Serum levels of 25(OH)-vitamin D and adipokine's profile in obese children and adolescents

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Background

There is an increasing body of evidences regarding hypovitaminosis D in children and adolescents. Low levels of 25-OH Vitamin D is associated with insulin resistance in adults. Recent *in vitro* studies have suggested that vitamin D may play a role in the regulation of adiponectin, leptin and resistin; since all these adipokines are related to insulin sensitivity modulation, they might represent a link between vitamin D status and insulin resistance.

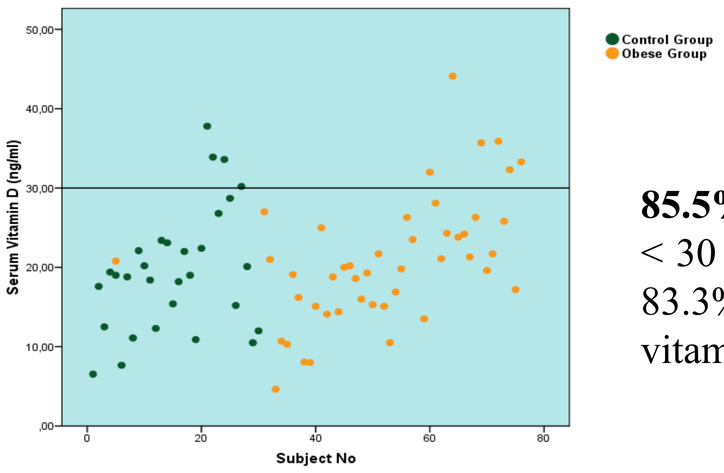
Objective

To identify possible correlations between 25(OH)-vitamin D serum levels and adipokine's profile in obese children and adolescents.

Patients and method

We evaluated **25-OH Vitamin D, insulin, adiponectin, leptin, resistin and HOMA index** in **46 obese children** and adolescents (age 14.3±2.2 years) and in **30** age-matched **healthy non-obese children** (control group). 25-OH Vitamin D was measured by chemiluminiscence (Liaison DiaSorin), total adiponectin, leptin and resistin by Elisa (Quantikine, R&D Systems), fasting insulin by RIA, and insulin resistance index calculated by homeostasis model assessment (HOMA). Vitamin D reference range was defined in accord with The Endocrine Society's Clinical Guidelines: deficiency < 20ng/ml, insufficiency 20 - 30 ng/ml.

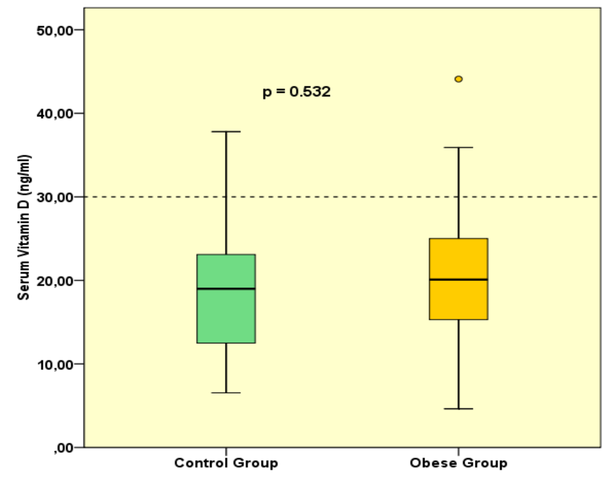
Fig. 1. Serum levels of vitamin D



Results

85.5% of subjects were vitamin D insufficient (serum vitamin D < 30 ng/ml, Fig 1). From these, 87% were in the obese group and 83.3% in the control group. The plasmatic levels of 25(OH)-vitamin D do not differ between groups (Fig 5).

Figure 5. Statistical expression of serum Vitamin D in the two groups



The adiponectin levels were significantly lower (Fig 2), whereas leptin (Fig 3) and resistin have significantly higher values in the obese group compared to the control group.

Parameter	Obese Group (n=46)	Control Group (n=30)	P
Insulinemia (µUI/ml)	24.04 ± 13.37	17.47 ± 6.39	0.011
HOMA –index	4.69 ± 2.79	3.51 ± 1.44	0.033
Adiponectin (µg/dl)	6.74 ± 3.17	12.54 ± 8.13	<0.001
Leptin (ng/ml)	35.37 ± 24.02	9.01 ± 7.11	<0.001
Resistin (ng/ml)	9.01 ± 2.60	7.23 ± 1.95	0.002
Vitamin D (ng/ml)	20.79 ± 7.99	19.63 ± 7.83	0.532

