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Study the calcium assessment of urban preschoolers in Aurangabad City and standardize fortified icecream with calcium extract

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ABSTRACT

Minerals are required for many purposes like forming the frame and rigid structure of the body. Calcium is one of the macro mineral most abundantly found in the human body. Most of the calcium in the body is present in the bones and teeth; only a small amount (1%) is present in blood/body fluids. It is present either is combined with protein or as calcium ion. To standardize the calcium fortified ice-cream with calcium powder. To determine the prevalence of calcium deficiency in preschoolers in urban population. To identifies the risk factors of calcium absorption among pre-schoolers. The data was collected on random sampling method and tools used were nutritional assessment sheet which consists of height, weight, BMI, food habits, physical examination like the presence of signs and symptoms of calcium deficiency, and 7-day dietary recall for calcium intake. A single random sampling technique was used to select subjects representing urban preschoolers. The statistical analysis was done for collected data of 180 children. Age wise and gender-wise distribution of calcium intake. Where a total number of male in the age group of 3-4 years is 72 and the total number of males in the age group of 5-6 years is 46. Same as for females total number in the age group of 3-4 years is 37 and in the age group of 5-6 years is 25. In this study, it is observed that calcium intake in the category of 400mg to 600mg/day is more than that of other categories. It is shown that there is a significant improvement in blood serum calcium levels of children who are treated with calcium-fortified ice cream. In compare to literature study of jurain hoogerwerf (18) there were statistically significant differences in calcium absorption from the ice cream fortified formulations and milk, demonstrating that calcium-fortified ice cream is an effective vehicle for delivering calcium. The study was concluded that it was a very nutritious and calcium-rich product (ice cream). More than 50%of children are having physical symptoms and clinical signs of calcium deficiency even if their calcium intakes are adequate and fortified products are enriched calcium absorption from the ice cream fortified formulations and milk, demonstrating that calcium-fortified ice cream is an effective vehicle for delivering calcium.

Keywords— Calcium deficiency, Urban preschoolers, Calcium-fortified ice-cream

1. INTRODUCTION

Minerals are required for many purposes like forming the frame and rigid structure of the body, as part of the body/cell fluids and for a number of cellular and subcellular physiological functions.

Calcium is one of the macro mineral most abundantly found in the human body. Most of the calcium in the body is present in the bones and teeth; only a small amount (1%) is present in blood/body fluids. It is present either in combination with protein or as calcium ion. Thyroid and parathyroid hormones maintain the concentration of calcium in the blood. During dietary deficiency, the calcium present in the bones maintains the blood calcium levels.

Syndromes of bone disease and deformities consequent to disorders of nutrition, bone and mineral metabolism constitute a serious national health problem. The studies on this subject are scanty. Data on nutritional bone disease are described and discussed. We had surveyed 337.68 million population residing in 0.39 million villages in 22 States of India during the period 1963 to 2005. Of the 4, 11,744 patients identified with the disorders of bone and mineral metabolism, 2, 13,760 (52%) had nutritional bone disease, 1, 77,200 (43%) had endemic skeletal fluorosis and 20,784 (5%) had metabolic bone disease and in 41 patients (0.19%) the bone disease was rare, mixed or unidentified. Vitamin D deficiency osteomalacia and rickets caused by inadequate exposure to sunlight (290-315 nm), dietary calcium deficiency.

1.1 Aim

- To study the prevalence of calcium deficiency in pre-schoolers (3 to 6 years) in Aurangabad city.
- To standardize the fortification of ice cream with Calcium powder.

1.2 Objectives

Objectives of this study were to identify the associated risk factors in the preschoolers; and to assess the relationship of rickets with risk factors like stunted growth, Osteomalacia, etc.

- (a) To determine the prevalence of calcium deficiency in pre-schoolers in urban population.
- (b) To identify the risk factors of calcium absorption among pre-schoolers.
- (c) To standardize the calcium fortified ice-cream with calcium powder.

2. MATERIAL AND METHODS

The data were collected on random sampling method and tools used were nutritional assessment sheet which consists of height, weight, BMI, food habits, physical examination like the presence of signs and symptoms of calcium deficiency, and 7-day dietary recall for calcium intake. A single random sampling technique was used to select subjects representing urban pre-schoolers. The statistical analysis was done for collected data of 180 children. And the data was analyzed by ANOVA and P values were derived.

