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Research Article

DIETARY CALCIUM INTAKE AMONG ADULTS-A QUANTITATIVE ASSESSMENT

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ABSTRACT

Background: Tropical countries like India is now found to be highly prevalent with the increased incidence of osteoporosis over the last three decades; which is inevitably aggravated with negative balance in dietary calcium. **Aim:** To quantitatively estimate the dietary calcium intake of adults. **Methods:** Forty subjects of the age group 35 to 45 years were selected randomly. Three-day food samples consumed by the subjects were collected and estimated for the calcium content using standard laboratory techniques and the values were analyzed. **Results:** The mean calcium intake was found to be 477.8 ± 121.5 mg/day among males and 410.2 ± 112.8 mg/day among females. **Conclusion:** Consumption of calcium should be increased by two fold to meet the recommended dietary allowance.

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INTRODUCTION

In the past two decades, there has been a great public importance on micronutrients. The fifth most abundant mineral in the human body is calcium with approximately 1000g present in adults. It is an essential element achieved solely through the dietary sources. It is required by all living cells to remain viable and is also required for a number of specific roles in the body.

Calcium is not only required for bone formation but also influences the remodeling rates by modulating the bone mass. Calcium absorption efficiency declines with ageing, both in men and women.

Calcium intake, calcium absorption and excretion determines the calcium balance. An obvious feature of this system is that relatively mild changes in calcium excretion and absorption can nullify a high intake or compensate for a low one. Between the countries, there is a wide divergence in calcium intake, depending largely on animal and dairy product consumption. Among the developing countries, Asians are found to consume lower levels of oral dietary calcium; and the increased calcium intakes are found with Europeans and North American's.^[1]

The Current dietary calcium recommendation is 600mg/day for men and women. In some individuals, particularly the elderly, to achieve the recommended dietary calcium intake, supplements may be needed. In most situations, on most intakes, dietary calcium is effectively absorbed for only about 25-30% and obligatory calcium losses are relatively large.

When evaluating the food sources of calcium, the calcium content is generally of greater significance than bioavailability. Calcium content, calcium bioavailability and frequency of consumption are the factors to determine of food's contribution in meeting the calcium needs. Bioavailability, the extent to which calcium is absorbed in the intestinal system, depends on the total amount of calcium in a food and the type of food consumed. Dietary intake of calcium has to be consumed in such a way that the rate of absorption tallies to the obligatory losses if skeletal damage is to be avoided.

The application of Indian food tables for micronutrient intakes would be unseemly due to the absence of good agreement in the case of several micronutrients^[2]. Therefore in the present study the calcium intake of the subject is found by collecting the food consumed and analyzing the content in a laboratory set up.

Objectives

To analyze the daily dietary intake of calcium from food consumed by Standard laboratory analysis.

METHODOLOGY

Forty adults in and around Chennai, between 35-45 years where chosen for the study. Healthy individuals with no disease condition affecting the nutritional status, food intake, and ability to record the dietary intake, subjects not on any calcium supplementation were the inclusion criteria for the present

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study. Each subject participating in the study gave their informed consent.

Food samples were collected from the subjects in polythene bags for three consecutive days including two weekdays and one weekend. All the subjects followed a South Indian mixed (vegetarian and non-vegetarian) meal pattern. The experimental procedures for the food sample collected were performed in the Food Analysis Laboratory, Department of Clinical Nutrition, Sri Ramachandra University, Porur, Chennai. The solid samples were analysed using the Clark and Collip method (Figure 1) and liquid samples using the EDTA solution method (Figure 2).

Variables were analyzed using percentage, mean values and standard deviations. To compare the mean intake of calcium Student's t-test was used.

men (<80%) and women (<68%). Considering the bioavailability and the multiple factors that inhibits the calcium absorption the overall availability from the food would be much lesser.

The calcium analysis from the food samples were compared with the Indian food composition table (IFCT) formulated by the National institute of nutrition (NIN) 2017. It was found that the calcium intake derived from the calibration using NIN values estimated a higher intake compared to the laboratory values from the study (Table 1), and the difference was significant ($p<0.01$). Estimates of micronutrient intake was found to be within $\pm 5\%$ for cooked foods based on questionnaires and food composition table values, whereas at daily intake levels the error increased up to $27\%^{[2]}$.

