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Nutritional risk factors for postmenopausal osteoporosis

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KEYWORDS

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Abstract *Background:* Osteoporosis is a bone disease that combines both a decrease in bone density and its internal architecture changes. Nutrition is one of the major determinants of osteoporosis.

Aim: The purpose of our study was to identify nutritional risk factors of osteoporosis of two groups of osteoporotic women and witnesses.

Methods: We conducted a comparative cross-sectional study including 60 postmenopausal women and screening for osteoporosis by a bone densitometry, recruited the outpatient service of Rheumatology of the Institute KASSAB.

Results: We have identified excessive supply of saturated fatty acids (SFA) in the osteoporotic compared with controls (13.27% vs 10.23%, $p = 0.002$) and an inadequate intake of monounsaturated fatty acids (MUFA) (12.6% vs 16.16%, $p = 0.012$).

A low calcium intake is another factor of risk of osteoporosis (574.27 ± 336.9 mg/day vs 782.45 ± 340.54 mg/day; $p = 0.021$). This is explained by the low consumption of milk and milk products objectified in the osteoporotic group ($p = 0.001$). We also found a negative relationship between inadequate intakes of potassium and osteoporosis (2241.55 ± 1049.85 mg/day vs 2988.17 ± 1146.52 mg/day; $p = 0.011$). This may be due to the low consumption in fruit and vegetables, sources of potassium, found in the osteoporotic group ($p = 0.003$).

We found a significant increase in the consumption of the VVPO group in the osteoporotic toward women witness (2.23 ± 0.99 number of times/day vs 1.67 ± 0.76 number of times/day; $p = 0.019$). A high consumption of coffee appears also as a risk factor since the osteoporotic group consume almost twice than controls ($p = 0.002$).

Conclusion: Nutritional risk factors of osteoporosis are all the most important that they are editable and can take their place in a prevention of public health policy.

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1. Introduction

Osteoporosis is a broadcast disease of the skeleton characterized by low bone mass and abnormal microarchitecture, responsible for an increase in bone fragility.[1] Osteoporosis greatly affects the health of postmenopausal women and is recognized as a major public health problem worldwide.[2]

The evaluation of bone mineral density (BMD) surface X-ray absorptiometry dual energy is currently used to retain the diagnosis of osteoporosis and low BMD is the main risk factor for the occurrence of fracture complications.[3]

The determinism of osteoporosis is multifactorial, dominated by genetic factors controlling bone metabolism. Among the exogenous factors, nutrient intakes play an important role appeared to be a target for cheaply therapeutic measures. Besides the calcium and vitamin D, widely known as key components of the metabolic bone, other nutrients may intervene in a non negligible way the changes in bone mass. Thus micronutrients and vitamins other than vitamin D, are substances essential to the success of numerous stages of bone metabolism.[4]

The objectives of our study were to determine nutritional risk factors for osteoporosis by comparing two groups of women with osteoporosis and controls.

2. Methods

This is a comparative cross sectional study involving 60 postmenopausal women, recruited from outpatient in a rheumatology service in Tunis, over a period of three months from December 2014 to March, 2015.

Women over the age 50 and postmenopausal for at least 5 years were included in this study. Women with hormonal diseases (hyperthyroidism, hyperparathyroidism) or inflammatory rheumatic diseases (rheumatoid arthritis, ankylosing spondylitis) or heparin or in some antiepileptic or in oral anticoagulants were excluded from the study.

Our population has been screened for osteoporosis by BMD and was distributed into two groups according to the results of this review.

The "control" group consisted of 30 women with a T-score at the lumbar spine or hip to the upper 1 and group "case" consists of 30 women with osteoporosis with a T-score at the lumbar spine or hip or less equal to −2.5.

All women underwent anthropometric measurements (weight in kilograms (Kg), height in meters (m), the calculation of BMI body mass index).

A food survey was conducted using the recall method 24 h and food consumption frequency specifying the changes in eating habits over the past ten years, the overall caloric intake, the shares of major nutrients (carbohydrates, fat, saturated fatty acids (SFA), monounsaturated fatty acids (MUFA), polyunsaturated fatty acids (PUFAs), protein, animal protein (PA) and vegetable protein (PV)), mineral intake, vitamins and fiber.

We used a questionnaire, referred to the National Health and Nutrition Program (PNNS), which consists of 20 items that match the majority of foods that may be consumed, gathered in groups 6 groups: milk and dairy products, meat, poultry, fish, eggs (MPFE), Fruits and vegetables, legumes and starchy foods, drinks: coffee, tea and soft drinks, oil seeds and olive oil.[5].

In order to convert the intake of food nutrients we performed a manual calculation using the food composition table CIQAUL 2013.

3. Statistic study

We undertook a descriptive statistical analysis of both groups, and a multivariate analysis using SPSS v 17.0 software.

In all comparisons, the level of significance was set at 0.05.

4. Results

The average age of the population is 56 years, and it is comparable in both groups. However, the age of menopause is earlier in the osteoporotic group compared with the control group ($p = 0.011$) (Table 1).

Food survey found that the majority of the population (71.7%) did not change their eating habits over the past ten years, allowing to reflect the nutritional profile of our sample. Thus, we found no significant difference between the two groups (Table 2).

The average calorie intake was similar in both groups; it is 2131.43 ± 782.34 kcal/day in osteoporotic group and 2097.61 ± 706.49 kcal/day in control and follows the recommendations of the AFSSA 2010.[6] As regards protein intake, it is excessive in both groups and PA/PV ratio is greater than 1 (Table 3).

PUFA intakes reduced in osteoporotic group benefit contributions in AGS are high. However, the intake of MUFA, was significantly lower in osteoporotic group compared with controls (12% vs 16.16%, $P = 0.012$) (Table 3).

The dietary fiber intake was comparable in both groups and is below the recommendations of the AFSSA 2010.

The average calcium intake in osteoporotic group is significantly lower than that of controls (574.27 ± 336.90 mg/day vs 782.45 ± 340.54 mg/day; $p = 0.021$). Similarly, the average intake of potassium was significantly lower in osteoporotic women compared to controls (2241.55 ± 1049.85 mg/day vs 2988.17 ± 1146.522 mg/day; $p = 0.011$) (Table 4).

The average daily intake of copper, magnesium and phosphorus is lower in osteoporotic group than in controls, but with no significant difference.

We found a dietary insufficiency of vitamin D in two groups. However, these contributions are more important in comparison with osteoporotic witnesses, but without significant difference (Table 4).

The frequency of consumption of milk and dairy products was significantly lower in osteoporotic group than in controls ($p = 0.001$). However, daily consumption of meat is more

Table 1 General characteristics of the population.

Characteristics	Cases	Controls	p
Age (years)	56.2 ± 3.74	56 ± 3.97	0.8
BMI (Kg/m^2)	27.3 ± 5.27	28.21 ± 5.21	$P = 0.503$
Age at menopause (years)	43.26 ± 3.91	45.66 ± 3.07	0.011

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