Food lists from the diet of a group of elderly individuals: Analysis and perspectives

Abstract

Background: Despite the phenomena of population aging, Brazilian studies related to the feeding practices of elderly individuals are scarce. **Aims:** To develop a list of the most ingested foods from community-dwelling elderly persons in the east-zone of São Paulo- Brazil and to analyse the foods that contribute most to relevant health-related nutrients of these individuals. **Methods:** The study was performed with 100 individuals aged 60 years and above, registered at a local reference center. To describe the nutritional status, the weight and stature were measured and the BMI- body mass index was calculated. To develop the food lists, two 24h food recalls were applied, during two different seasons of the year. The food recalls were analysed for food intake frequency and for percentage contribution of each food and each nutrient: energy, macronutrients, calcium and vitamin D. **Results:** The participants were classified as following: 52% with BMI ≤ 28 kg/m^2; 15% with BMI between 28 and 30 kg/m^2; 26% between 30 and 35 kg/m^2 and 7% presented BMI> 35 kg/m^2. The positive aspects related to food intake were rice, bean and green vegetable consumption. As negative aspects, we observed that the diet pattern was repetitive, since few foods contributed to a high number of nutrients. Furthermore, a high ingestion of refined carbohydrates was observed instead of whole foods. **Conclusion:** The food lists allowed reflecting on educative interventions, and also allow future development of different food frequency questionnaires that are specific for this group.

Key-words: Elderly, diet, nutrition assessment, food list, food records, food frequency questionnaire.

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Introduction

According to the year 2000 Brazilian Census, elderly people constitute 14.5 million of persons, double that of the 1980 Brazilian Census. In percentages, individuals above 60 years increased from 4.2%, in 1950, to 8.6% in 2000, and are predicted to reach 14.2% in 2020. São Paulo is the fourth city in numbers of elderly, and a high number of this population is located at the East Zone of the City[1]. These data clearly show a need for researching and understanding the aging processes, with the aim of thinking about strategies for interventions directed at this populational group.

Aging is known to be a process of physiologic, psychological and social changes, which happen throughout the life[2]. These changes have effects on the nutritional status, which in turn are related to health[3]. Is this context, a healthy diet and, consequently, the maintenance of an adequate nutritional status is important for health and, therefore, to successful aging[4,5].

A healthy diet embraces different foods from animal and vegetal sources, which are quantitatively adequate for individuals[6]. The Food Guide directed to Brazilian Population[6], despite its relevance, did not establish any specific reference for the elderly. It is important to highlight that food recommendations for the elderly should take into account the changes related to this life stage, including an enhanced risk of chronic diseases such as hypertension, diabetes, dislipidemic status, osteoporosis, amongst others[7].

The nutritional evaluation of the elderly should include, therefore, a detailed anamnesis regarding physical modifications observed and/or referred[8]. Nutritional assessment include different methods and techniques, of these the evaluation of food intake deserves special attention. The 24h-food recall (R24h) and the food frequency questionnaire (FFQ) are the most adopted methods in epidemiologic studies. R24h is a retrospective method where the subject describes all the food ingested in the previous day[9,10]. In turn, FFQ is composed of one list of foods followed by their respective frequency of intake (in days, weeks, months or years); some FFQ may describe the size of servings[11]. FFQ have the advantage of being self-applicable, besides the fact of being practical and fast. As such, a number of studies have adopted this tool.

One of the recommended steps in developing a FFQ is a previous development of a food list, which needs a previous R24h as a reference. In order to develop a food list, it is necessary to take into account the foods that represent the most significant quantities of nutrients, taking into consideration the serving size and frequency of consumption. The list should describe a sufficient number of foods that can represent the food habits of the target population/group. In addition, this list should not allow answers in duplicate, which could overestimate the food intake[12,13].

Considering the relevance of the diet analysis for the nutritional evaluation of the elderly, and also considering the lack of this kind of analysis in the literature, the present study aimed to: - set up a list of the foods most consumed by a group of elderly people from the East Zone of São Paulo- SP-Brazil, aiming to, in the future, develop a Food Frequency Questionnaire; - analyzing and discussing the foods that contribute the most to the consumption of the relevant nutrients related to health and nutrition of the elderly.

Methods

Location of the study

All the steps of the present research (volunteer recruitment, clarification of the importance of the study, and data collection) were performed at the *Instituto Paulista de Geriatria e Gerontologia* (IPGG), located at São Miguel Paulista – São Paulo – SP - Brazil. Therefore, we can define the sample as convenient and non-probabilistic.