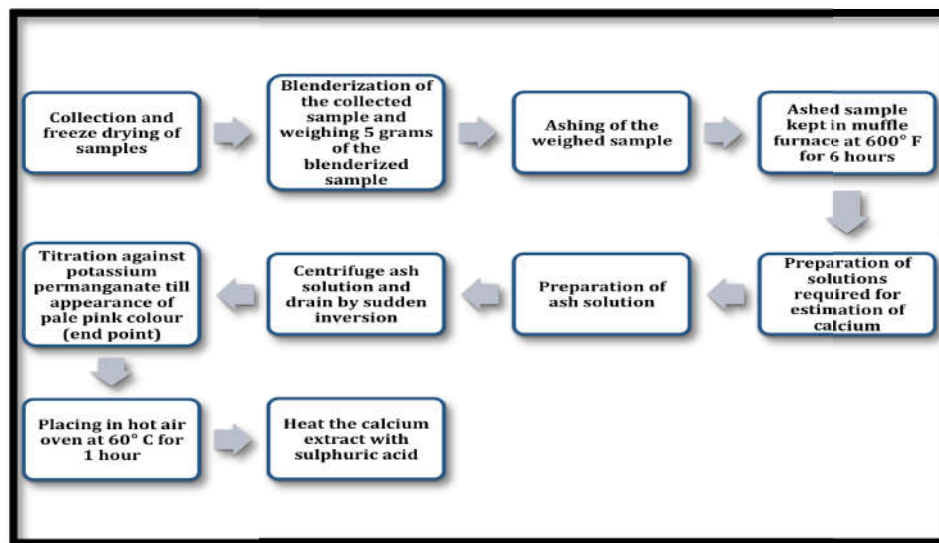


Figure 1 Flow chart of calcium analysis using Clark and Collip method

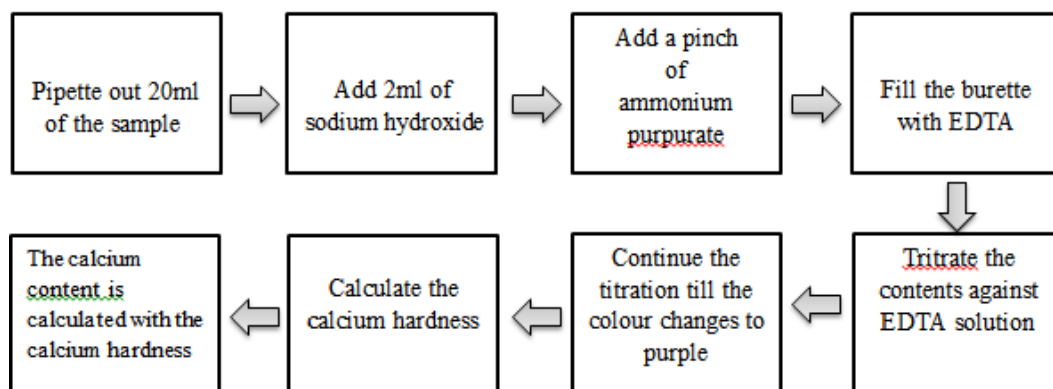


Figure 2 Procedure of calcium analysis using EDTA solution method

RESULTS AND DISCUSSION

There was an equal distribution of male and female subjects. The mean age of the male subjects was 39.3 ± 4.6 years and that of the females was 40.7 ± 6.2 years. Among the subjects 31% of the females and 25% of the males were found to be overweight. The mean calcium intake was found to be 477.8 ± 121.5 mg/day among males and 410.2 ± 112.8 mg/day among females. From the analysis it was evident that the consumption of calcium was lesser than the recommended daily allowance of calcium for

Table 2 Comparison of Calcium Intake Through Laboratory Analysis And Ifct Values

Gender	Mean dietary calcium intake (M \pm SD)		Percentage loss (%)	p Value
	Calculated using NIN value	Calculated using the laboratory values		
Male	573.3 \pm 212.1	477.8 \pm 121.5	16	0.004*
Female	492.2 \pm 113.4	410.2 \pm 112.8	17	0.002*

* $p<0.01$ highly significant

CONCLUSION

Calcium is an essential element and has to be consumed from the diet. The decreased amount of calcium intake in the current scenario would increase the risk of osteopenia and subsequent osteoporosis. Therefore there is a need for more concentrated efforts to improve the dietary calcium intake by the population to overcome the predicted risk.

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