

# Waist-to-Height Ratio is a suitable measure of cardiovascular risk in overweight and obese children

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**Background:** Different statements for the prediction of cardiovascular complications in overweight and obese patients have been reported in the literature.

Results from cross-sectional studies in children are inconsistent: while from American data it was shown that BMI waist-to-height ratio (WHtR) are equally good in the ability to identify children with cardiovascular risk factors (Freedman et al 2007, Hara et al 2002), other studies report that waist circumference and WHtR are better predictors of cardiovascular risk compared to BMI (Freedman et al. 2005, Savva et al. 2000).

In the last 5 years it has been discussed that the ratio of waist to hip circumference is not at all a significant and reliable parameter for cardiometabolic risks.

On the other hand, WHtR is compared with BMI reliance in adults and shows strong association with those risks in children.

## Aims and Objectives:

- To evaluate WHtR as an indicator for cardiovascular risk factors in 8-18 year old children with overweight and obesity.
- To evaluate changes in WHtR during an obesity intervention program were studied.

## Methods:

The study included 93 children and adolescents  
8 and 18 years  
BMI > 85th perc.  
WHtR > 0.5

Children received individual nutritional and exercise counseling .  
Patient evaluation: 0, 3 and 6 months.

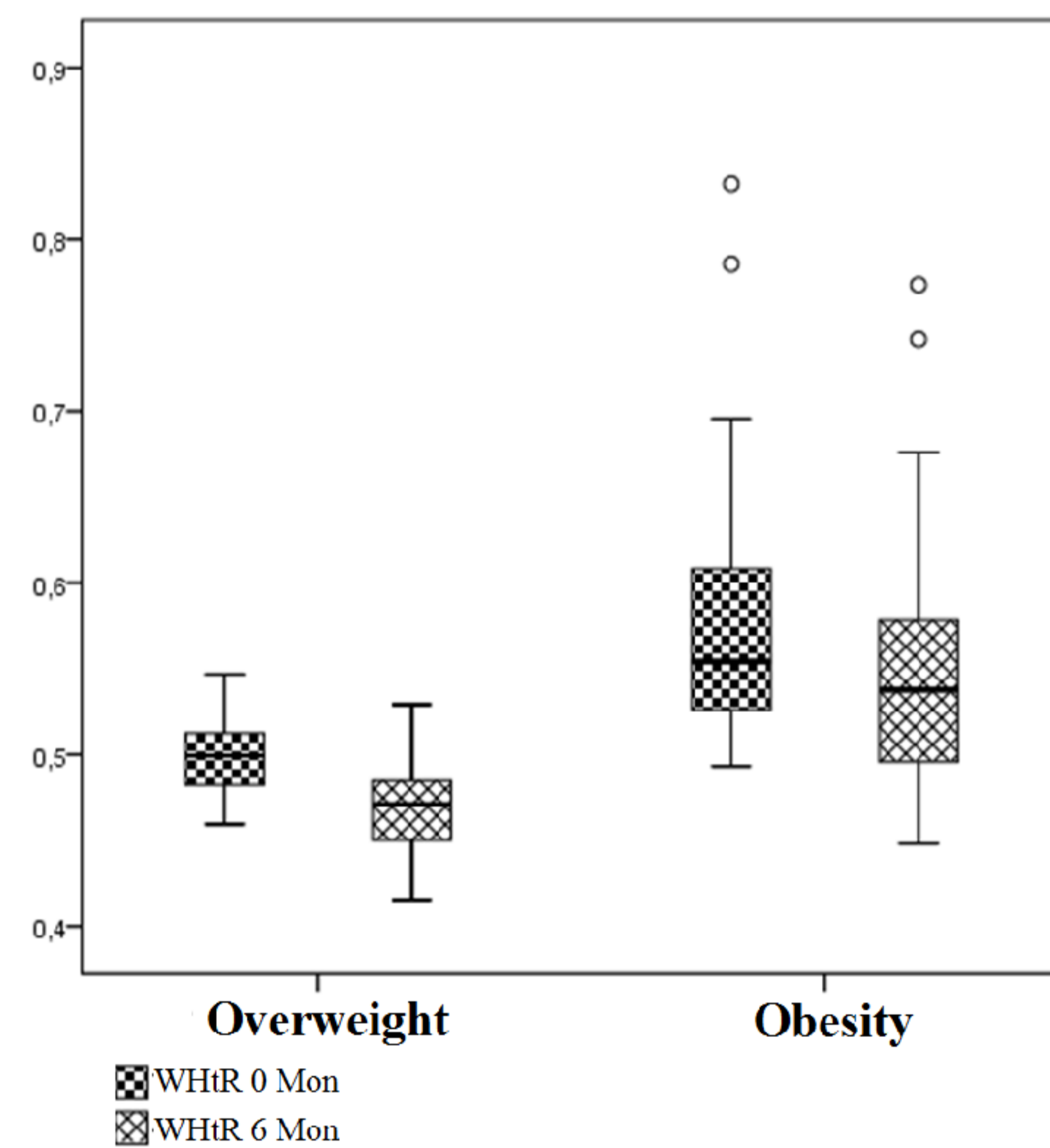


Fig. 1 WHtR: before and after Therapy

- The mean WHtR was  $0.58 \pm 0.07$  in obese children, and significantly lower in overweight children ( $0.51 \pm 0.04$ ,  $p < 0.001$ ) before the intervention.
- It decreased significantly after weight loss in obese children ( $0.55 \pm 0.08$ ) as well as in overweight participants ( $0.47 \pm 0.03$ ).
- A gender has an influence on the ration ( $p < 0,001$ , Mann-Whitney-Test).
- The most significant decline of WHtR is observed in the first 3 months.