2.1 Method of preparation

Table 1: Ingredients and their values

Ingredients	Value
Milk	1 lit
Condense milk	400gms
Butter	400gms
Sugar	600gms
Vanillas extract	3ml
Seashell powder	5g

2.2 Preparation of ice cream mix

Raw materials like condensed milk, sugar of ‘M’ grade, butter are added to milk. The mix is pasteurized at 75°C- 80°C / 30 min addition of concentrated flavours to the mixer. The mix is fortified with calcium carbonate by adding sea shell powder. The mix is refrigerated at -4 to -8°C

2.3 Experimental protocol of the study.

10 children deficit in calcium were taken under experimental studies such as group A and group B; whereas group A (n=5) is an experimental group and group B (n=5) is a control group.

Pre Blood serum calcium levels were investigated of Children of the group A respectively.

The calcium-fortified ice cream was given to the children of group A continuously for 15 days. Whereas children of group B were monitored on their daily dietary intakes?

Approximately after 15 days again blood serum calcium level was investigated of children of both the groups A and B.

Structural protocol of the study



The data of prevalence of calcium deficiency in preschoolers was conducted in 3 different playschools in Aurangabad city



On random basis children were assessed nutritionally, examined physically and clinically investigated.



On the basis of 7-day dietary recall calcium intake was calculated and children are classified in standard categories.



10 subject selected for trial basis

Table 2: Demographic information of urban preschoolers (n=180)

S. No.	Category	Parameters	No's	%	P- Value
1	Gender	Male	118	65%	
		Female	62	35%	
2	Age	3-4 years	109	60%	0.033*
		5-6 years	71	40%	
3	Height (cm)	60-100	106	58%	0.073**
		101-150	58	37.7%	

		151-200	5	2.7%	
4	Weight (Kg)	10-15	59	32.7%	0.001***
		16-20	72	40%	
		21-25	39	21.6%	
		25-30	9	5%	
5	Food habit	Vegetarian	78	43%	0.83*
		Non-vegetarian	102	56%	
6	Physical sign	Presence of white spot on the skin	101	56%	
		Presence of brittle nails	80	44%	
		Muscle cramp	71	78%	
		Numbness and tingling on face, hands, feet.	142	78%	
		Skeletal deformities	62	34%	
		Delayed teething	110	61%	
		Tooth bristleness	50	27%	
7	Clinical sign	Chvotcksign. (present)	113	62%	
		Trousseau's sign. (present)	90	50%	
8	Dietary recall	0-200 (poor)	15	8.3%	
		201-400 (fair)	42	23%	
		401-600 (good)	84	46.6%	
		601 & above (excellent)	38	21.1%	

Table 2 is the demographic information of data collected from urban preschoolers. The total data collected is of 180 children respectively. The data is presented according to parameters for example; total no. Of male and female, age-wise distribution, classification of height and weight, physical examination, clinical investigation and average of 7-day calcium dietary recall.

Table 3: Age-wise and gender-wise distribution of daily calcium intake. (N=180)

S. No.	Gender	Calcium intake	3-4 years		5-6 years		P value
			No's(n=72)	%	No's(n=46)	%	
1	Male	0-200	5	6.94%	5	10.8%	F=10.65 p=0.02**
		201-400	20	27.7%	8	17.3%	
		401-600	32	44%	23	50%	
		601-800	11	15.2%	6	13%	
		801-1000	3	4.1%	5	10.8%	
2	Female		No's(n=37)		No's(n=25)		F=9.25 p=0.02**
		0-200	4	10.8%	2		
		201-400	11	29.7%	7		
		401-600	17	45.9%	10	40%	
		601-800	3	8.1%	3	12%	
		2	5.4%	3	12%		

The above table is a representation of age wise and gender-wise distribution of calcium intake. Where a total number of male in the age group of 3-4 years is 72 and the total number of males in the age group of 5-6 years is 46. Same as for females total number in the age group of 3-4 years is 37 and in the age group of 5-6 years is 25.

In this study, it is observed that calcium intake in the category of 400mg to 600mg/day is more than that of other categories.

