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Diagnostic Performance of the TyG Index for Early Detection of Metabolic Syndrome

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ABSTRACT

Introduction: Metabolic syndrome (MetS) is a prevalent endocrine disorder characterized by a cluster of metabolic abnormalities, including abdominal obesity, dyslipidemia, hypertension, and impaired glucose metabolism. Early diagnosis and screening of this disorder are crucial for its effective management. The triglyceride-glucose (TyG) index, derived from fasting triglycerides and glucose levels, has emerged as a potential alternative marker for insulin resistance and MetS.

Methods and Materials: This cross-sectional study utilized data from the Dehgolan Prospective Cohort Study, which involved 3,800 participants aged 35 to 70 from Western Iran. MetS was defined using WHO criteria. The TyG index and its variants and anthropometric indices were calculated and evaluated for their diagnostic performance in identifying MetS using regression analysis, receiver operating characteristic curves, and area under the curve (AUC).

Results: The prevalence of MetS in the study population was 35.19%. In the total population, the TyG-WHtR (waist-to-height ratio) index exhibited the highest AUC of 0.86 (sensitivity: 84.56%, specificity: 72.23%). In the male population, the TyG-WC (waist circumference) index had the highest AUC of 0.90 (sensitivity: 79.29%, specificity: 85.4%), while in females, the TyG index alone ranked first with an AUC of 0.87 (sensitivity: 76.12%, specificity: 87.1%).

Conclusion and Discussion: The TyG index and its anthropometric variants demonstrated high diagnostic accuracy for MetS, with the TyG-WHtR and TyG-WC indices exhibiting superior performance in the total and male populations, respectively. The TyG index alone exhibited the highest diagnostic value in females. These findings suggest the potential utility of the cost-effective TyG index, alone or combined with anthropometric parameters, as a screening tool for early MetS detection, particularly in resource-limited settings. However, further validation across diverse populations is warranted.

Keywords: Metabolic syndrome, Diagnosis, Iran

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