Time of the study

The study consisted of two steps. The

first one took place during three months (from April to June, 2008). At that time, the subjects were invited and recruited, and all the explanations related to procedures, schedule of data collection, amongst others, were given. The second step occurred from August to December 2008, when the second stage of data collection was made. The procedures at each step are described below.

Subject recruitment, inclusion and exclusion criteria

The invitation for elderly subjects to take part in the study was given at the place of the study. All the individuals were above 60 years, of both genders, showed willingness to take part in the study and were checked according to inclusion and exclusion criteria. Only the physically-independent individuals, i.e. those that were able to walk without any help, and without any reference to diseases that could impair their physical autonomy, were included. The maximum educational level accepted in the study was completed high school, although the subjects had to be literate (checked by the reading of a simple text). In addition, subjects were included only if they received a maximum income of three current minimum salaries. We excluded the elderly individuals who showed any kind of mental confusion, identified from the double repetition (at the beginning and at the end of the interview) of the personal data that were part of the identification files. Those that presented any inconsistency in answering these questions were excluded. It is important to highlight that the elderly that referred any typical diseases related to aging (such as type II diabetes, dyslipidemia or hypertension) were not excluded from the study.

Ethical aspects

All the elderly signed an informed consent and the research project was approved by local review board (COE- São Judas Tadeu University, process number 11/08).

Procedures and data collection

During the first step of the study, after explanations were given, the subjects answered demographic questions, and afterwards answered questions for the R24h. The elderly were asked about all food and drink consumed during the previous day, with their respective quantities, in home measurements. The R24h data collection was achieved using mnemonic strategies, such as the memorization of the activities performed during the day, the places where the subjects were, besides the utilization of pictures regarding serving sizes[14]. At the time of the interviews, the elderly were scheduled for the second step of data collection.

The second step consisted of a new administration of the R24h, given by the same investigator and adopting the same procedures of the first step. The second R24h was held in order to identify possible seasonable aspects of food consumption, as suggested by Block et al[12,13]. The anthropometric data were also collected at this step. Weight and height were measured with an electronic scale (FILIZOLA 100g precision) and stadiometer (coupled to the scale, 0.5cm precision), and from these data, the body mass index (BMI= weight/height^2) was calculated. The anthropometric procedures followed the recommendations of Lohman, Roche e Martorell[15].

Food lists development

For the development of the food lists, the R24h data were analyzed for the frequency of consumption of each food, according to the different culinary dishes or different forms of intake, and according to the number of individuals who referred to this consumption. The consumption of energy (kcal), macronutrients (carbohydrates, proteins, total fat, saturated fat, monounsaturated fats, polyunsaturated fats and cholesterol) and micronutrients (calcium and vitamin D) were calculated by adopting the Virtual NutriPlus[16].

Considering the nutritional calculation, the foods were grouped in six different forms, that is, according to the energy consumption, carbohydrates consumption, proteins consumption, total fat consumption, calcium and vitamin D consumption. These groups allow the construction of the food lists. These lists were constructed according to the percentage contribution of each food to the total energy consumed and the total consumption of each selected nutrient (in grams)[12,13]. These percentages of contribution were calculated following the formulae below:

% of nutrient "X" in the food "Y" = [(content of the nutrient "X" in the food "Y") / (sum of the content of the nutrient "X" in all foods reported for the studied population)] x 100

For the construction of the food lists, we included all the foods, which when summed, contributed to 90% of the total energy and of each nutrient[12,13].

Information regarding data collection and the interviewers

The interviewers were trained and supervised by three registered dietitians. Before the study, a pilot study was conducted, where the data were collected twice: the first time the data were collected by the interviewers, and at the second time, by the dietitians. Both data collections were checked for reproducibility, and discussed with regard to inconsistencies. Regarding anthropometric data, all the measurements were held only by the dietitians. All the dietitians were trained as follows. They performed repeated measures in the same subject until the variation between the three evaluators could be found to be as small as possible.

Results

From the 210 elderly individuals interviewed, 171were considered eligible for taking part in the study. Of these, 30 refused to participate and nine of them did not present consistency in answering the interviews, which was considered by the interviewers as "mental confusion". All the subjects fitted the criteria with regard to income and schooling. Of those who took part in the first step, only 100 attended the second step, thus only these individuals were included in the data file.

