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Research Article

Calcium intake in the Moroccan adolescents

Abstract

Purpose: Calcium needs vary in function with age, sex and individuals. Needs are increased in adolescents. The aim of our work is to evaluate the calcium intake in the Moroccan adolescents. Methods: The version translated into Arabic dialect Fardellone questionnaire is tested on a sample of 257 Moroccan adolescents aged between 14 and 17 years old.

Results: The study population includes 43% female (n = 111), 57% of male (n = 146). The mean calcium intake was 5991 mg per week, a daily consumption of 855 mg per 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 females than males.

Conclusion: Evaluation of the calcium intake is an essential tool for better management of metabolic bone diseases.

Introduction

Calcium is the mineral for which the body needs are the highest. Indeed, the body of a healthy adult contains about one kilo of calcium, of which nearly 99% is located in the skeleton and teeth [1]. Indeed, calcium plays an active role in the regulation of many metabolic processes. It intervenes, for example, in the mechanism of muscular contraction, but also in the transmission of nerve impulses. It also plays a role in the cascade of blood clotting and in the metabolism of many hormones [1-11]. Calcium needs vary in function with age, sex and individuals. These needs evaluated by the study of the calcium balance, which determines a threshold beyond which there is no retention of calcium. Needs are increased in adolescents [12], so we performed this work in order to evaluate the calcium ration the Moroccan adolescents.

Methods

This study included 257 adolescents aged between 14 and 17 years old, to describe the calcium ration in the Moroccan adolescents. The calcium ration is evaluated using the translated version in dialectal Arabic of the Fardellone questionnaire [13,14]. The questionnaire consists of 22 items whose calcium content is evaluated by the Fardellone equivalence tables [13]. 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 [15]; 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 a 257 adolescents aged between 14 and 17 years old, 43% female (n = 111), 57% of male (n = 146). The average age is 16.42 ± 8.47 . The mean total calcium consumption of the subjects recruited is 5991 mg per week (median is 5467 mg per week), a daily consumption of 855 mg per day (median is 788 mg per day). These results are obtained by the use of *scoring* methods. 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 (8.4 % 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). The comparison of both gender found a deficit higher among females (789 mg per day) than males (876 mg per day). Just 5.1% of males and 4.7% of females had adequate intake of 1200mg/day or more.

Discussion

The aim of our study is to quantify the calcium intake of the Moroccan adolescents 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. In this study, the weekly frequency for food variations and consumption was evaluated throughout the week without excluding weekend meals. We have shown a lack of calcium intake affecting the Moroccan adolescents. In Morocco, a study carried out in 2010 for evaluating the calcium ration in population of Marrakesh and its region [16], which shows results similar to the results of our study, which can be explained by the similarity of food habits in different regions of Morocco. The table 2 shows a comparison of our results with different studies [16–24]. The deficiency of calcium intake is often associated with vitamin D deficiency. Hypovitaminosis D is widespread in children and adolescents around the world including Morocco. This situation is frequent in the Maghreb countries despite the sunshine [25–27], which suggests a high incidence of bone metabolic pathology. Considering the high prevalence (80 %) of vitamin D deficiency in the world including Morocco [28], adequate Ca intake is important to

achieve optimal bone accretion and growth. We suggest that interventions designed to promote improvements in Ca intake should emphasize strategies that encourage consumption of milk and other Ca-rich foods. The limitations of this study are related to the applicability of the questionnaire, since it was dependent on complete and honest responses from the adolescents.

Conclusion

This investigation found low calcium intake in the adolescent population of Morocco, in common with other study that have been developed in this country [16], which represent a public health problem in Morocco and requires the implementation of a strategy of management including essentially the prevention which involves raising public awareness of the dangers of this deficiency and the risk factors, and the conservation of a food rich in calcium is important at any age.

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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	1888 (33 %)	284
Dairy + cheese	1732 (28.9 %)	248
Vegetables + fruits + meat + water	965 (15.4 %)	132
Bread + pasta + semolina	851 (14.1 %)	121
Chocolate	555 (8.6 %)	74
Total	5991	855

Table 2: Comparison of calcium intake for different series.

Publications	Calcium intake In mg / day
Ait Ouazar et al. [16]	839
Marshall et al. [17]	733-915
Keith Jensen et al. [18]	1200-1479
Siew Sun Wong et al. [19]	1045-1210
Oliveira et al. [20]	540
Rodrigues et al [21]	700
Peters et al. [22]	682.2±132.2
Santo et al. [23]	703.7±396.0
Jong Geun et al. [24]	510.2
Our series	855

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