Food intake of calcium and vitamin D in elderly

Ingestão alimentar de cálcio e vitamina D em idosos

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ABSTRACT

Introduction: Knowledge of the nutritional status of the elderly is important for the prevention of chronic noncommunicable diseases. Objective: To identify the nutritional status of calcium and vitamin D of the elderly assisted by the family health strategy. Methodology: This is an exploratory-descriptive, cross-sectional study with a quantitative approach. The study was developed from September 2016 to June 2017 in two Family Health Strategy units of the urban area of a municipality of Piauí. Results: Food consumption of calcium and vitamin D foods was observed, in which 59.1% consume milk daily, 23.7% consume yogurt and 26.6% cheeses, 24.5% sardines, 31.4% % yogurt, 43.4% beef, 44.2% chicken meat. Conclusion: Elderly people who do not consume or who consume infrequently food sources of vitamin D and calcium should receive guidance on their consumption, exposure to the sun at times and for adequate periods of time.

Keywords: Elderly. Vitamin D. Nutritional status.

RESUMO

Introdução: O conhecimento da situação nutricional dos idosos é importante para a prevenção das Doenças Crônicas não Transmissíveis. Objetivo: Identificar o estado nutricional de cálcio e vitamina D de idosos assistidos pela estratégia de saúde da família. Metodologia: Trata-se de um estudo exploratório-descritivo, transversal com abordagem quantitativa. O estudo foi desenvolvido no período de setembro de 2016 a junho de 2017, em duas unidades de Estratégia de Saúde da Família da zona urbana de um município do Piauí. Resultados: Foi observado o consumo alimentar de alimentos que possuem cálcio e vitamina D, onde foi identificado que 59,1% consomem leite diariamente, 23,7% consomem iogurte e 26,6% queijos, 24,5% sardinhas, 31,4% iogurtes, 43,4% carne bovina, 44,2% carne de frango. Conclusão: Os idosos que não consomem ou que consomem com pouca frequência alimentos fontes de vitamina D e cálcio devem receber orientações sobre seu consumo, exposição ao sol em horários e por períodos de tempo adequados.

Descritores: Idoso. Vitamina D. Estado Nutricional.

NOTA

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INTRODUCTION

Around 75% of the world's elderly are estimated to have one or more diseases that could be prevented or controlled with adequate nutrition, that at least 50% present health problems that require nutritional intervention, and around 20 to 40% are in nutritional risk[1].

Knowledge of the nutritional status of the elderly is important for the prevention of chronic non-communicable diseases.2 Therefore, it is necessary to evaluate calcium and vitamin D consumption, since such nutrients, when found in low amounts in the body, can lead to bone problems [3].

Calcium and vitamin D are nutrients that act mutually in bone metabolism, especially in the reach of peak bone mass, calcium has functions of constitution and regeneration of bone tissue, the synchronous action of parathyroid hormone and vitamin D maintain homeostasis levels of calcium in the body[4]. Vitamin D acts on the absorption of calcium through the intestine and into bone functions[3].

The sources of calcium in the diet are easily found mainly in milk and its derivatives. Calcium and vitamin D deficiency in the body, especially in postmenopausal women and in the elderly, contribute to muscle weakness, thereby increasing the risk of falls and fractures in this population[4]. In turn, the dietary sources of vitamin D are more difficult to access when compared to calcium, being found, especially, in fatty fish, being the major source of this vitamin the body exposure to sunlight[5].

Therefore, this study aimed to identify the nutritional status of calcium and vitamin D of the elderly assisted by the family health strategy.

METHOD

This is an exploratory-descriptive cross-sectional study with a quantitative approach. The study was developed from September 2016 to June 2017, in the municipality of Picos-PI, in two units of Family Health Strategy (ESF) in the urban area.

The population was constituted by the total number of elderly registered of the two ESF. In the Health Unit "A" there were 206 registered elderly, of which 5 were bedridden, 16 with physical limitations to go to the Basic Health Unit (BHU) and 1 with cognitive deficit. And in Health Unit "B" there are 260 registered elderly people, of whom 9 were bedridden, 3 with physical limitations to go to UBS and 7 with cognitive deficit.

The inclusion criteria were: agreement to participate in the study, to be 60 years old or older and to be enrolled in the FHT chosen for this study. As exclusion criteria: elderly people who present some type of cognitive impairment, such as the inability to hear, speak, or deficient in understanding the questions of the instrument, which were perceived by the researchers. We also excluded bedridden and elderly individuals who had physical limitations to move to UBS. After applying the exclusion criteria, 184 elderly remained in the FH "A" and 241 elderly in the FH "B".