The elderly who took part in the study were community-dwelling in Ermelino Matarazo and São Miguel Paulista, borough of São Paulo City. Comparing our sample with data from the census of these regions[1], the total number of elderly of our sample corresponds to 0.3% of the population above 60 years. The majority (90% or 90 individuals) was female and only 10% was male. The age range of the subjects was from 60 to 82 years (mean ± standard deviation = 69.3 ± 5.1 years). Regarding nutritional status, 52% had their BMI calculated as ≤ 28 kg/m^2; 15% had their BMI between 28 and 30 kg/m^2; 26% between 30 and 35 kg/m^2 and 7% > 35 kg/m^2.

From the R24h, the foods with the highest frequency of consumption, and the number of individuals who reported each food were identified. These results are depicted in Table 1. We may note that the most consumed food was coffee.

Table 2 describes the foods that contributed the most to the energy content of the diet of the elderly. The most important contribution came from rice.

The foods that contributed the most to carbohydrate consumption are depicted in Table 3. The three foods that contributed the most where refined rice, white bread and refined sugar. The first whole food in the list (whole bread) is located at the 21st position. The low frequency of whole food consumption was also observed when we analyzed fiber intake, whose data are not presented in the Tables: 1st = *carioca* beans [number of individuals who related the consumption (n) = 95; % of contribution to fiber intake (%) = 16.3]; 2nd = oranges (n = 53; % =10.1); 3º = bananas (n = 54; % = 5.8). Whole bread, the only whole food identified in the list, is located at the 12th position (n = 14; % = 2.3).

The foods that contributed to protein

Table 1 - Ranking of the ten most consumed foods, according to their referred frequency and according to the number of individuals who referred to their consumption. East zone, São Paulo, 2008.

Ranking	Food	Frequency of references	Number of individuals who referred to consumption
1	Coffee (infusion)	239	100
2	White rice	230	100
3	"Carioca" beans	166	95
4	Refined sugar	145	71
5	Whole milk	125	75
6	Liquid sweetener	120	53
7	French bread	110	64
8	Skimmed milk	87	48
9	Clear green leafy vegetables (lettuce)	81	46
10	Margarine with salt	69	50

intake are described in Table 4. Chicken contributed the most to the consumption of this nutrient. Data related to fat consumption are presented in Table 5. Chicken contributed the most to total fat consumption. Importantly, whole milk and eggs also contributed to the consumption of this nutrient. Although not described in a Table, it is important to highlight that chicken was also responsible for the consumption of all kinds of fats [polyunsaturated fat (n = 76; % = 16.8) monounsaturated fat (n = 76; % = 18.3) and cholesterol (n = 76; % = 33.2)].

Foods that contributed to calcium intake are described in Table 6, and Table 7 depicts the intake of vitamin D. As expected, milk and dairy foods were the most important foods related to these nutrients. We can also notice that there were few foods responsible for the vitamin D intake; whole milk and skimmed milk were responsible for 56.3% of this intake.

Discussion

This study had the aim of setting up, from two previous R24h, lists of the most ingested food in community-dwelling elderly persons from the east-zone of São Paulo- Brazil and to analyse the food that contributed the most to relevant health-related nutrients of these individuals. Coffee was de most consumed food, and this is in accordance with Brazilian and American studies: *Familiar Budget Research* (POF) 2002-2003 (Brazil)[17] and *National Health and Nutrition Examination Survey* (NHANES II)[12,13]. Coffee consumption is part of Brazilian food culture, and this information was confirmed by a commercial research run by the ABIC (Brazilian Association of Coffee Industry) in 2008[18].

White rice and *carioca* beans deserve special consideration in food consumption by elderly, since these are among the most ingested foods. These foods are considered the basis of the Brazilian diet. Moreover, some studies refer to these foods as protective against some diseases, such as cancer[19]. Levy-Costa *et al*[17] analyzed data from *Familiar Budget Research* (POF 2002-2003) and observed a trend towards a reduction of the consumption of rice and beans by the general Brazilian population. Similarly, the *Food Guide to Brazilian Population*[6], pointed out that the contribution of rice and beans relative to total energy intake from the diet was reduced from 42.1% in 1974 to 38.7% in 2003. Otherwise, the present study showed that elderly people have preserved this food habit, which can be considered as a positive aspect when compared to the younger population.

White bread *(French bread,* as it is called

Table 2 - Contribution to total energy intake (relative and accumulated) from 24h food recall- Individuals above 60 years- East Zone, São Paulo, 2008.

