

Calcium Biochemical Indicators in a Group of Schoolchildren with Low Socioeconomic Status from Barranquilla, Colombia

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Abstract : Calcium is an essential element for good growth and development of the organism, and its requirement is increased at school age. Low socio-economic populations of developing countries such as Colombia may have food deficiency of this mineral in schoolchildren that could be reflected in calcium biochemical indicators, bone alterations and anthropometric indicators. The objective of this investigation was to evaluate some calcium biochemical indicators in a group of schoolchildren of low socioeconomic level from Barranquilla city and to correlate with body mass index. 60 schoolchildren aged 7 to 15 years were selected from Jesus's Heart Educational Institution in Barranquilla-Atlántico, apparently healthy, without suffering from infectious or gastrointestinal diseases, without habits of drinking alcohol or smoking another hallucinogenic substance and without taking supplementation with calcium in the last six months or another substance that compromises bone metabolism. The research was approved by the ethics committee at Universidad del Atlántico. The selected children were invited to donate a blood and urine sample in a fasting time of 12 hours, the serum was separated by centrifugation and frozen at -20 °C until analyzed and the same was done with the urine sample. On the day of the biological collections, the weight and height of the students were measured to determine the nutritional status by BMI using the WHO tables. Calcium concentrations in serum and urine (SCa, UCa), alkaline phosphatase activity total and of bone origin (SAPT, SBAP) and urinary creatinine (UCr) were determined by spectrophotometric methods using commercial kits. Osteocalcin and Cross-linked N-telopeptides of type I collagen (NTx-1) in serum were measured with an enzyme-linked immunosorbent assay. For statistical analysis the Statgraphics software Centurium XVII was used. 63% (n = 38) and 37% (n = 22) of the participants were male and female, respectively. 78% (n = 47), 5% (n = 3) and 17% (n = 10) had a normal, malnutrition and high nutritional status, respectively. The averages of evaluated indicators levels were (mean \pm SD): 9.50 \pm 1.06 mg/dL for SCa; 181.3 \pm 64.3 U/L for SAPT, 143.8 \pm 73.9 U/L for SBAP; 9.0 \pm 3.48 ng/mL for osteocalcin and 101.3 \pm 12.8 ng/mL for NTx-1. UCa level was 12.8 \pm 7.7 mg/dL that adjusted with creatinine ranged from 0.005 to 0.395 mg/mg. Considering serum calcium values, approximately 7% of school children were hypocalcemic, 16% hypercalcemic and 77% normocalcemic. The indicators evaluated did not correlate with the BMI. Low values were observed in calcium urinary excretion and high in NTx-1, suggesting that mechanisms such as increase in renal retention of calcium and in bone remodeling may be contributing to calcium homeostasis.

Keywords : calcium, calcium biochemical, indicators, school children, low socioeconomic status

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