Association between Triglyceride-Glucose-Body Mass Index Score and Risk of Stroke: A Pooled Analysis of Cohort Studies

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Background :
The triglyceride-glucose-BMI (TyG-BMI) index, a combination of the Triglyceride-Glucose (TyG) index and BMI has performed better than other parameters and variants of the TyG index. Hence, it is a reliable surrogate for insulin resistance (IR), allowing for patient risk stratification. Additionally, IR has been associated with an increased risk of stroke. Our meta-analysis is the first to explore the relationship between the TyG-BMI index and stroke risk.

Methods:
A total of 97 were identified from the systematic search of PubMed, SCOPUS, and EMBASE databases using title abstract and medical subheading keywords up to May 2024. 36 Studies were identified after filtering and removing duplicates, 9 reports after two reviewers' blind screening, and 4 full texts met our complete inclusion criteria. The risk of bias was assessed using the Newcastle-Ottawa Scale. Binary random effects models were used to calculate pooled unadjusted and adjusted odds ratios (ORs) with 95% confidence intervals (CIs). We assessed heterogeneity using I^2 statistics. Leave-one-out sensitivity analysis was performed to validate our results. Statistical significance was set at $p < 0.05$.

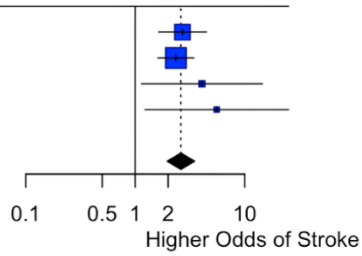
Results:
Of the four included studies, three were retrospective and one prospective, with a total sample size of 28,854. Over a mean follow-up duration of 27.35 months, we found that a high TyG-BMI index was associated with higher odds for stroke, with an OR of 2.61 (95% CI: 1.96, 3.49) and minimal heterogeneity ($I^2 = 0\%$, $p = 0.63$). Sensitivity analysis confirmed result reliability, with each study omission yielding similar ORs (ranging from 2.54 to 2.70, all statistically significant, $p < 0.01$).

Conclusion:
Increased TyG-BMI values are found to be associated with significantly increased odds of stroke. The TyG index's simplicity makes it a valuable tool for assessing stroke risk early in hospitalization.

Study	High TyG-BMI Events	High TyG-BMI Total	Low TyG-BMI Events	Low TyG-BMI Total	Weight	Odds Ratio MH, Random, 95% CI
Huang Q, 2023, China	56	4991	21	5025	32.9%	2.70 [1.64; 4.47]
Huo RR, 2023, China	92	1146	41	1146	58.3%	2.35 [1.61; 3.43]
Cheng Y, 2023,	12	480	3	479	5.1%	4.07 [1.14; 14.51]
Liu M, 2024, China	11	883	2	883	3.7%	5.56 [1.23; 25.14]
Total (95% CI)	**7500**		**7533**		**100.0%**	**2.61 [1.96; 3.49]**

Heterogeneity: $Tau^2 = 0$; $Chi^2 = 1.74$, df = 3 (P = 0.63); $I^2 = 0\%$

Test for overall effect: Z = 6.53 (P < 0.01)



Study	P-value	Tau2	Tau	I2	Odds Ratio MH, Random, 95% CI
Omitting Huang Q, 2023, China	< 0.01	0.0288	0.1697	0%	2.70 [1.72; 4.23]
Omitting Huo RR, 2023, China	< 0.01	0	0	0%	3.03 [1.94; 4.74]
Omitting Cheng Y, 2023,	< 0.01	0	0	0%	2.55 [1.90; 3.43]
Omitting Liu M, 2024, China	< 0.01	0	0	0%	2.54 [1.89; 3.41]
Total (95% CI)	**< 0.01**	**0**	**0**	**0%**	**2.61 [1.96; 3.49]**