For the calculation of the sample was used the formula for cross-sectional study with finite population:

$$n = \frac{Z^2_{(\alpha/2)}.p(1-p).N}{E^2(N-1) + Z^2_{(\alpha/2)}.P(1-P)}$$

Where: n = Size of the sample to be used; Z = Reduced Variable; α = Type I error (proportion); N = Population size, number of elderly enrolled in the FHS; p = true probability of the event; E = Sample error.

The 95% confidence coefficient (1.96), type I error of 5%, the sample error of 5%, and the population of 184 elderly of the "A" health unit and 241 elderly people in the health unit "B", these being registered in the ESF in question. The proportion of occurrence of the phenomenon, as a general rule was used, p = 50%, because there is information about the expected value. Thus, from the application of the formula, the estimated sample was 125 and 149 elderly in health units A and B, respectively, thus accounting for a total sample of 274 elderly people enrolled in the two FHS in the municipality of Picos-PI, the which were chosen at random, through the checklist provided by community health agents.

For the data collection, the pilot test was applied with 10 elders, five of whom were enrolled in unit "A" and five in unit "B". The test was performed to find out whether or not the questionnaire matched the actual population. After applying this test, the instrument was ratified in order to better reflect the profile of food consumed in the region. It should be noted that the 10 participants were not included in the total number of the sample.

This phase of the research was carried out in April and May of 2017 in the FHS A and B, through the use of two semiquantitative instruments, which were adapted from a study.6 The forms and verification of measures were performed and measured by nursing students participating in the Public Health Research Group belonging to the elderly health area, who were duly trained by the researcher responsible. It was used as a reference for measurement according to the parameters included in the Technical Standard for Food and Nutrition Surveillance[7].

The collections started at the unit itself, guaranteeing the privacy of the elderly in a reserved room while they waited for the care or the beginning of the group of elderly people in the ESF, but a small part of the collection was made in the UBS, since only a part of the elderly attended the unit, in this way active searches were carried out with the help of the Community

Health Agents and the collections, from then on, were carried out at the household of the elderly, until the sample was completed.

The collected data were digitized and analyzed through the statistical software IBM Statistical Package for the Social Sciences (SPSS), version 20.0. Descriptive analytical statistics, simple frequency, standard deviation, mean, maximum and minimum values were used. The findings were presented through tables for better understanding and the data were discussed and analyzed according to the pertinent literature.

This research was approved by the Ethics and Research Committee of the UFPI with opinion number 1,977,297 and was developed according to the requirements proposed by Resolution 466/2012 of the National Health Council[8].

RESULTS

Table 1 shows the data related to sociodemographic variables, which are: age, sex, monthly income and religion.

In Table 2 we can observe the characterization of the participants and the clinical variables. Clinical variables may indicate the health impairment of the elderly participants.

Regarding the presence of diagnosed diseases, it was observed that 86.5% of the elderly had diseases diagnosed by physicians, with Systemic Arterial Hypertension (SAH) being the most prevalent (25.2%). Of the participants in the research, only 17.5% were currently calcium replacement. It is also observed that 85.4% of the elderly did not have fractures after 45 years.

The data in Table 3 show the anthropometric variables of the elderly.

Table 3 shows that the predominant weight range was 59 to <70 kg (54.4%), height between 1.40 and <1.60m (63.9%) and adequate BMI (47.1 %), but draws attention to nutritional deviations, especially overweight.

Table 4 shows the frequency of consumption of thirteen calcium-containing foods by the research participants.

Table 4 shows that the majority of the elderly consume milk (59.1%) and beans (71.2%) daily, eggs (31.4%) and sweet biscuits (27.7%) less than 4 times a week and did not consume cheese (68%), sardines (74.1%), lettuce (43.1%), cabbage (75.2%), cabbage , okra (72.6%) and orange (38%). Next, Table 5, which describes the weekly frequency of consumption of thirteen foods that have vitamin D.

In relation to consumption of food sources of vitamin D, most of the elderly consume milk (59.1%) daily, beef (43.4%) and chicken (44.2%) ≥ 4 times a week, eggs (64.2%), sheep (67.2%), sardines (74.1%), ham (94.9%), sausage (92.0%), %), sweet bread (62.8%) and butter (73.4%) (Table 5).

Thus, the foods most consumed according to Tables 5 and 6 are milk and beans daily, and beef and poultry at a frequency greater than or equal to four times a week.

TABLE 1 – Characterization of the participants of the research according to sociodemographic variables. Peaks - PI, 2017. (n = 274).

