89.3)	-	-
Inactive/insufficiently active	1,034	91.9 (89.1; 94.1)	1.06	0.001
Smoking				
Non smoker	1,031	88.8 (85.6; 91.4)	-	-
Former smoker	306	91.6 (87.3; 94.6)	1.03	0.184
Smoker	172	95.5 (91.3; 97.8)	1.07	< 0.001
Desire to change weight				
Yes	611	87.2 (82.8; 90.6)	-	-
No	894	92.2 (89.4; 94.3)	1.05	0.017
Sleep (hours/day)				
< 7	329	85.1 (79.9; 89.1)	-	-
7–9	997	91.5 (88.8; 93.7)	1.07	0.005
> 9	169	91.8 (87.4; 94.8)	1.08	0.023

*Intake of dietary fibers below 21 g/day for women and 30 g/day for men; ** χ^2 test.

Table 3. Factors associated with inadequate intake of dietary fibers in Poisson multiple regression models, prevalence ratio (PR) and 95% confidence intervals (95%CI).

Variables and categories	Model 1[a]		Model 2[b]	
	RP	95%CI	RP	95%CI
Male sex	1.07	(1.03; 1.11)*	1.06	(1.02; 1.10)*
Age (years)	1.00	(0.99; 1.00)	1.00	(0.99; 1.00)
With partner	1.05	(1.00; 1.09)*	1.05	(1.00; 1.10)*
Income (minimum wages)				
< 1	1.00	-	1.00	-
1–2	0.95	(0.91; 0.99)*	0.95	(0.92; 0.99)*
> 2	0.92	(0.88; 0.97)*	0.95	(0.91; 1.00)*
Chronic diseases				
0	-	-	1.00	-
1–2	-	-	1.04	(0.99; 1.09)
>3	-	-	1.04	(0.99; 1.09)
Physically inactive	-	-	1.05	(1.02; 1.09)*
Does not wish to change weight	-	-	1.05	(1.00; 1.10)*
Sleep (hours/day)				
< 7	-	-	1.00	-
7–9	-	-	1.08	(1.03; 1.13)*
> 9	-	-	1.07	(1.00; 1.14)*

*p < 0,05; [a] socioeconomic variables included; [b] socioeconomic variables included, as well as health conditions and lifestyle indicators.

A review study that compiled the existing research from European countries and countries such as Australia, New Zealand and the United States on dietary fiber consumption showed that the average consumption in these countries ranged from 15 to 25 g/day for males and 14 to 21 g/day for females. That is, none of the countries has met the existing dietary recommendations. The lowest mean intake of dietary fiber was found in Canada and the United States, while the highest was reported in the National Nutrition Survey in Germany in 2005/06, where mean intake among men was 25 g/day and among women 23 g/dia[13].

It is suggested that the high inadequacy of dietary fiber would be related to the increase in consumption of ultra-processed food, that is, ready-to-eat foods that require little or no preparation and whose production processes involve the addition of salt and/or sugar, frying, smoking, pickling and frequent use of preservatives and cosmetic additives[14]. The amount of dietary fiber in these foods is minimal.

Data from the Family Budget Survey (Pesquisa de Orçamento Familiar, POF) in Brazil in 2008/2009 report an increase in the consumption of ultra-processed foods and a decrease in minimally processed foods compared to the previous survey of 2002/2003[15]. These findings are related to the amount of dietary fiber available in such foods. That is, the higher the level of food processing, the smaller the amounts of dietary fiber.

According to the Dietary Guidelines for Americans, at least three servings of whole grains should be consumed daily[16]. The Food Guide for the Brazilian Population does not have a specific recommendation for whole grains, but it is suggested that one should give preference to whole grains rather than refined grains, besides recommending that food be based on *in-natura* or minimally processed food varieties, and the consumption of processed and ultra-processed foods be limited. Using data from POF 2008-2009, a study that evaluated the intake of nutrients in 4,322 people aged 60 years and over, showed that this population made insufficient consumption of fruits, vegetables and vegetables, consuming one-third of what is recommended by the Food Guide[18].

Regarding differences in dietary fiber consumption between sexes, the results indicate that men have the highest prevalence of inadequacy in relation to women, 94.4 and 87.1%, respectively. A study that evaluated the main dietary sources of dietary fiber, such as fruits, vegetables, greens and whole grains, using the Diet Index of the Elderly Diet (IQD-I) with 1,426 people from Pelotas, found that this type of food consumption was twice as high in men. That is, they would make higher consumption of foods considered of low quality (fried foods, sweets, soft drinks, processed foods)[19] and, thus, lower consumption of dietary fibers. This result was also observed in other studies carried out in different regions of the country[20,21].

