EVALUATION OF DIAGNOSTIC ACCURACY OF TRIGLYCERIDE–GLUCOSE INDEX FOR INSULIN RESISTANCE AMONG PATIENTS WITH UNCONTROLLED TYPE 2 DIABETES MELLITUS COMPARED TO HOMA-IR IN A TERTIARY CAREHOSPITAL

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BACKGROUND

- Insulin resistance (IR) plays a pivotal role in the pathogenesis and progression of Type 2 Diabetes Mellitus (T2DM) and its cardiovascular complications.
- The Homeostatic Model Assessment for Insulin Resistance (HOMA-IR) is a validated tool, but it requires fasting insulin estimation — costly and not widely available.
- The Triglyceride-Glucose (TyG) Index, calculated using fasting triglycerides and glucose, is a simple, inexpensive surrogate for insulin resistance.
- However, its diagnostic accuracy compared to HOMA-IR has not been well established in Indian patients with uncontrolled T2DM.

OBJECTIVES

1. To evaluate the diagnostic accuracy of the TyG Index in detecting insulin resistance, using HOMA-IR as the reference.
2. To assess the correlation between TyG Index and HOMA-IR.
3. To analyze age- and gender-related variations in TyG and HOMA-IR.
4. To determine the optimal TyG cut-off value for identifying insulin resistance.

INCLUSION CRITERIA

1) Participants aged 18 years and above.
2) Participants with uncontrolled type 2 diabetes mellitus (HbA1C ≥8%)
3) Participants with a body mass index of 18.5 – 40

EXCLUSION CRITERIA

1) Participants with type 1 diabetes mellitus.
2) Participants with well controlled type 2 diabetes mellitus (HbA1C <8%).
3) Participants with extreme body mass index (very high or very low)
4) Pregnant or lactating women..
5) Participants with chronic illnesses like liver disease, renal disease, cardiovascular disease.
6) Participants with hormonal disorders like polycycstic ovary syndrome, cushings syndrome.

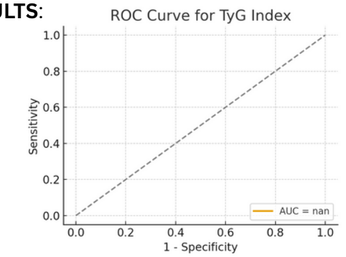
MATERIALS AND METHODS

- Study Design: Cross-sectional, observational study.
- Setting: Department of General Medicine, Sree Balaji Medical College and Hospital.
- Sample Size: 74 adults with uncontrolled T2DM (HbA1c ≥ 8%).

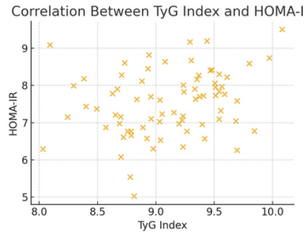
FORMULAE:

- TyG Index: ln [Fasting Triglycerides (mg/dL) × Fasting Glucose (mg/dL) / 2]
- HOMA-IR: [Fasting Glucose (mg/dL) × Fasting Insulin (μU/mL)] / 405
- Insulin Resistance defined as: HOMA-IR ≥ 2.5

RESULTS:



ROC Curve Analysis
- AUC: 0.82 → Good diagnostic accuracy
- Optimal Cut-off: 9.0
- Sensitivity: 81%
- Specificity: 75%



Significant positive correlation between TyG Index and HOMA-IR (r = 0.64, p < 0.001).

INTERPRETATION:

The ROC curve demonstrates that the TyG Index can correctly classify insulin-resistant versus non-resistant patients 82% of the time.
At a cut-off value of 9.0, the test achieves high sensitivity (81%) and specificity (75%), confirming its clinical usefulness.

SUBGROUP OBSERVATIONS

- Males had slightly higher mean TyG values (9.25) than females (9.15), but the difference was not statistically significant.
- Participants aged ≥50 years had higher TyG and HOMA-IR values than younger patients, consistent with increasing insulin resistance with age.

CONCLUSION

- The TyG Index shows strong correlation with HOMA-IR and demonstrates good diagnostic accuracy in identifying insulin resistance in patients with uncontrolled T2DM.
- It is a simple, inexpensive, and easily available alternative to insulin-based indices, making it especially valuable in resource-limited settings.
- The study supports the use of TyG Index as a practical screening tool for insulin resistance in clinical practice.

LIMITATIONS:

- Modest sample size (n=74).
- Single-center, cross-sectional study design.
- Did not include other confounding variables (e.g., diet, physical activity, medication).
- Comparison with gold-standard clamp technique was not performed.

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