

# Augmented FGF21 Serum Levels in Metabolic Disorders and Association With Endothelial Function in Childhood

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## INTRODUCTION AND OBJECTIVES

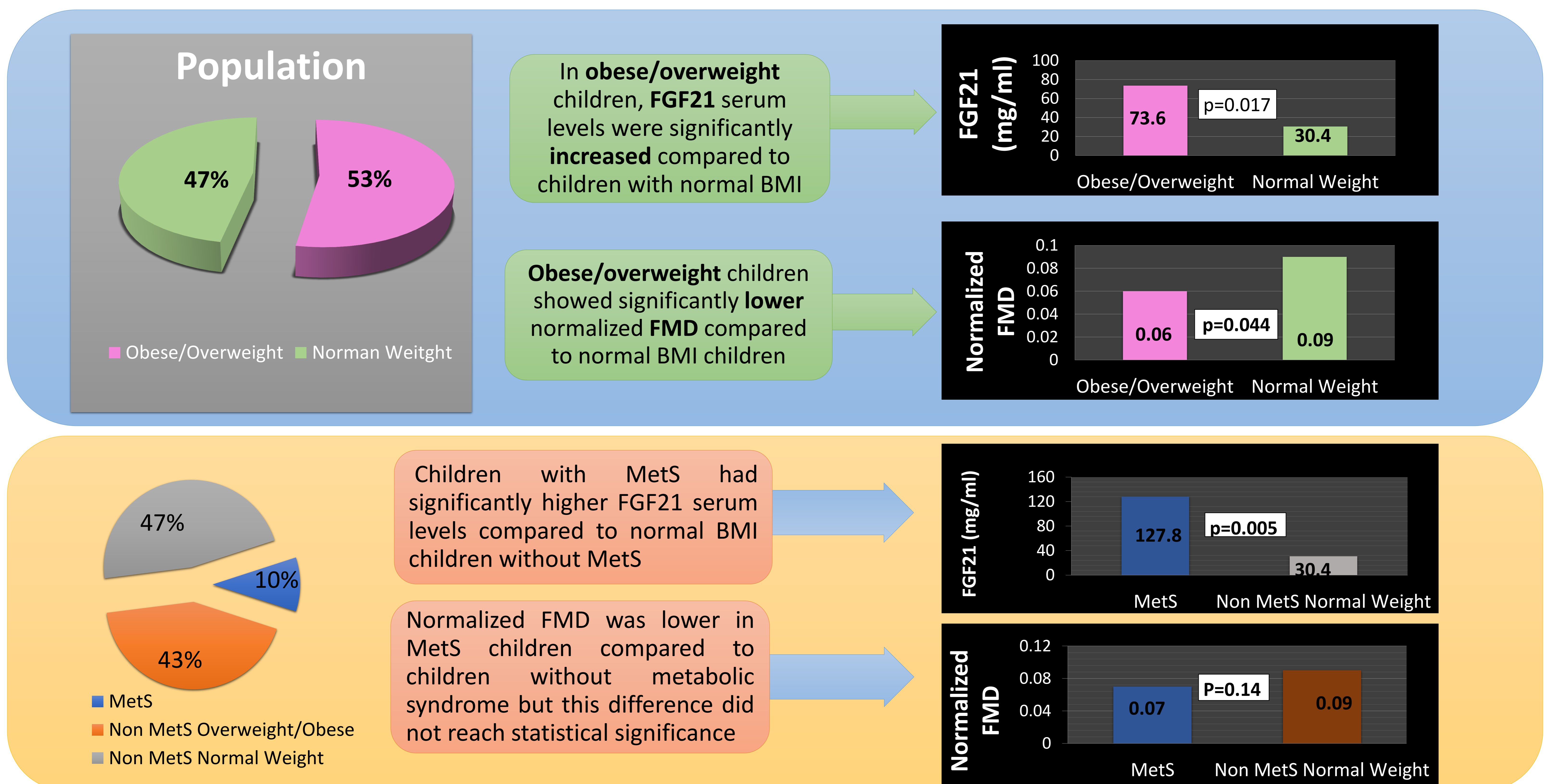
Obesity and the metabolic syndrome (MetS) are linked to increased risk for endothelial dysfunction which is considered as the first step in the progression of cardiovascular disease (1). Fibroblast growth factor 21 (FGF21) is a protein with known effects on various metabolic pathways. In adults, the circulating blood levels of FGF21 have been associated with parameters of lipid/carbohydrate metabolism, and FGF21 is known to be increased in obesity (2,3). The prevalence of childhood obesity presents a constant yearly increase. However, there are limited data regarding the role of FGF21 in children and its potential role in metabolic and cardiovascular disorders in the paediatric population. Our aim was to investigate FGF21 serum levels in metabolic disorders and in relation to endothelial function in children.

## METHODS

Seventy-eight healthy children (8-16 years old) were studied and classified as obese/overweight and normal weight defined by body mass index (BMI) percentiles for age and sex. Blood pressure, fasting blood glucose, lipid profile and FGF21 serum levels were assessed. Children with MetS were identified according to the International Diabetes Federation criteria. Endothelial function was assessed by the brachial artery flow-mediated dilation (FMD) technique and normalized to the shear stimulus [i.e. peak%FMD normalized to shear rate (normalized FMD)]. Non-parametric statistics were used to investigate the relationship between FGF21 and FMD (Spearman's rank correlation) and the differences between groups (Mann-Whitney test).

## RESULTS

**TOTAL POPULATION:** In all children, there was a significant negative correlation between FGF21 and normalized FMD (Spearman's rho = -0.239, p=0.035).



## CONCLUSIONS

1. FGF21 serum levels were **negatively correlated to normalized FMD in children.**
2. FGF21 serum levels were **increased in both obese/overweight and MetS children.**
3. **Obese/overweight children showed impaired endothelial response to FMD.**

FGF21 seems promising as a **novel biomarker** for identifying **early in life metabolic disorders** and a potential **risk** for development of **cardiovascular disease.**

## References:

1. Expert Panel on Integrated Guidelines for Cardiovascular H, Risk Reduction in C, Adolescents, National Heart L, Blood I. Expert panel on integrated guidelines for cardiovascular health and risk reduction in children and adolescents: summary report. Pediatrics. 2011;128 Suppl 5:S213-56.
2. Bobbert T, Schwarz F, Fischer-Rosinsky A, Pfeiffer AF, Mohlig M, Mai K, et al. Fibroblast growth factor 21 predicts the metabolic syndrome and type 2 diabetes in Caucasians. Diabetes care. 2013;36(1):145-9.
3. Zhang X, Yeung DC, Karpisek M, Stejskal D, Zhou ZG, Liu F, et al. Serum FGF21 levels are increased in obesity and are independently associated with the metabolic syndrome in humans. Diabetes. 2008;57(5):1246-53.