Regarding socioeconomic conditions, the results showed that, as conditions improve, the inadequacy of dietary fiber consumption decreases. This can be corroborated in other population studies that evaluated the consumption of fiber-rich foods, such as cereals, fruits and vegetables, in the older adult population in the regions of São Paulo and Brazilian metropolitan regions, according to POF data (2008-2009), respectively. These studies also reported that the consumption of food with more fibers increased proportionately according to income[18,22]. In a cross-sectional investigation that evaluated the dietary patterns of 402 older adults in Viçosa (MG), through a factorial analysis based on the Food Frequency Questionnaire (FFQ), low leaf and fruit intake was associated the worst socioeconomic conditions[23].

Similar results concerning the population with the lowest purchasing power of foods rich in dietary fiber are reported in other countries, like the study carried out with adults in Boston, USA, which evaluated the purchase of fiber-rich foods by per capita income; it was found that those with higher income or more years of education reported purchasing more foods source of fibers, from fresh and frozen vegetables, and less pasta[24].

Dessa maneira, tanto os achados aqui apresentados quanto os reportados anteriormente na literatura indicam que os aspectos sociodemográficos como a renda e escolaridade são determinantes na qualidade da dieta e, consequentemente, na ingestão de fibras alimentares. Ou seja, quanto melhores essas condições, maiores as chances de consumo adequado de fibras[25-27].

Thus, both the findings presented here and those previously reported in the literature indicate that the sociodemographic aspects such as income and schooling are determinant in the quality of the diet and, consequently, in the dietary fiber intake. That is, the better these conditions, the greater the chances of adequate fiber consumption[25-27].

The hypothesis for this condition is the cost of foods that are source fibers (fresh vegetables and whole products), which is generally higher than the foods poor in such nutrient. Claro et al. evaluated the influence of income and food prices on the presence of fruits and vegetables in household food consumption based on data from the 1998-1999 POF in the city of São Paulo, and stated that the group of fruits and vegetables presented average cost of R$ 4.07/1,000 Kcal against R$ 2.39/1,000 Kcal for all other foods, indicating that increasing family income or reducing the relative price of fruit and vegetables would be possible ways to increase the insertion of these foods one's diet[28]. In addition, Damiani et al. still argue that schooling influences the choice of healthy foods, since it can mean access to better opportunities for employment, income and information[29].

Regarding lifestyle, the physically active participants and those who have the interest of changing body weight presented lower prevalence of inadequate consumptions. It is known that individuals who have more information about health, or are more concerned with disease prevention, tend to maintain healthier habits, such as physical activity and more adequate food consumption[21,30]. Regarding the desire to change body weight, the increase in fiber consumption in general is recommended because of the lower energetic level of foods rich in this nutrient[31]. It is possible, based on the cross-cutting nature of the present study, that these people have already undergone feeding guidance and have modified their habits according to their desire to change body weight.

In the evaluation of sleep hours, the present study showed that older adults who reported sleeping over nine hours per day had a higher prevalence of inadequate dietary fiber intake compared to those with shorter sleep time and medium sleep time (between 7 and 9 hours). A study that evaluated the association of sleep duration with self-reported health status by older adults, using ISACAMP data from 2008-2009, showed that a longer duration of sleep was associated with poorer health status among older adults, with significant differences between sexes[32]. Therefore, those who reported having a longer sleep time can experience a more debilitated state of health, or are under the effect of specific medications and, therefore, have a lower intake of dietary fiber.

This study has some limitations that must be taken into account when interpreting its results. The method used to evaluate consumption, R24h, applied only once, does not allow to evaluate the habitual consumption of individuals, but, when applied in a population base, can estimate the average consumption of the target population. This method is also susceptible to the memory of individuals, which may be compromised in older adults, however it is the most common method of application in population surveys, due to its ease of application, cost effectiveness and level of detail of portions. Another limitation was the bias of heterogeneity of responses when the respondent was the caregiver and not the selected subjects, but the proportion of these participants was minimal in the population.

In a sensitivity analysis, we tested the model excluding older adults with auxiliary responders, and the results did not differ from the total sample (data not shown). In addition, because this was a cross-sectional study, it was not possible to assess whether the associations found would have a cause-and-effect relationship.

CONCLUSION

Considering the high prevalence of older adults who make inadequate consumption of dietary fiber, the entire population aged 60 and over should be subject of nutritional intervention to ensure adequate intake of this nutrient. This study brought important findings of populational relevance as for the presence of dietary fibers in the diet of older adults, pointing out, in the most vulnerable groups, the worst intake and association with other unhealthy behaviors, thus indicating that health promotion strategies should be broad, and not focused on a single factor.

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