

The Association Between Serum Thyrotropin Within The Reference Range And Cardiometabolic Risk In Obese Children



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INTRODUCTION

The adaptative increase of serum thyrotropin (TSH) levels in obese subjects may affect the metabolic regulation of body tissues and thus promote an unfavorable cardiometabolic profile (1-3).

AIM

To investigate the association between serum TSH, free thyroxine (FT4) within the reference range and cardiometabolic risk factors in euthyroid obese children and adolescents.

METHOD

Four hundred ninety-one Caucasian euthyroid obese children and adolescents (age 9.93±2.90) were recruited. Subjects with genetic and/or endocrine causes of obesity, diabetes, chronic diseases, chronic pharmacological therapies and overt or subclinical hypo-/hyperthyroidism, arterial hypertension were excluded. Each patient underwent clinical examination and laboratory workup including an OGTT and the measurement of serum TSH, FT4 and lipid profile. Homeostasis model assessment of insulin resistance (HOMA-IR), triglyceride to high density lipoprotein cholesterol (TG/HDL-c) ratio, total cholesterol to HDL-c (Tc/HDL-c) ratio, atherogenic index of plasma (AIP), area under the glucose curve (AUCglu) and area under the insulin curve (AUCins) were calculated.

RESULTS

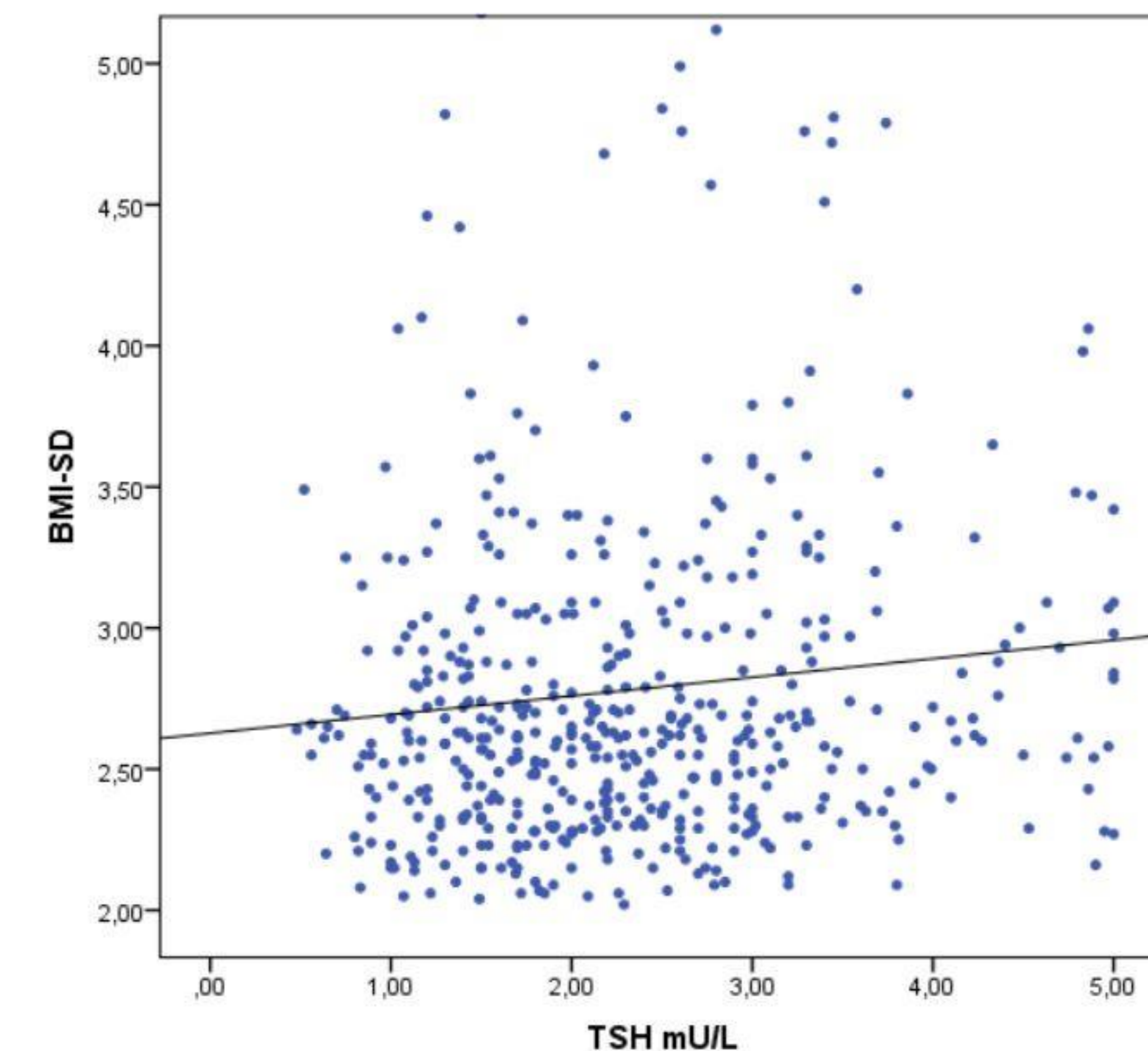
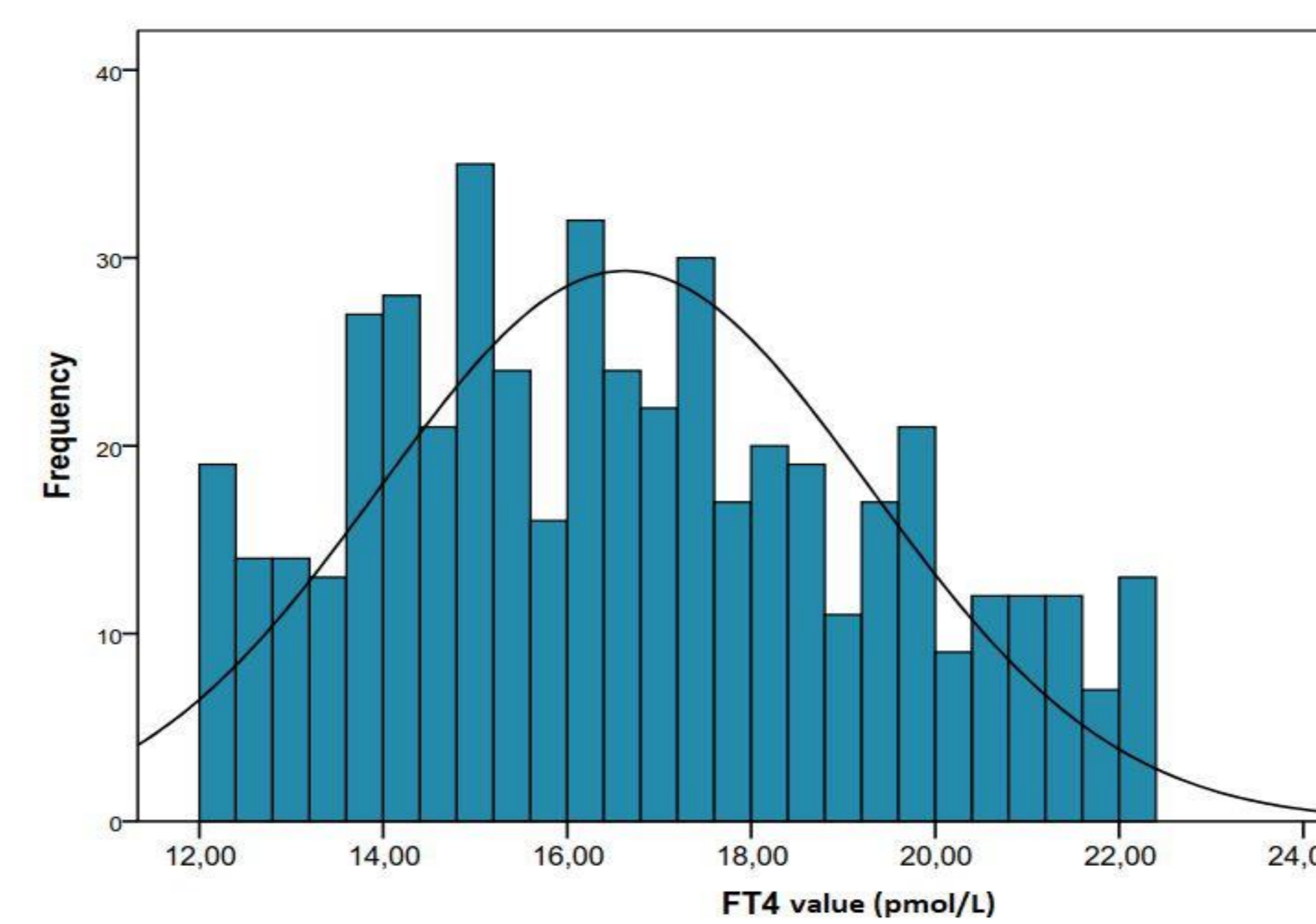
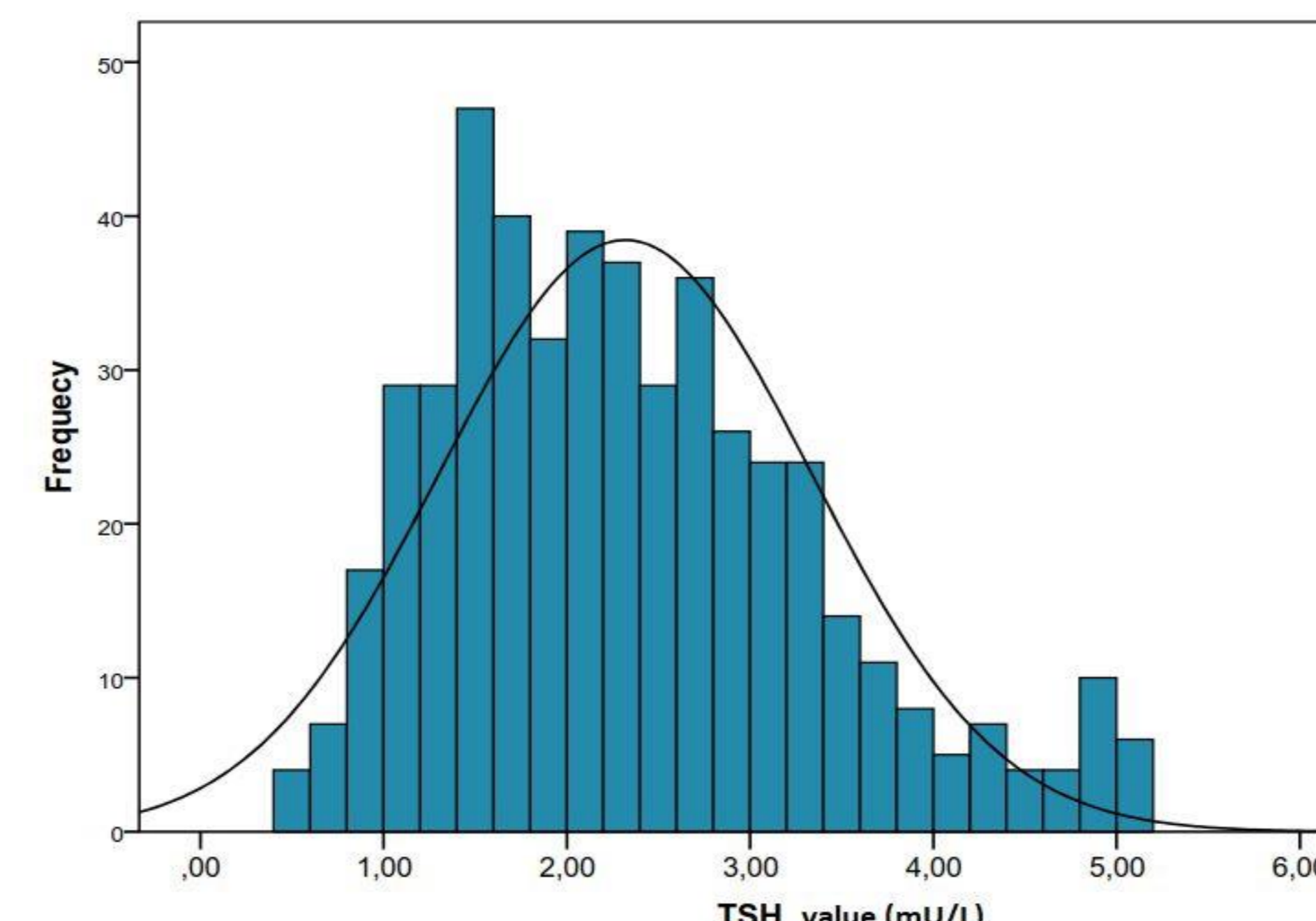
The mean TSH level in our cohort was 2.31 mU/L (range 0.48-5) with a mean FT4 level of 16.62 pmol/L (range 12-22). Two hundred twenty-five subjects (45.8%) had a high-normal TSH level (TSH 2.3-5.0 mU/L), among whom 151 subjects (67.1%) were severe obese.

