

# Classification of Children with Abdominal Obesity: Comparison of CART, Multi-Layer Neural Network, Flexible Discriminant Analysis and Logistic Regression

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**Abstract. Objectives:** We aimed to compare non-linear statistical methods [classification tree (CART), multi-layer neural network (NN), flexible discriminant analysis (FDA) and logistic regression (LR)] for discrimination and classification and to estimate the significance of frequently preferred basic and practical anthropometric indices such as body mass index and arm fat area for predicting the abdominal obesity among children. **Design:** A total of 5358 students (2737 girls and 2621 boys) participated. A stratified multistage probability sampling design was employed. A total of 47 schools were selected randomly among 699 schools in Kayseri province including children aged between 6 and 17 years. For estimation of abdominal obesity; CART, NN, FDA, and LR statistical models were used. Comparison of the performance of all models was performed by receiver operating characteristic (ROC) curve analysis. **Results:** Accuracy rates of all models were males CART 6.90%, NN 7.13%, FDA 6.87% and LR 7.06%, and females CART 7.49%, NN 7.19%, FDA 7.75%, and LR 7.06%, respectively. For all models used, the ROC curve areas were not found to be statistically significant for both genders. **Conclusion:** For both gender, no statistically

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significant difference was detected relevant to the classification accuracy of all models used. For the estimation of abdominal obesity, non-linear statistical methods may be preferred to each other and anthropometric indices were good predictors of abdominal obesity.

**Keywords.** abdominal obesity, CART, flexible discriminant analysis, logistic regression, and multi-layer perceptron