



THE PREVALENCE OF 25-HYDROXYVITAMIN D INSUFFICIENCY AND DEFICIENCY AMONG OVERWEIGHT AND OBESE CHILDREN AND ADOLESCENTS IN GREECE



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BACKGROUND

The prevalence of obesity has increased dramatically in Greece in the last decades, and more than 30% of children and adolescents are currently overweight or obese. Obesity is associated with decreased circulating 25-hydroxyvitamin D concentrations, which might predispose to metabolic syndrome and cardiovascular morbidity and mortality.

OBJECTIVE AND HYPOTHESES

To determine serum 25-hydroxyvitamin D concentrations and their relationship to cardiometabolic parameters in overweight and obese children and adolescents.

METHODS

One thousand ninety six (n=1296) children and adolescents [700 females (F), 596 males (M)] were recruited to participate in the study. Of these, 143 had normal body mass index (BMI) (age: 11.15 ± 0.27 yr; BMI: 20.00 ± 0.21 kg/m²), 349 were overweight (age: 11.29 ± 0.15 yr; BMI: 23.14 ± 0.12 kg/m²) and 804 were obese (age: 11.36 ± 0.12 yr; BMI: 28.41 ± 0.18 kg/m²). Blood samples for determination of liver and renal function, 25-hydroxyvitamin D, bone profile and cardiometabolic parameters were determined at 08:00h following a 12-hour fast. Systolic and diastolic blood pressure was determined twice and the mean was calculated. (Table 1). The study was approved by the local Committee on the Ethics of Human Research. Comparisons among groups were performed using one-way analysis of variance (ANOVA).

RESULTS

The concentrations of 25-hydroxyvitamin D were sufficient (≥30 ng/mL; 37.65 ± 0.42 ng/mL) in 291 (22.45%) children and adolescents, insufficient (20-29 ng/mL; 24.39 ± 0.13 ng/mL) in 481 (37.11%) and deficient (<20 ng/mL; 14.75 ± 0.17 ng/mL) in 524 (40.43%) subjects (Figure 1). A significant difference in 25-hydroxyvitamin D concentrations was noted among the three groups of subjects (Normal BMI: 25.44 ± 0.78 ng/mL; Overweight: 24.91 ± 0.52; Obese: 22.49 ± 0.35 ng/mL, P< 0.01).