Rank	Food	N	%	Accumulated %
1	White rice	99	14.4	14.4
2	Chicken	76	6.7	21.1
3	French Bread	64	6.3	27.4
4	Whole milk	75	5.8	33.2
5	Refined sugar	71	3.3	36.5
6	Banana	54	2.9	39.3
7	Citric fruits (orange, clementine)	53	2.8	42.1
8	"Carioca" bean	95	2.6	44.7
9	Pasta	16	2.6	47.3
10	Skimmed milk	48	2.6	49.9
11	Salty biscuits (non-filled)	41	2.2	52.1
12	Potato	31	2.0	54.1
13	Filled cakes (cover made with cream and filled)	9	1.7	55.8
14	Pork sausage	17	1.4	57.1
15	Covered cake non- filled	4	1.3	58.5
16	Bread (milk variety)	18	1.3	59.7
17	Powdered fruit juice	11	1.2	60.9
18	"Dobradinha" (dish made of cow stomach)	2	1.2	62.1
19	"Feijoada" (dish made of black beans with different kinds of sausages)	5	1.2	63.3
20	Margarine with salt	50	1.1	64.4
21	Soft drinks	25	1.1	65.4
22	Swetened biscuits (non-filled)	20	1.0	66.5
23	Manioc scone (fried)	1	1.0	67.5
24	Red apple	27	1.0	68.5
25	Low fat cheese (ricotta, fresh white cheese, and others)	26	1.0	69.6
26	Soy oil	5	1.0	70.6
27	Whole bread	14	0.9	71.5
28	Olive oil	20	0.8	72.3
29	Papaya	28	0.8	73.1
30	Semi-skimmed milk	9	0.8	73.9
31	Avocado	4	0.8	74.7
32	Dark green leafy vegetables (watercress, chicory, spinach, rucola and others)	56	0.8	75.4
33	Cheese bread	9	0.7	76.2
34	Lean fish (whitefish)	8	0.7	76.9
35	Fortified whole milk – "VivaLeite"	9	0.6	77.5
36	Oat flakes	18	0.6	78.1
37	Mayonnaise	6	0.5	78.6
38	Beef	82	0.5	79.1

Table 2 - Contribution to total energy intake (relative and accumulated) from 24h food recall- Individuals above 60 years- East Zone, São Paulo, 2008. (cont.)

Rank	Food	N	%	Accumulated %
39	Chicken egg	11	0.5	79.6
40	Manioc flour	9	0.5	80.0
41	Ham, Bologna, salami	13	0.5	80.5
42	Margarine without salt	14	0.4	80.9
43	Granola	5	0.4	81.4
44	Tomato	48	0.4	81.8
45	Green tea	2	0.4	82.2
46	Natural juices	36	0.4	82.6
47	Marmelade	7	0.4	83.0
48	Grape	5	0.4	83.4
49	Panettone	2	0.4	83.8
50	Chickpea	2	0.4	84.2
51	Fatty cheeses (mozzarella. parmesan. among others)	18	0.4	84.6
52	Dried beef	5	0.4	84.9
53	Instant pasta	3	0.3	85.3
54	Toasted bread	10	0.3	85.6
55	Sweets made of cereal and milk	5	0.3	85.9
56	Soy milk	11	0.3	86.2
57	Popcorn (salty)	3	0.3	86.5
58	Desserts made of pumpkins	2	0.3	86.8
59	Whole yogurt with fruits	3	0.3	87.1
60	Clear green leafy vegetables (chard, lettuce, cabbage and others)	69	0.3	87.4
61	Onion	22	0.3	87.6
62	Powdered chocolate	10	0.3	87.9
63	Crumbs	1	0.3	88.2
64	Soup made from meat	2	0.3	88.5
65	Roots and yams	5	0.2	88.7
66	Oat porridge	16	0.2	88.9
67	Biscuit (filled)	1	0.2	89.2
68	Mango	8	0.2	89.4
69	Biscuits made of manioc powder	3	0.2	89.7
70	Sausages	3	0.2	89.9

N= number of individuals Who reported the consumption of the food; %= % of contribution of the food to the total of the nutrient (formulae described in Methods)

in Brazil) made an important contribution to the intake of energy, carbohydrates, protein, fiber and calcium in the diet reported by the elderly. This high consumption is in accordance with studies by Block *et al* on the American population[12,13]. In Brazilian diets, rice and bread present a high consumption, classified as the first and the second most consumed foods from the cereals group, according to POF 2002-2003[17].

In this study, a high consumption of food sources of complex carbohydrates was

Table 3 - Contribution to total carbohydrate intake (relative and accumulated) from 24h food recall- Individuals above 60 years- East Zone, São Paulo, 2008.