Table 4: Age-wise and gender-wise distribution of children for experimental study (n=5)

S. No.	Gender	No's	3-4 years		5-6 years		P value
			Pre sr.ca+	Post sr.ca+	Pre sr.ca+	Post sr.ca+	
1	Male	3	7.2mg%	9.1mg%	-	-	F=0.63 p=0.61*
			6.9mg%	8.8mg%	-	-	
			6.8mg%	9.4mg%			
2	Female	2	-	-	6.5mg%	8.3mg%	F=2.52 p=0.35**
			-	-	7.0mg%	10.5mg%	

Sr:ca+= serum calcium

In the above table, it is shown that there is a significant improvement in blood serum calcium levels of children who are treated with calcium-fortified ice cream.

In compare to literature study of Jurain Hoogerwerf (18) there were statistically significant differences in calcium absorption from the ice cream fortified formulations and milk, demonstrating that calcium-fortified ice cream is an effective vehicle for delivering calcium.

3. DISCUSSION

Calcium and vitamin D are required for bone accretion, and there are reports that higher intakes of calcium are related to increased bone mass in children, young adults, and postmenopausal women, thereby preventing osteoporosis and risk of fracture in later life (25). In industrialized countries, the main dietary sources of calcium are milk and other dairy products, which supply 50% to 80% of dietary calcium. Changes in beverage consumption, with milk being replaced by soft drinks (10,11) can result in lower intakes of calcium, therefore, calcium-fortified foods can make a valuable contribution, particularly when the products appeal to the subgroups of the population who require additional calcium to promote bone health (26).

Ice cream is a palatable and widely enjoyed food product that could provide a useful source of calcium in the diet. It naturally contains calcium and can be additionally fortified to provide substantial amounts (200 mg) without impacting on taste and flavor. Ice creams used in this study were a low-fat dairy ice cream (3% butterfat, normal levels of sugar) enriched with milk minerals (.Levels of milk minerals provided the same amount of calcium in a 60-g portion of ice cream as in a 200-g portion of milk.

Bioavailability of calcium in ice cream has not been measured previously. We, therefore, conducted the current study to observe the high biological value calcium enrichment with ice cream in treating hypocalcemia in children. There is a significant improvement in sr ca level of children.

4. RESULT AND DISCUSSION

Table 1 is the demographic information of data collected from urban preschoolers. The total data collected is of 180 children respectively. The data is presented according to parameters for example; total no. Of male and female, age-wise distribution, classification of height and weight, physical examination, clinical investigation and average of 7-day calcium dietary recall. In this study, it was observed that more than 50% of children are having physical symptoms and clinical signs of calcium deficiency even if their calcium intakes are adequate.

5. CONCLUSION

Inadequate intake of calcium may primarily result in bone and teeth related issues in kids. Read on to learn more about the risks associated with calcium deficiency in kids.

In our study, we came to the conclusion that a number of children are a deficit in calcium in the most important period of growing age. From the complete study we can found that from 180 children only 82 (45.5%) children are in the category of 400-600 mg/day and 63 children(35%) are in the category of below 400mg/day and rest of 36 (20%)are in the category of above 600mg /day calcium intake , this indicates that only 20% of children consuming adequate calcium in their diets .rest of 80% of children are lacking in fulfilling the recommended dietary allowance of calcium intake. And our product which we have enriched with calcium has significant results in improving calcium levels in the deficient pediatric within 15 days period of time.

6. REFERENCES

- [1] Liberman B, Cukiert A. Fisiologia e fisiopatologia do hormônio do crescimento. São Paulo: Lemos Editorial; 2004.
- [2] Hall R, Anderson J, Stuart GA, Besser GM. Clinical Endocrinology. 2nd ed. 1994.
- [3] Cobayashi F. Cálcio: seu papel na nutrição e saúde. *Compacta Nutr.* 2004;2:3-18.
- [4] Joint FAO/WHO Expert Consultation on Human vitamin and mineral requirements. Bangkok; 1998.
- [5] Vitolo MR. Nutrição: da gestação à adolescência. Rio de Janeiro: Reichmann & Affonso; 2003.
- [6] Holick MF. Sunlight and vitamin D for bone health and prevention of autoimmune diseases, cancers and cardiovascular disease. *Am J Clin Nutr.* 2004;80:1678S-88S
- [7] Hochberg Z. Vitamin D and rickets. Consensus development for the supplementation of vitamin D in childhood and adolescence. *Endocr Dev Basel.* 2003;6:259-81