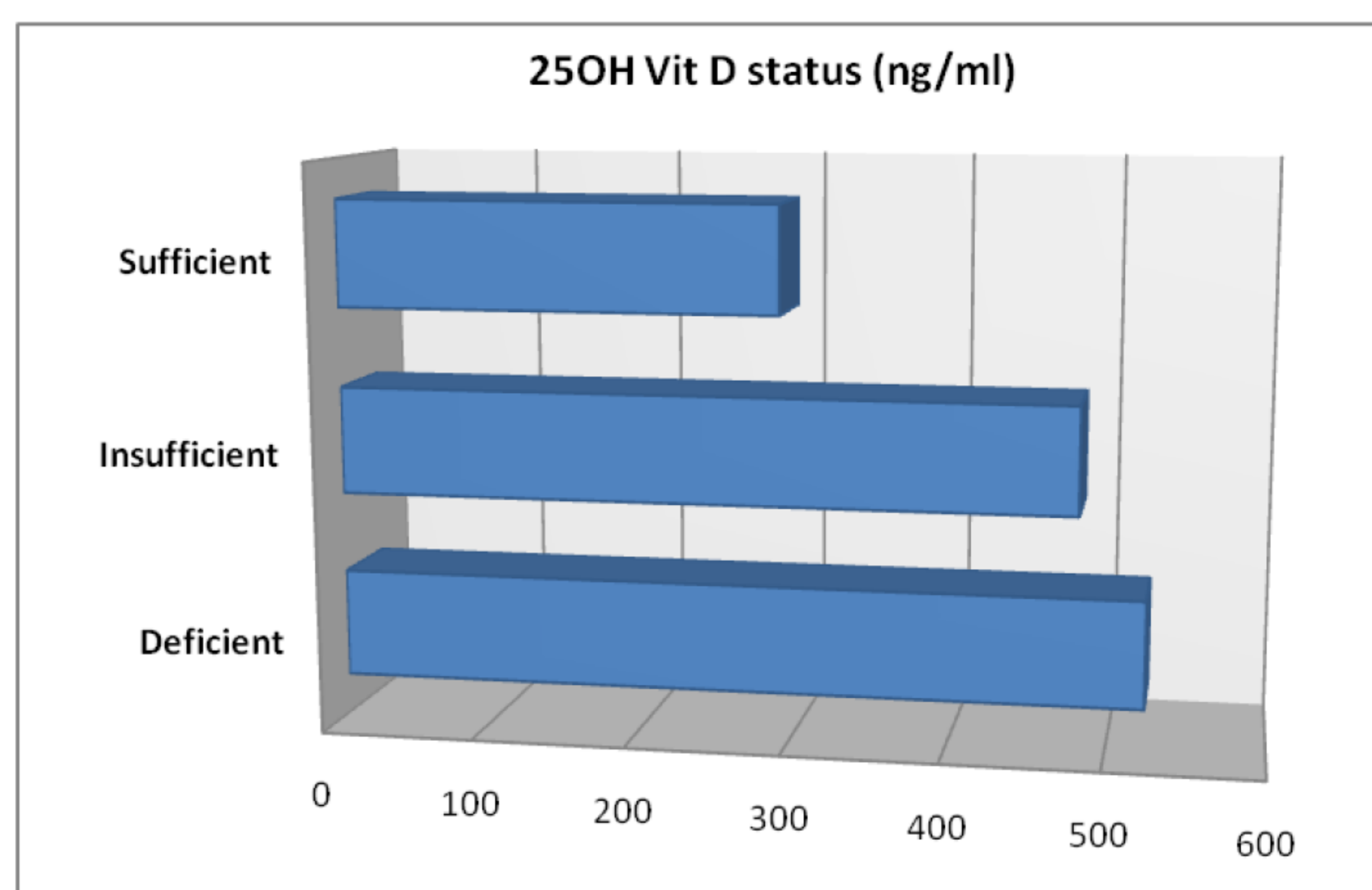


Figure 1: Concentrations of 25-hydroxyvitamin D in the study population

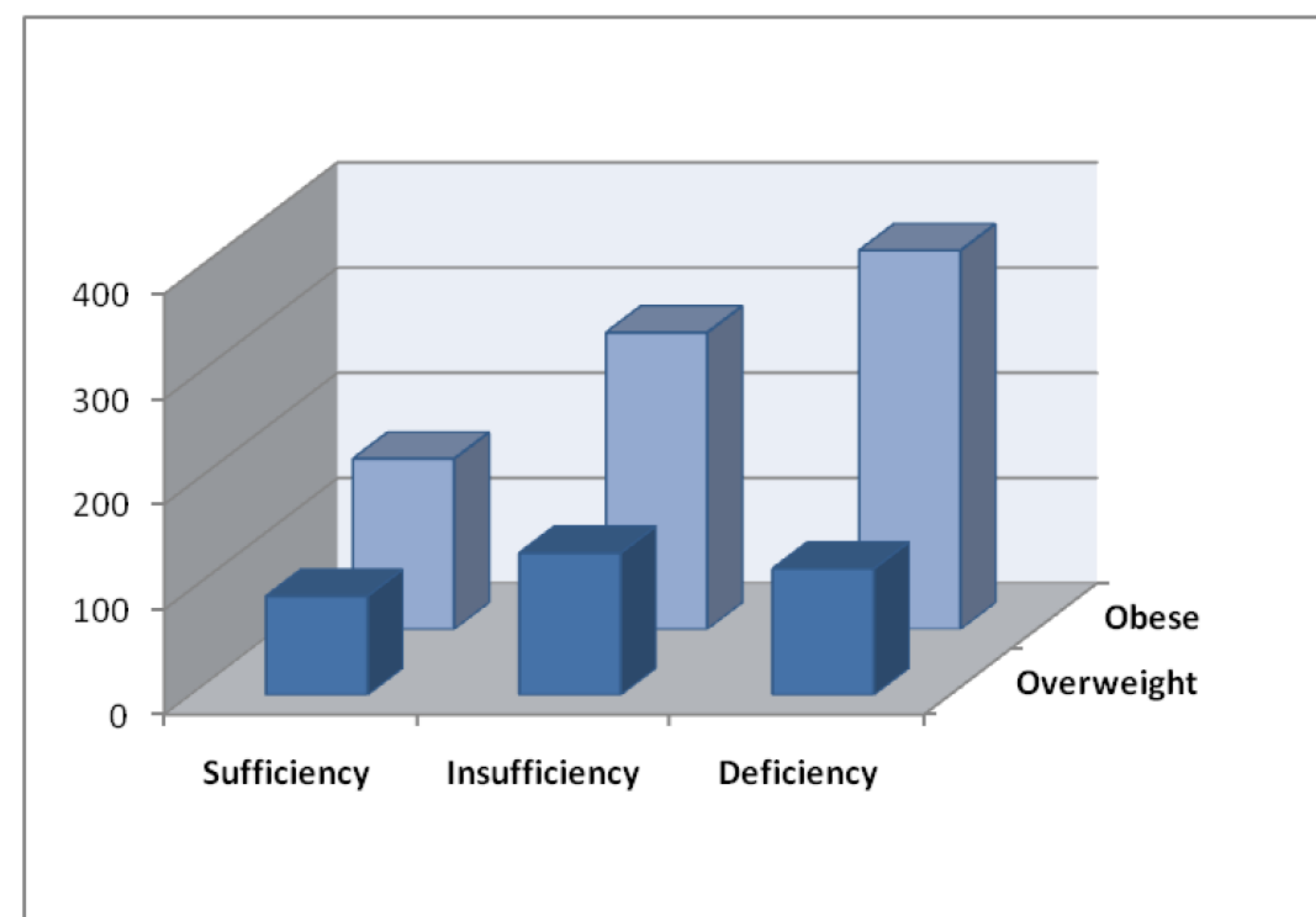


Figure 2: Prevalence of 25-hydroxyvitamin D insufficiency and deficiency among overweight and obese children and adolescents

CONCLUSIONS

Our findings indicate that 25-hydroxyvitamin D insufficiency or deficiency is observed in 87.2% of overweight and obese children and adolescents in Greece (Figure 2).

Table 1: Clinical characteristics and endocrinologic parameters

	Normal	Overweight	Obese	P
Age (yr)	11.15 ± 0.27	11.29 ± 0.15	11.36 ± 0.12	NS
Weight (kg)	41.04 ± 1.13	48.69 ± 0.83	62.58 ± 0.83	<0.001
Height (cm)	139.54 ± 1.60	141.76 ± 0.87	144.99 ± 0.67	<0.001
BMI (Kg/m ²)	20.00 ± 0.21	23.14 ± 0.12	28.41 ± 0.18	<0.001
WHR	0.89 ± 0.01	0.93 ± 0.01	0.96 ± 0.01	<0.001
BP _{SYST} (mmHg)	83.83 ± 3.64	92.78 ± 2.19	94.70 ± 1.49	<0.03