Rank	Food	N	%	Accumulated %
1	White rice	99	19.6	19.6
2	French bread	64	8.3	27.9
3	Refined sugar	71	5.6	33.5
4	Banana	54	4.9	38.3
5	Citric fruit (orange, clementine)	53	4.7	43.0
6	Pasta	16	3.2	46.2
7	Whole milk	75	3.0	49.2
8	Potato	31	2.9	52.2
9	Carioca beans	95	2.3	54.5
10	Salty biscuits (non-filled)	41	2.2	56.7
11	Red apple	27	2.0	58.8
12	Skimmed milk	48	2.0	60.7
13	Diluted powdered juices	11	2.0	62.7
14	Soft drinks	25	1.8	64.5
15	"Dobradinha" (dish made of cow stomach)	2	1.7	66.2
16	Covered cakes (cover made with cream and filled)	9	1.6	67.8
17	Filled cakes (non-iced)	4	1.5	69.3
18	Bread (Milk variety)	18	1.4	70.7
19	Papaya	28	1.3	72.1
20	Whole bread	14	1.2	73.3
21	Sweetened bicuits (non-filled)	20	1.2	74.4
22	Manioc scone (fried)	1	0.9	75.4
23	Manioc flour	9	0.7	76.1
24	Marmelade	7	0.7	76.8
25	Natural juice	36	0.7	77.5
26	Grape	5	0.7	78.1
27	Cheese bread	9	0.6	78.8
28	Oat flakes	18	0.6	79.4
29	Tomato	48	0.6	80.0
30	Semi-skimmed milk	9	0.5	80.5
31	Dark green leafy vegetables (watercress, chicory, spinach, rucola and others	56	0.5	81.0
32	Soup made from meat stock	2	0.5	81.4
33	Industrialized spices (Knor®. Sazón®)	4	0.4	81.9
34	Onion	22	0.4	82.3
35	Chickpeas	2	0.4	82.7
36	Chocolate powder	10	0.4	83.1
37	Panettone	2	0.4	83.6

Table 3 - Contribution to total carbohydrate intake (relative and accumulated) from 24h food recall- Individuals above 60 years- East Zone, São Paulo, 2008. (cont.)

Rank	Food	N	%	Accumulated %
38	Mango	8	0.4	84.0
39	Desserts made from cereal and milk	5	0.4	84.4
40	Toasted bread	10	0.4	84.8
41	Roots and yams	5	0.4	85.2
42	Custard-apple	1	0.4	85.5
43	Brown sugar	2	0.4	85.9
44	Clear green leafy vegetables (chard, lettuce, cabbage and others)	69	0.4	86.3
45	Fortified whole milk - VivaLeite	9	0.4	86.6
46	Sweeted corn-flakes	2	0.3	87.0
47	Dessert made of pumpkins	2	0.3	87.3
48	Regular jelly	7	0.3	87.6
49	Granola	5	0.3	88.0
50	Flavored soya milk	2	0.3	88.3
51	Creams and puddings	10	0.3	88.6
52	Crumbs	1	0.3	88.9
53	Pear	5	0.3	89.2
54	Low fat yogurt with fruits	3	0.3	89.6
55	"Feijoada" (dish made of black beans with different kinds of sausages	5	0.3	89.9

N= number of individuals who reported the consumption of the food; %= % of contribution of the food to the total of the nutrient (formulae is described in Methods)

observed (bread, rice, pasta and potato), but almost all had a low fiber content. These data are similar to those from the study of Bachman *et al* [20]. These authors analyzed data from NHANES II (2001-2002) and reported that 95% of the grains consumed were refined to the detriment of whole foods. It is important to be aware that refinement leads to the loss of an expressive part of vitamins, especially B vitamins, making these foods poor in nutrients[6]. In addition, fibers are important in the management of the glycemic index of foods, which can be considered an important aspect in relation to diseases related to aging[21,22]. According to data from the SABE Project (*Health and wellness at aging*- Brazil, 2003)[7], 18% of elderly people referred having diabetes.

It is important, however, to highlight that other foods considered as fiber sources were expressively consumed by the elderly in the present study, such as dark green vegetables (cress, chicory, spinach and rucola), citric fruits (mainly orange), banana and *carioca* beans.

Chicken and whole milk made an important contribution to fat consumption. Wu *et al*[23], evaluating the fat intake by Japanese individuals, found different results, with an important contribution of meat fats. These differences may certainly be attributed to cultural and economic factors.