Increasing concentrations of **TSH** were **associated** with increasing values of **BMI SD** (B =0.067, p=0.012), **Tc level** (B =2.860, p=0.040), **LDL-C level** (B= 3.017, p=0.022), **Tc/HDL-c ratio** (B =0.080, p=0.046), **HOMA-IR** (B =0.376, p=0.009), **AUCgluc** (B =4.636, p=0.021) and **AUCins** (B =19.501, p=0.022) after adjustment for some confounding variables.

In addition, **TSH level** was **positively correlated** with **BMI-SD** (rs=0.113; p=0.012), **Tc** (rs =0.121; p=0.008), **LDL-c** (rs =0.104; p=0.031), **TG/HDL-c** (rs =0.104; p=0.033), **Tc/HDL-c** (rs =0.134; p=0.005) **fasting plasma insulin** (rs =0.114; p=0.012), **HOMA-IR** (rs =0.123; p=0.007), **AUCglu** (rs =0.178; p=0.005), **AUCins** (rs =0.122; p=0.045) and **AIP** (rs =0.100; p=0.040).

However, no association was found between serum TSH and dyslipidemia, impaired glucose metabolism and severe obesity.

Serum **FT4** was **negatively associated** with **BMI-DS** (B= -0.044, p=0.000) and (rs =-0.110; p=0.016). **negative correlated with fasting plasma glucose**



CONCLUSIONS

Even in euthyroid obese children and adolescents increasing TSH is associated with an increasing cardiometabolic risk.

The pediatrician should evaluate the thyroid function in obese youths with the aims to assess not only an associated thyroid dysfunction but a possible adjunctive cardiometabolic risk factor.

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