

Variation of Circulating Brain-Derived Neurotrophic Factor according to Gender, Body Mass Index and Metabolic Syndrome Parameters in Adolescents

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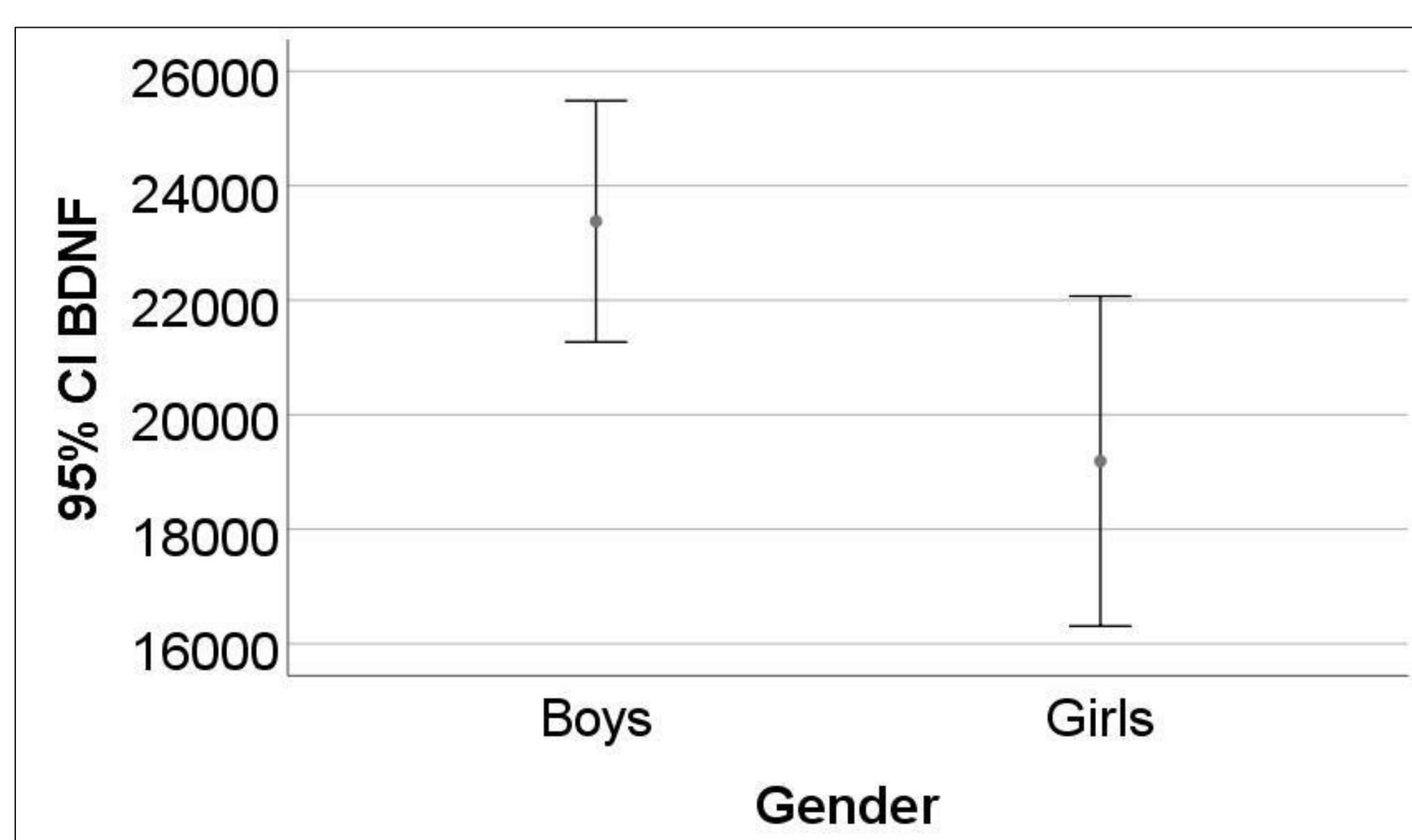
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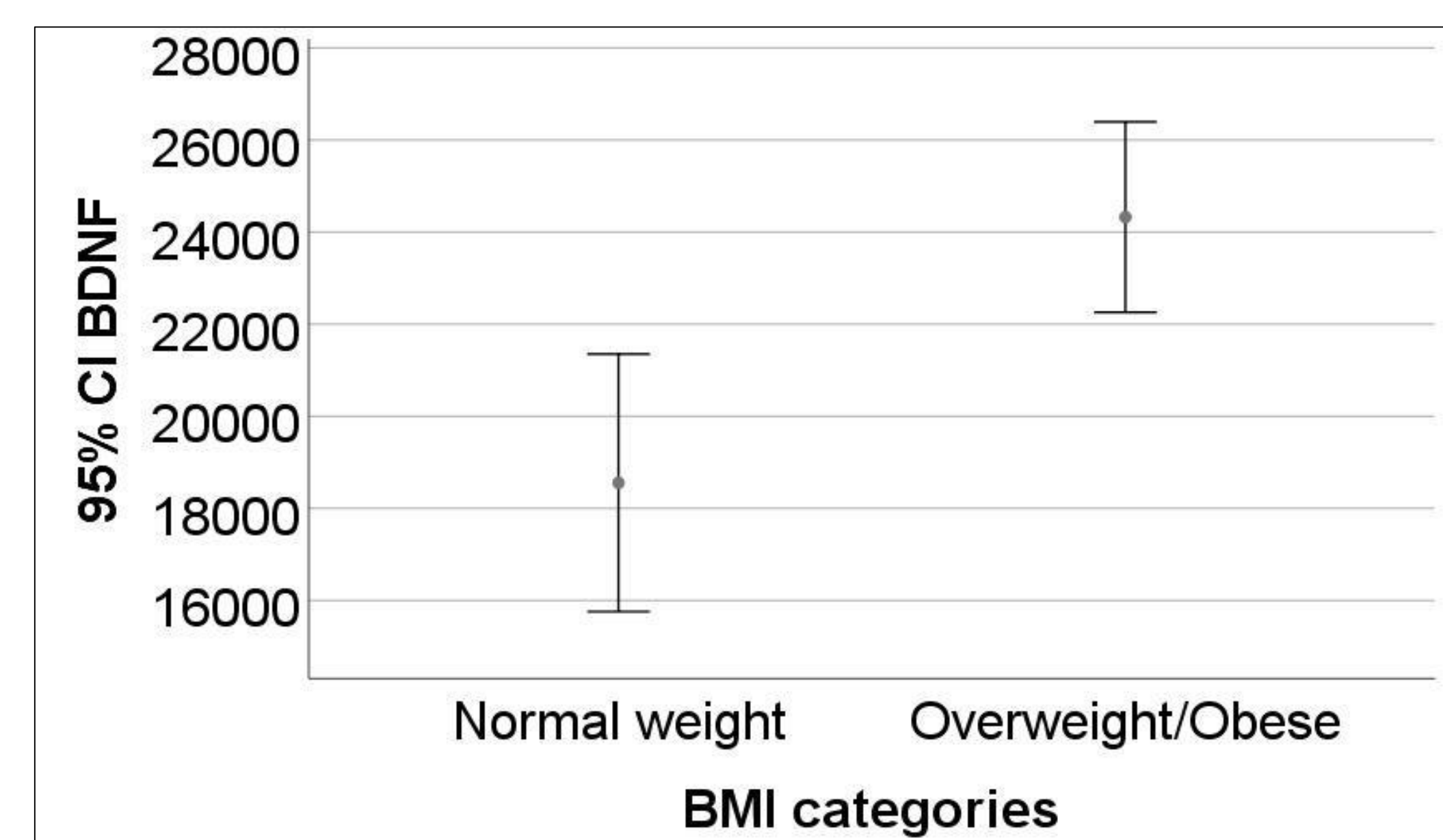
Introduction and Objectives: Brain-derived neurotrophic factor (BDNF) is a neurotrophin with important roles in feeding behavior, food intake regulation, energy metabolism and weight control. The aim of this study was to investigate potential differences in serum BDNF concentrations in adolescents by gender and BMI, as well as possible correlations of circulating BDNF with the adolescents' characteristics of metabolic syndrome.