Variables	Nº	%	Statistic
1. Age			
60 - 69 years	136	49,6	
70 - 79 years	104	38	**Average** = 70,66
80 - 89 years	31	11,3	**SD*=**7,415
90 - 99 years	3	1,1	
2. Gender			
Male	93	33,9	
Female	181	66,1	
3. Monthly income			
< 1 minimum wage	25	9,1	
1 to 2 minimum wages	246	89,8	
>2 minimum wages	3	1,1	
4. Religion			
Catholic	233	85	
Evangelical/Protestant	39	14,2	
Others	2	0,7	

TABLE 2 – Characterization of participants according to clinical variables. Picos - PI, 2017

Variables	N	%
1. Do you have diagnosed diseases? (n=274)		
Yes	237	86,5
No	37	13,5
2. If YES, which ones? (n=237)		
DM	12	5,1
SAH	69	29,1
SAH + dyslipidemia	8	3,4
SAH + DM	19	8
SAH + cardiovascular disease	9	3.8
SAH + osteoarthrosis	6	2,5
SAH + osteoporosis	11	4,6
Osteoporosis	13	5,5
Other answers	90	38
3. Do you consider sun exposure important? (n=274)		
Yes	195	71,2
No	79	28,8
4. If YES, why? (n=195)		
Good for the bones	16	8,2
Good for the health	94	48,2
Doctors say it's good	8	4,1
I heard that it's good	5	2,6
It has Vitamin D	17	8,7
Other answers	55	28,2
5. Do you do calcium replacement? (n=274)		
Yes	48	17,5
No	226	82,5
6. If YES, what is the daily dose? (n=48)		
<300 mg	13	27,1
300 to 600 mg	32	66,7
>600 mg	3	6,2
7. Did you have a fracture after age 45? (n=274)		
Yes	40	14,6
No	234	85,4

Source: research data.

Legend: DM – Diabetes Mellitus; SAH – Systemic Arterial Hypertension

TABLE 3 – Classification of the nutritional status of the elderly. Peaks - PI, 2017. (n = 274).

Variables	N	%	Average	SD*
1. Weight (kg)			63,5	13,0
30 to < 50	42	15,3		
50 to < 70	149	54,4		
70 to < 90	75	27,4		
90 to 110	8	2,9		
2. Height (m)			1,5	0,0
<1,40	2	0,7		
1,40 to <1,60	175	63,9		
>= 1,60	97	35,4		
3. BMI (kg/m²)			25,9	4,4
Low weight (<=22	49	17,9		
Average weight (>22 e <27)	129	47,1		
Overweight (>=27)	96	35,0		

Source: research data. BMI = body mass index

*Standard deviation.

TABLE 4 – Weekly consumption frequency of foods containing calcium. Peaks - PI, 2017. (n = 274).

Variables	<4 x a week		>=4 x a week		7 x a week		Do not consume	
	Nº	%	Nº	%	Nº	%	Nº	%
1. Milk	33	12	25	9,1	162	59,1	54	19,7
2. Yogurt	65	23,7	6	2,2	16	5,8	187	68,2
3. Cheese	73	26,6	14	5,1	32	11,7	155	56,6
4. Sardine	67	24,5	3	1,1	1	0,4	203	74,1
5. Eggs	86	31,4	75	27,4	33	12	80	29,2
6. Lettuce	82	29,9	22	8	52	19	118	43,1
7. Kale	47	17,2	7	2,6	14	5,1	206	75,2
8. Cabbage	83	30,3	14	5,1	15	5,5	162	59,1
9. Okra	58	21,2	9	3,3	8	2,9	199	72,6
10. Orange	89	32,5	15	5,5	66	24,1	104	38
11. Beans	14	5,1	52	19	195	71,2	13	4,7
12. Sweet Cookie	76	27,7	12	4,4	22	8	164	59,9
13. Tapioca Cake	145	52,9	7	2,6	9	3,3	113	41,2

Source: research data.

TABLE 5 – Weekly consumption frequency of foods containing vitamin D. Picos - PI, 2017. (n = 274).

Variables	<4 x a week		≥4 x a week		7 x a week		Do not consume	
	N	%	N	%	N	%	N	%
1. Milk	33	12	25	9,1	162	59,1	54	19,7
2. Yogurt	65	23,7	6	2,2	16	5,8	187	68,2
3. Cheese	73	26,6	14	5,1	32	11,7	155	56,6
4. Beef	99	36,1	119	43,4	17	6,2	39	14,2
5. Chicken	101	36,9	121	44,2	14	5,1	38	13,9
6. Fish	72	26,3	24	8,8	2	0,7	176	64,2
7. Lamb	85	31	3	1,1	2	0,7	184	67,2
8. Sardines	67	24,5	3	1,1	1	0,4	203	74,1
9. Ham	14	5,1	0	0	0	0	260	94,9
10. Sausage	20	7,3	2	0,7	0	0	252	92,0
11. Eggs	86	31,4	75	27,4	33	12	80	29,2
12. Sweet Bread	81	29,6	8	2,9	13	4,7	172	62,8
13. Butter	47	17,2	7	2,6	19	6,9	201	73,4

Source: research data.