Foods sources of fat, mainly animal products, despite their supposed undesirable effects on health, are also important sources of high biological value proteins. Thus, it is a good option to combine animal and vegetal foods in the diet [6]. From the information of the present study of the elderly, an adequate proportion of vegetal and animal foods was observed, since of the ten most consumed sources of protein, six of these were of ani-

Table 4 - Contribution to total protein intake (relative and accumulated) from 24h food recall- Individuals above 60 years- East Zone, São Paulo, 2008.

Rank	Food	N	%	Accumulated %
1	Chicken	76	20.9	20.9
2	Whole milk	75	8.6	29.5
3	White rice	99	7.5	37.0
4	French Bread	64	5.7	42.7
5	Low-fat milk	48	5.7	48.4
6	Carioca bean	95	3.9	52.3
7	Lean fish (whitefish)	8	3.6	55.9
8	Pasta	16	2.5	58.4
9	Pork sausages	17	2.3	60.7
10	Low-fat cheeses (ricotta, fresh white cheese and others)	26	2.1	62.8
11	Salty biscuits (non-filled)	41	1.6	64.4
12	Feijoada (dish made of black beans with different kinds of sausages)	5	1.6	66.0
13	Semi-skimmed milk	9	1.5	67.4
14	Citric fruit (Orange, clementine)	53	1.5	68.9
15	Beef	82	1.3	70.2
16	Milk bread	18	1.2	71.4
17	Potato	31	1.2	72.5
18	Dried cow meat	5	1.1	73.7
19	Whole bread	14	1.0	74.6
20	Banana	54	0.9	75.5
21	Fortified whole milk - VivaLeite®	9	0.9	76.4
22	Dark green leafy vegetables (watercress, chicory, spinach, rucola and others)	56	0.8	77.2
23	Fatty fish	2	0.7	77.9
24	Covered cake (frost made with cream and filled)	9	0.7	78.7
25	Chicken sausage	3	0.7	79.4
26	Fatty cheeses (mozzarella, parmesan, among others)	18	0.7	80.1
27	Soya milk	11	0.7	80.8
28	Ham, bologna., salami	13	0.7	81.5
29	Oat flakes	18	0.7	82.2
30	Dobradinha (recipe made of cow stomach)	2	0.7	82.9
31	Chicken egg	11	0.7	83.5
32	Cheese bread	9	0.6	84.1
33	Covered cake (non-filled)	4	0.6	84.7
34	Chick peas	2	0.6	85.3
35	Clear green leafy vegetables (chard, lettuce, cabbage and others)	69	0.5	85.8
36	Sweetened biscuits (non-filled)	20	0.5	86.3
37	Tomato	48	0.5	86.8
38	Corn flour cake	1	0.5	87.3

Table 4 - Contribution to total protein intake (relative and accumulated) from 24h food recall- Individuals above 60 years- East Zone, São Paulo, 2008. (cont.)

Rank	Food	N	%	Accumulated %
39	Whole plain yogurt	5	0.4	87.7
40	Cooked fish with vegetables	5	0.4	88.1
41	Soy bean	3	0.4	88.5
42	Star fruit	1	0.3	88.9
43	Papaya	28	0.3	89.2
44	Manioc scone (fried)	1	0.3	89.5
45	Carrots	32	0.3	89.8

N= number of individuals who reported the consumption of the food; %= % of contribution of the food to the total of the nutrient (formulae is described in Methods)

Table 5 - Contribution to total fat intake (relative and accumulated) in 24h food recall- Individuals above 60 years- East Zone, São Paulo, 2008.

Rank	Food	N	%	Accumulated %
1	Chicken	76	12.4	12.4
2	Whole milk	75	10.4	22.7
3	White rice	99	4.4	27.2
4	Margarine with salt	50	4.1	31.3
5	Soya oil	5	3.7	35.0
6	Pork sausage	17	3.7	38.7
7	Olive oil	20	3.1	41.8
8	"Feijoada" (dish made of black beans with different kinds of sausages)	5	2.9	44.7
9	Low fat cheeses (ricotta, fresh white cheese and others)	26	2.7	47.4
10	Avocado	4	2.5	49.8
11	Salty biscuits (non-filled)	41	2.4	52.2
12	Covered cake (cover made with cream and cream-filled)	9	2.4	54.6
13	"Carioca " beans	95	2.3	56.9
14	Skimmed milk	48	2.1	59.0
15	Mayonnaise	6	2.0	61.0
16	French bread	64	1.8	62.9
17	Manioc scone (fried)	1	1.7	64.5
18	Dark green leafy vegetables (watercress, chicory, spinach, rucola and others)	56	1.6	66.1
19	Margarine without salt	14	1.6	67.8
20	Covered cake non-filled	4	1.4	69.2
21	Chicken eggs	11	1.4	70.6
22	Ham, Bologna, salami	13	1.3	71.8
23	Beef	82	1.1	72.9
24	Fortified whole milk - VivaLeite®	9	1.1	74.0
25	Sweetened cake (non-covered , non-filled)	20	1.0	75.0