Methods: Study participants included adolescent males and females, aged 12-20 years, who presented to the Centre for Adolescent Medicine and UNESCO Chair on Adolescent Health Care of the First Department of Pediatrics, from May 2016 to May 2017. Exclusion criteria included diabetes mellitus, other severe chronic disorder, chronic medication use and pregnancy. Anthropometric parameters (weight, height, waist and hip circumferences), blood pressure and fasting serum levels of glucose, triglycerides, high-density lipoprotein were measured and body mass index (BMI) was calculated for each study participant. Serum BDNF concentrations were measured by ELISA using the R&D Systems Quantikine ELISA kit. The sensitivity was 20 pg/mL, the intra-assay precision ranged from 3.8% to 6.2% and the inter-assay sensitivity ranged from 7.6% to 11.3%. Student's *t*-test and Pearson κ Spearman correlations were used for statistical analysis.

Results and Conclusion: A total of 60 adolescents (31 boys, 29 girls), 12-19 years (mean age \pm SD 14.1 \pm 1.7 years) with BMI of 14.7-37.4 Kg/m² (mean \pm SD 24,5 \pm 6.6 Kg/m²) participated in the study. Boys had significantly higher BDNF serum concentrations than girls (**Graph 1**). Adolescents of normal weight had significantly lower BDNF serum concentrations compared to the adolescents with overweight or obesity and this difference was attributed to the girls (**Graph 2**).



Graph 1



Graph 2

Statistically significant correlations across the study sample were found between BDNF serum concentrations and HDL, triglycerides, waist circumference, hip circumference and systolic blood pressure (**Table**).

In conclusion, serum BDNF concentrations appear to vary according to sex, BMI and metabolic syndrome parameters in adolescents. These findings need to be confirmed by future studies of larger adolescent populations.

Parameters	Test	Correlation	P value
Glucose	Spearman Correlation	0.32	0.314
Cholesterol Total	Pearson Correlation	-0.045	0.766
High-Density Lipoprotein	Pearson Correlation	-0.421	0.001
Triglycerides	Spearman Correlation	0.377	0.003
Systolic Blood Pressure	Pearson Correlation	0.299	0.023
Diastolic Blood Pressure	Pearson Correlation	0.041	0.757
Pulse	Pearson Correlation	0.102	0.445
Waist Circumference	Pearson Correlation	0.394	0.002
Hip Circumference	Pearson Correlation	0.266	0.042

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