Figure 2. Serum adiponectin - comparison between groups

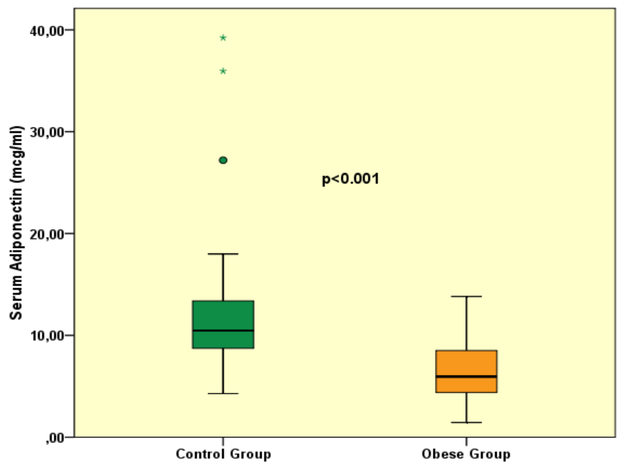
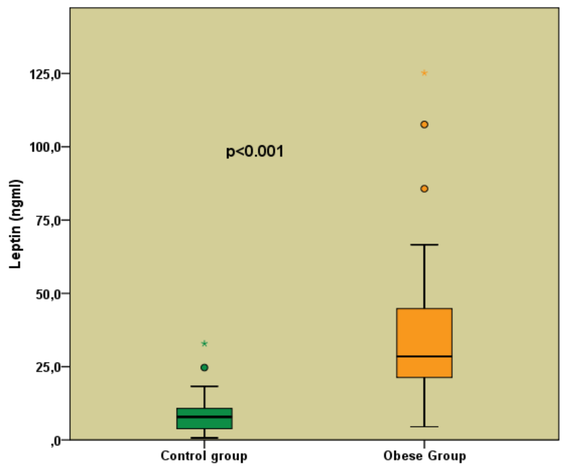


Figure 3. Serum levels of leptin - Comparison between groups



25(OH)-vitamin D was negatively correlated to fasting insulinemia (r=-0.324, p=0.036) and to plasmatic levels of leptin (r= -0.363, p= 0.013); in multivariate regression analysis the only parameter that influenced vitamin D status in obese children was leptin.

Figure 6. Correlation between serum vitamin D and fasting insulinemia

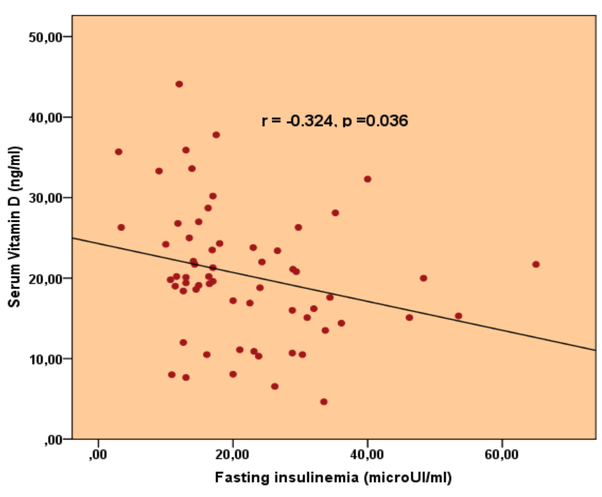
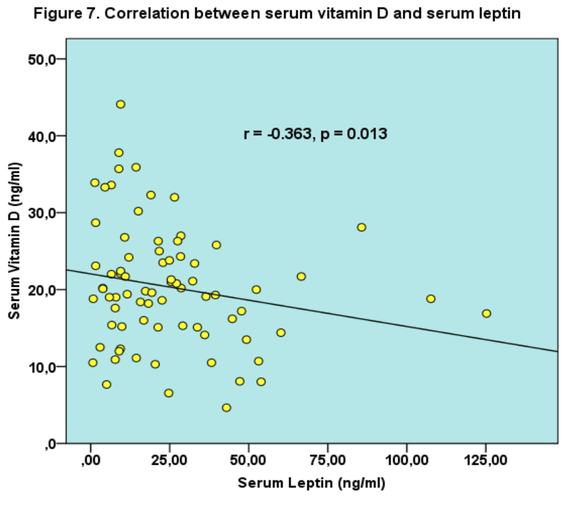
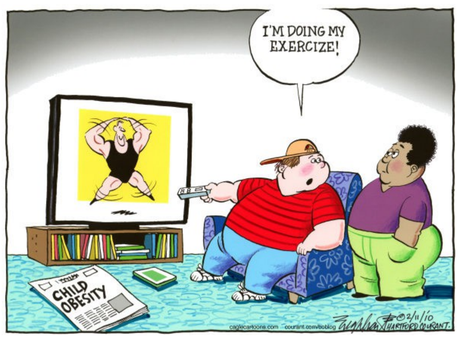


Figure 7. Correlation between serum vitamin D and serum leptin



We found no correlation between plasmatic levels of 25(OH)-vitamin D and adiponectin or 25(OH)-vitamin D and resistin, respectively.

Conclusion We found an insufficiency of vitamin D in a large majority of selected Romanian children. Vitamin D deficit in obese children is related to hyperinsulinemia, their association being explained by a parallel variation with plasmatic levels of leptin.



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