Table 5 - Contribution to total fat intake (relative and accumulated) in 24h food recall- Individuals above 60 years- East Zone, São Paulo, 2008. (cont.)

Rank	Food	N	%	Accumulated %
26	Semi-skimmed milk	9	1.0	76.0
27	Fatty cheeses (mozzarella, parmesan, among others)	18	1.0	77.0
28	Cheesebread	9	1.0	78.0
29	Pasta	16	1.0	78.9
30	Granola	5	0.8	79.7
31	Green tea	2	0.8	80.5
32	Sausages	3	0.7	81.2
33	Butter with salt	2	0.6	81.8
34	Dried beef	5	0.6	82.4
35	Soy milk	11	0.6	83.0
36	Low fatty fish	8	0.6	83.6
37	Popcorn (salty)	3	0.6	84.1
38	Intant pasta	3	0.6	84.7
39	Banana	54	0.5	85.2
40	Milk bread	18	0.5	85.7
41	Panettone	2	0.4	86.1
42	Pork	7	0.4	86.5
43	Corn bread	1	0.4	87.0
44	Oat flakes	18	0.4	87.4
45	Sweet biscuits (filled)	1	0.4	87.8
46	Cooked fish with vegetables	5	0.4	88.2
47	Potato	31	0.4	88.5
48	Requeijão (Brazilian creamy cheese)	6	0.3	88.9
49	Bacon	1	0.3	89.2
50	Linseed	9	0.3	89.5
51	Crumbs	1	0.3	89.8

N= number of individuals who reported the consumption of the food; %= % of contribution of the food to the total of the nutrient (formulae is described in Methods)

mal origin (chicken, whole milk, skimmed milk, cheese, fish and sausages) and four of them were from vegetal origin (rice, bread, beans and pasta). As such, another aspect to take into account in diet counseling to the elderly is the best combination of different foods, in order to improve the protein quality of the diet.

Chicken was the animal food that contributed the most to energy intake, and consequently to the intake of many other nutrients analyzed: proteins, total fat, saturated fat, monounsaturated fat, polyunsaturated fat and cholesterol. Many reasons could explain the high consumption of chicken. It is a low-price meat, which makes it affordable to people from many economic incomes[24]. In addition, the meat has a softer consistency when compared to beef, facilitating its intake. This aspect is important considering that dental and oral problems are very common among the Brazilian elderly[25]. It is also possible to speculate that the chicken consumption could be due to the "healthy" status attributed to it. Non-scientific or even scientific informa-

Table 6 - Contribution to total calcium intake (relative and accumulated) from 24h food recall- Individuals above 60 years- East Zone, São Paulo, 2008.

Rank	Food	N	%	Accumulated
1	Whole milk	75	25.8	25.8
2	Skimmed milk	48	17.6	43.5
3	Low fat cheeses (ricotta, fresh white cheese and others)	26	6.6	50.0
4	French bread	64	5.6	55.7
5	Citric fruit (orange, clementine)	53	4.7	60.3
6	Semi-skimmed milk	9	4.5	64.8
7	White rice	99	3.4	68.2
8	Whole plain yogurt	5	2.2	70.3
9	"Carioca" beans	95	1.8	72.1
10	Fatty cheeses (mozzarella, parmesan, among others)	18	1.7	73.8
11	Cheese bread	9	1.5	75.4
12	Chicken	76	1.3	76.7
13	Clear green leafy vegetables (chard, lettuce, cabbage and others)	69	1.3	77.9
14	Papaya	28	1.1	79.1
15	"Dobradinha" (recipe made of cow stomach)	2	0.9	80.0
16	Dark green leafy vegetables (watercress, chicory, spinach, rucola and others)	56	0.8	80.8
17	Low fat fish	8	0.7	81.5
18	Covered cake non- filled	4	0.7	82.2
19	Oat porridge	16	0.7	82.9
20	Low fat yogurt with fruits	3	0.6	83.5
21	Whole yogurt with fruits	3	0.5	84.0
22	Dessert made of cereal and milk	5	0.5	84.5
23	Natural juice	36	0.5	84.9
24	Banana	54	0.4	85.4
25	Onion	22	0.4	85.8
26	Covered cake (cover made with cream and filled)	9	0.4	86.2
27	Low fat yogurt (non-sweetened)	3	0.4	86.7
28	Pasta	16	0.4	87.1
29	"Feijoada "(dish made of black beans with different kinds of sausages)	5	0.4	87.4
30	Sesame seeds	3	0.4	87.8
31	Requeijão (Brazilian creamy cheese)	6	0.4	88.2
32	Milk bread	18	0.4	88.5
33	Green tea	2	0.3	88.9
34	Potato	31	0.3	89.2
35	Red apple	27	0.3	89.4
36	Chickpea	2	0.3	89.7
37	Cow meat	82	0.2	89.9