DISCUSSION

In the present study there was a greater participation of females with a prevalence of 66.1%. This result can be explained by the fact that there are more women than men in Brazil (IBGE, 2010). Resembling national research[10].

In this study, the majority of the participants presented diseases already diagnosed and among these diseases the most prevalent was systemic arterial hypertension, corroborating with other national studies [7-9].

This research has identified that the elderly consider sun exposure to be important, and in fact the importance of sun exposure to health is good, since solar radiation is the source of 90% of the body's vitamin D[11].

A study on the risks of postmenopausal calcium and vitamin D supplementation showed that after one year of calcium and vitamin D supplementation hypercalcemia and hypercalciuria were detected in the participants[12]. However, these symptoms appeared to be unrelated to dose of vitamin D or its serum levels.

The present study found that a large part of the elderly are eutrophic according to the BMI classification, 13 since it corroborates a study that analyzed the anthropometric profile and serum levels of vitamin D in the elderly[2]. Differently from another study that reported that according to BMI classification the majority of participants were in the overweight range[14].

A study that addresses the evaluation of the nutritional status of the elderly showed that the majority of the participants consume milk and dairy products daily, thus resembling the present study, but with respect to daily consumption of beans by the majority of the elderly the present study presented a higher percentage when compared to the same study, in which only 63.4% participants consume legumes daily[15].

As for the consumption of beef and chicken, the highest frequency of consumption is greater than or equal to four times a week. When observing a study about the subject, it was noticed that the red meat consumption of the participants is inferior 16 when compared to the present research.

On the consumption of fish, sheep, sardine and butter meat occur more frequently in the sample in a period less than four days per week. In the study, it is observed that the weekly consumption of meats is 60.4% and 42% the weekly consumption of fats[15].

When comparing the results on the consumption of sausages and eggs to another study it is verified that the consumption of sausages is inferior and that the ingestion of eggs is superior, a period less than four times per week[16].

A survey of the most consumed foods in Brazil showed that the five foods most consumed by the elderly were beef followed by oils and fats, juices and soft drinks, poultry and bananas. The foods most consumed by the elderly in this study were milk and beans, consumed daily, and beef and chicken meat ingested at a frequency equal to or greater than four times a week, as described in the results. These four foods are sources of calcium and vitamin D[18]. Dietary Reference Intakes (DRIs) have the dietary amounts recommended for each nutrient, according to the average daily intake which would be sufficient to meet the nutritional needs of the vast majority of healthy subjects[19]. Thus, the recommended daily intake of calcium for males is 800 mg/1000 mg/d, in the age group 51 to 70 years and above 70 years, respectively. For females aged 51 and older, the recommendation is 1000 mg/d. The increased need for calcium by women can be explained due to the changes that occur in their bodies throughout the aging process, which directly affect the bone metabolism[4].

With regard to vitamin D, the recommended intake is 10 µg / d for both sexes and for all age groups[19].

When analyzing the IBGE 18 table it is possible to verify that in 100 grams (approximately three tablespoons) of whole milk powder, for example, there are 904 milligrams (mg) of calcium and 8 micrograms (mcg) of vitamin D In analyzing the nutritional composition of the bean, it is verified that in 100g of string beans or green there are 128mg of calcium. The beef has 100g in its composition 8 mg of calcium and 0.70mcg of vitamin D. And the chicken meat contains 100g in its composition, 15mg of calcium and 0,20 mcg of vitamin D.

The elderly are in the group at risk for the onset of hypovitaminosis D, since at this stage of life a lower production of this vitamin.11 Thus, there is a recommendation that populations at risk from the positive results to the deficiency may use supplementation or dietary sources of vitamin D[11].

CONCLUSION

Social, economic and demographic issues end up influencing and affecting the food pattern of the elderly population. Thus, it is necessary to evaluate each individual individual, since each one has inherent issues, which directly reflect on their living and eating habits.

The consumption of food sources of calcium and vitamin D are essential for maintaining the quality of life of the elderly, as they help in the prevention of bone diseases and fractures.

It is therefore of the utmost importance that elderly people who do not consume or consume foods that are sources of vitamin D and calcium too often receive guidance about the need for their consumption as well as the relevance of sun exposure at times and for periods time.

The portion of the elderly population that has unhealthy living habits and an inadequate nutritional intake should receive special attention from the FHS professionals to which they belong, since these habits can cause harmful consequences to the public, such as medication use, hospitalization , dependence for basic activities of daily living and the emergence of pathologies.

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