



## Calcium Intake in the Moroccan Elderly

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### ABSTRACT

**Introduction:** Calcium intakes of elderly people are often below the recommendations which are 1200 mg/day. The advancing age may be accompanied by a loss of capacity to absorb additional calcium in case of deficiency. The aim of our work is to evaluate the calcium intake in the Moroccan elderly. **Methods:** The version translated into Arabic dialect Fardellone questionnaire is tested on a sample of 159 subjects aged over 60 years. **Results:** The study population includes 87 women (55%), 72 men (45%). The mean calcium intake was respectively 3078 mg by week (that means 440 mg/day). The assessment of calcium intake showed a deficiency and the average consumption of calcium per day is significantly lower than the recommended daily amount for this population. The comparison of both gender found a deficit higher among women than among men. **Conclusion:** Evaluation of the calcium intake is an essential tool for better management of metabolic bone diseases.

**Keywords:** Calcium intake, Fardellone, Questionnaire, Elderly, Morocco

### INTRODUCTION

In the human body, there is about 1 kg of calcium, which is concentrated in the bone in the form of calcium phosphate [1]. By interacting in different cell compartments, calcium is involved in a large number of cellular activities, such as muscle contraction, enzymatic activation, cell differentiation, immune response, programmed cell death and neuronal activity [1-11]. Food is the primary source of calcium absorption. Common calcium-rich foods include dairy products, shrimp, soy, tofu, broccoli, orange, and others. The main forms of calcium supplements are calcium carbonate and calcium citrate [12,13]. Aging causes a decrease in intestinal absorption of calcium by active transport. Calcium requirements therefore increase after menopause, or after 65 years in men, from 1000 mg/day to 1200 mg/day. The main sources of calcium are dairy products. Four servings are required per day; in the elderly. In the event of inability to absorb them, food must be enriched. In case of Insufficient intake, drinking calcium-rich water should also be encouraged, except when receiving treatment for osteoporosis [14]. We performed this work in order to evaluate the calcium ration of the Moroccan elderly.

### METHODS

This study included 159 subjects aged over 60 years, to describe the calcium ration in the Moroccan elderly population. The calcium ration is evaluated using the translated version in dialectal Arabic of the Fardellone questionnaire [15,16]. The questionnaire consists of 22 items whose calcium content is evaluated by the Fardellone equivalence tables [15]. These foods have been grouped into one of the following five classes: Calcium in the form of milk (Pure milk, Milk drinks, etc.); Calcium in the form of dairy and cheese (Yoghurt, petit Suisse, white cheese, baked cheese, soft cheese, etc.); Calcium in the form of vegetables, fruits, meats, and mineral waters (VFMW) (Note that Moroccan mineral waters are not very rich in calcium [17]); Calcium in the form of breads, meal, or pasta (BMP) And calcium in the form of chocolate. The calcium intake in drug form Were not included in the calculation of calcium intake. The time required to complete the questionnaire was 15 to 20 minutes. The investigation lasted three months (March, April, and

May 2017). The statistical analysis was carried out using the software Epi-info in version 7.2. The questionnaire was completed after having the informed consent of the participants, informed in advance about the purpose of our work and the conditions of the proceedings and strictly anonymous.

## RESULTS

Our series included 159 subjects aged over 60 years, 45% of whom were male (n=72) and 55% female (n=87). The average age is  $69.27 \pm 9.33$ . The mean total calcium consumption of the subjects recruited is 3078 mg per week, a daily consumption of 440 mg per day. The assessment of calcium intake by age group showed a deficiency in this population. The results are detailed in Table 1. The calcium deficiency is explained by a decreased contribution of chocolate (2.2% of the total calcium intake) followed by the BPS group (16% of the total calcium intake) and cheese dairy (18.5% of the total calcium intake) (Table 1).

**Table 1 Weekly calcium intake distributed according to food groups**

Food Groups	Average calcium intake in mg / week	Average calcium intake in mg / day
Milk	1220 (39.6 %)	174
Dairy + cheese	570 (18.5 %)	81
Vegetables + fruits + meat + water	730 (23.7 %)	104
Bread + pasta + semolina	488 (16 %)	70
Chocolate	70 (2.2 %)	10
Total	3078	440

## DISCUSSION

The aim of our study is to quantify the calcium intake of the Moroccan elderly population and to compare these results with the recommended intakes. This type of survey of calcium ration is easy to carry out, especially with the current choice of frequency questionnaires. The Fardellone questionnaire used for our study has the advantage of being adapted to the Moroccan food culture. Evaluating a weekly frequency, it takes into account intra-individual food variations and consumption throughout the week without excluding weekend meals. We have shown a lack of calcium intake affecting the Moroccan elderly population. In Morocco, a similar study carried out in 2010 for evaluating the calcium ration in population of Marrakesh and its region [18], which shows results similar to the results of our study, which can be explained by the similarity of food habits between the east and the south of Morocco. Based on the idea that the diet, and in particular the calcium intake, is modified by the rural or urban origin of the population studied, Jane, et al. Evaluated calcium in 81 adults of rural origin. They found that the average calcium intake assessed by the questionnaire (1287 mg per day) differs from that measured by the reference method (1141 mg per day) with  $p=0.01$ . Thus, they concluded that this is not a good way to evaluate the calcium in the rural population and that instead it is necessary to use appropriate questionnaires for this population [19], Hence the interest of developing questionnaires adapted to the specificities of the diet of each region, which was the case for example in the United Arab Emirates and Kuwait. The deficiency of calcium intake is often associated with vitamin D deficiency. This situation is frequent in the Maghreb countries despite the sunshine [20-22], which suggests a high incidence of bone metabolic pathology.

## CONCLUSION

Our survey shows the frequency of calcium deficiency affecting the Moroccan elderly. The frequency of calcium deficiency requires the implementation of a strategy of management including calcium supplementation for this population. Prevention involves raising public awareness of the implications of this deficiency and the risk factors.

## CONFLICT OF INTEREST

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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