Body mass index (BMI) is used to diagnose obesity in children and adolescents. Recently, the tri-ponderal mass index (TMI) has been reported to be a useful tool in obesity prevention and early diagnosis of adverse health outcomes. The aim of this study was to compare the TMI and BMI in estimating insulin resistance and impaired liver enzymes.

**Method:**
One hundred and forty-three overweight or obese children were classified based on BMI and TMI scores, with samples collected from a larger cohort. The BMI thresholds to diagnose overweight status were 18.0 kg/m² for boys and 16.8 kg/m² for girls, and the TMI thresholds were 22.7% for overweight and 11.4% for obese children. The TMI was calculated as the sum of 1) ponderal mass index (PMI), 2) liver function enzymes, and 3) pubertal stage.

**Results:**
A total of 143 patients were enrolled in the study. The BMI and TMI were measured in each group. The BMI and TMI thresholds for overweight and obese children were calculated based on the sample study. The TMI thresholds for overweight and obese children were significantly higher in obese children than in overweight children when BMI was used to classify study group (Table 2). Twenty-two overweight children with normal BMI had 22.7% insulin resistance, 4.5% low HDL, high triglyceride levels, and liver enzymes with 50% higher LDL levels than 100 mg/dL. Two of 8 obese children with normal TMI had insulin resistance and low HDL levels. There was no increase in liver enzyme levels in any child with normal TMI. Forty-four obese children were classified as overweight according to the TMI. In this group, insulin resistance was detected in 40.9%, low HDL in 34.1%, and 10 children had elevated liver enzymes.

**Discussion:**
In conclusion, when we use TMI, we may have a risk of overdiagnosing obesity. However, if we assume that liver enzymes are elevated as a finding of visceral adiposity, TMI can be used as an auxiliary parameter to show visceral effects of adiposity. Normal BMI may indicate that visceral organ functions have not deteriorated yet.