BP _{DIAST} (mmHg)	49.22 ± 2.20	53.47 ± 1.30	55.51 ± 0.92	<0.03
Glucose (mg/dl)	77.29 ± 0.90	77.22 ± 0.65	78.37 ± 0.42	NS
Insulin (µg/ml)	9.68 ± 0.47	12.17 ± 0.37	17.31 ± 0.39	<0.001
CHOL (mg/dl)	160.12 ± 2.28	161.02 ± 1.60	159.17 ± 0.97	NS
TGL (mg/dl)	66.20 ± 2.54	72.43 ± 2.23	82.92 ± 1.52	<0.001
LDL (mg/dl)	90.30 ± 1.99	91.31 ± 1.49	91.54 ± 0.90	NS
HDL (mg/dl)	55.55 ± 1.15	52.58 ± 0.76	49.15 ± 0.45	<0.001
APOA1 (mg/dl)	146.97 ± 2.31	142.42 ± 1.59	138.56 ± 0.99	<0.03
APOB (mg/dl)	70.53 ± 1.45	71.09 ± 1.06	72.99 ± 0.71	NS
LpA (mg/dl)	15.84 ± 1.88	16.32 ± 1.33	17.82 ± 0.93	NS
PTH (pg/ml)	34.11 ± 1.04	33.25 ± 0.73	34.42 ± 0.48	NS
25OHvit D (ng/ml)	25.44 ± 0.78	24.91 ± 0.52	22.49 ± 0.35	<0.001
IGF-1 (ng/ml)	320.34 ± 16.79	290.50 ± 8.42	305.14 ± 6.34	NS
IGFBP3(mg/l)	4.94 ± 0.09	4.95 ± 0.05	5.18 ± 0.04	<0.001

Values indicate means ± SEM