N= number of individual Who reported the consumption of the food; %= % of contribution of the food to the total of the nutrient (formulae is described in Methods)

Table 7 - Contribution to total vitamin D intake (relative and accumulated) from 24h food recall- Individuals above 60 years- East Zone, São Paulo, 2008.

Rank	Food/Dish	N	%	Accumulated
1	Whole milk	75	32.7	32.7
2	Skimmed milk	48	23.6	56.3
3	Chocolate	10	11.1	67.4
4	Semi-skimmed milk	9	6.3	73.7
5	Margarine with salt	50	4.4	78.1
6	Fortified whole milk - VivaLeite®	9	4.2	82.3
7	Chicken	76	3.5	85.9
8	Lean fish	8	2.5	88.4

N= number of individuals who reported the consumption of the food; %= % of contribution of the food to the total of the nutrient (formulae is described in Methods)

tion commonly attributes to poultry meat advantages over red meats such as beef and pork, due to its reduced fat content. This information deserves some warning, since the presence of fat is dependent on the kind of recipes used, the origin of the animal, amongst other aspects. In addition, the excessive consumption of a single food can contribute to the monotony of the diet. A varied diet, intra and inter food groups, contributes to the achievement of nutritional recommendations[6]. At this point, it is important to highlight that the data collection was carried out in two different seasons, aiming to identify foods preferentially consumed in warmer or cooler weather. However, this data collection showed a monotony in the food choices by the elderly, since expressive variations between both data collection were not observed.

Milk and dairy foods, in addition to their important function as protein sources, were important contributors of calcium and vitamin D, which in turn are important nutrients in bone health[26,27,28].

Finally, it is important to point out the limitations of our study. Our sample does not necessarily reflect the food consumption of the elderly from other regions of Brazil, or even from São Paulo state and, therefore, the present discussion should be directed only to the population studied. Furthermore, the majority of our studied group is composed of women. Even considering the so-called aging feminilization[29] and also considering that women are more willing to participate in interviews, we have to take into consideration the high disproportion between both genders in our study. Considering these observations together with the fact that the work was performed at a specific site, we can consider the possibility of bias due to sample selection. Another important aspect to take into account is the use of the R24h. This method is strictly dependent on memory, which in turn constitutes a limitation to the elderly. However, concerns regarding memory are usual in the utilization of R24h, independently of age. However, there is a lack of existence of a better alternative method[14]. Regarding food composition tables, information about specific nutrients, mainly micronutrients are scarce in Brazil. Information from food composition tables are generally incomplete, which compromises the conclusion from different studies. As such, some of the data discussed in the present study could be inconsistent. Therefore, more studies are needed in order to obtain a consistent profile of food intake from elderly people, including number of meals, influence of diseases or medications on food intake, difference between genders, age and body mass index.

Conclusions and Perspectives

The present study analyzed data regar-

ding the food consumption of the elderly from the east zone of São Paulo City- SP-Brazil. Our data certainly will contribute to the data in this area in literature. From the lists made it was possible to highlight important points: -few foods contributed to the consumption of many nutrients, which indicates a monotonous diet; - high consumption of refined carbohydrates to the detriment of whole grains; -low intake of foods sources of monounsaturated and polyunsaturated fats. Otherwise, the frequent consumption of rice and beans and dark green leafy vegetables deserves consideration as a positive aspect. All this information should be taken into account when developing educative interventions for these individuals.

Finally, the development of food lists may also provide a preliminary step in the construction of food frequency questionnaires specific for this group.

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