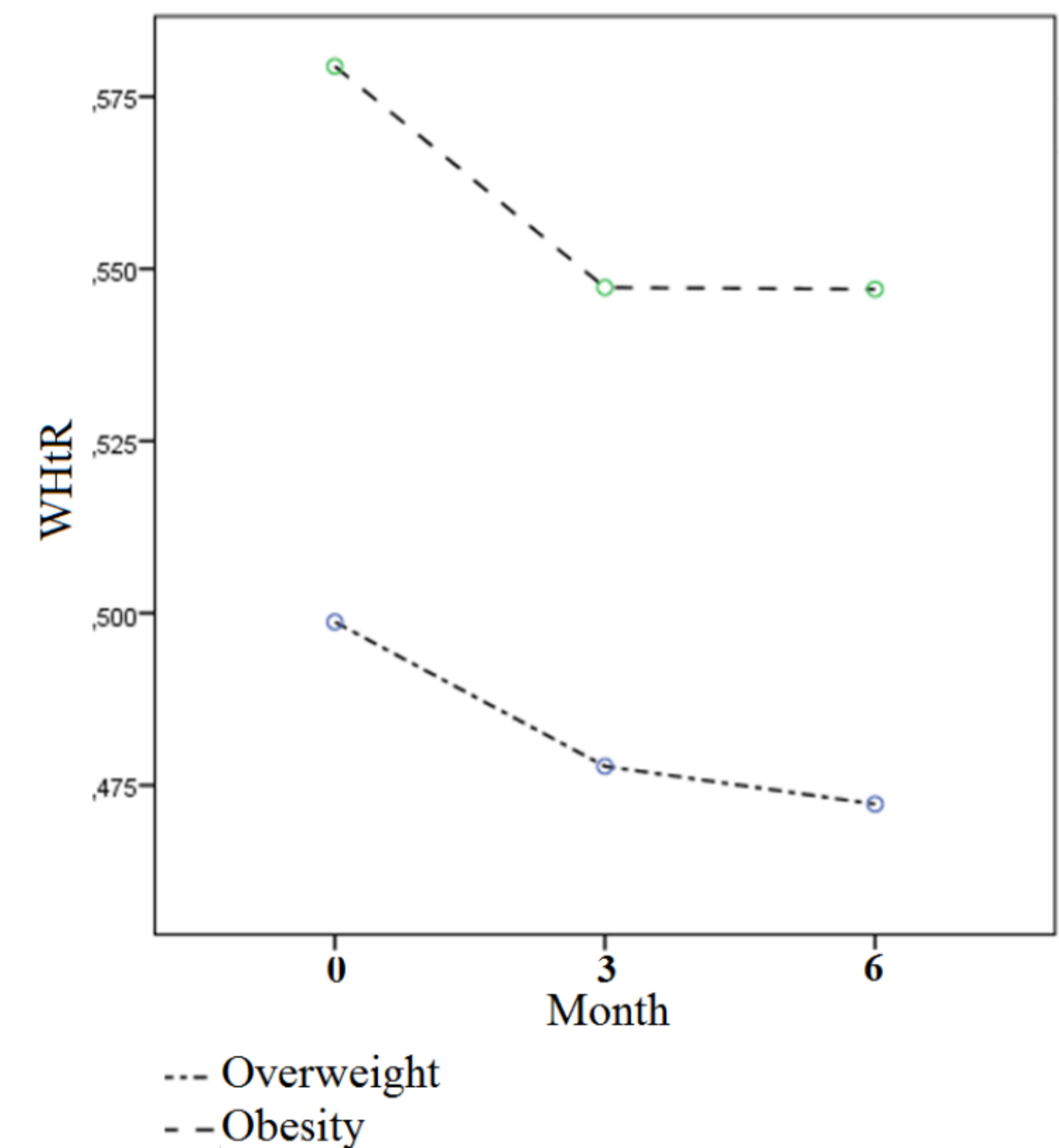


Fig. 2 WHtR: before Therapy, in 3 and 6 Months

## Conclusions

- The value of WHtR is also confirmed by the statistically relevant relationship to parameters of carbohydrate metabolism (HOMA index, C-peptide), to leptin, uric acid, adiponectin and blood pressure.
- After completion of the therapy this parameter has improved significantly among overweight and obese participants.
- These results are influenced by the degree of therapeutic success. Greater and more significant reductions reached the patients that were consistently following both nutrition and exercise recommendations.

In summary, our data indicate that WHtR is a reliable marker for cardiovascular risk factors in children and adolescents. We suggest that WHtR may be used as a control parameter for intermediate stages of the therapy as a predictor of improved or worsened metabolic status.