

Associations Between Triglyceride-Glucose Index and Cardiovascular Diseases: An Insight from Three-years Nationwide Datasets

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BACKGROUND

The triglyceride-glucose (TyG) index has been identified as a reliable alternative biomarker of insulin resistance. Recent studies has presented substantial statistically significant evidence to suggest that TyG index is associated with the development and prognosis of cardiovascular disease (CVD). However, little to minimum population-based study has been done to investigate associations between TyG and cardiovascular diseases. We aim to evaluate the relationship between TyG index and CVD using a three-year national datasets from the USA population.

METHODS

Data from the National Health and Nutrition Examination Survey (2017-2020) were analyzed in this study. We included participants aged over 20 years. TyG index were calculated using equations which combine triglycerides (TG) and fasting blood glucose (FBG). TyG index formula was defined as $\text{Ln}(\text{fasting triglycerides [mg/dL]} \times \text{fasting plasma glucose [mg/dL]}/2)$. Logistic regression analyses were conducted to measure the relationship between distinct TyG index and increased risk of CVD. Linear regression splines were used to estimate relationships between TyG index and CVD, such as hypertension, angina, coronary heart disease, congestive heart failure, and heart attack. TyG index quartile as independent variables were employed to perform sensitivity analyses with CVD manifestations.

RESULTS

- A total of 3,746 participants were included. Males comprised of 1,817 (48.5%) participants and females 1,929 (51.5%).
- The median age (mean \pm SD) was 52.00 \pm 17.28 years, and the average value (SD) of TyG index was 8.52 (0.69).
- After adjusting for covariates, the association between the fourth TyG index quartile and cardiovascular diseases was more pronounced compared to the first TyG index quartile, with adjusted odds ratio (AOR) and 95% confidence interval (95% CI) values for angina pectoris of 2.46, 1.28-4.75; coronary heart disease, 2.01, 1.14-3.56; and heart attack, 2.86, 1.57-5.21.
- There was no significant association with hypertension and congestive heart failure ($p > 0.05$). Regression analyses revealed statistically significant associations between TyG index quartiles and angina ($p = 0.013$).
- Sensitivity analyses indicated that the fourth TyG index quartile was more strongly associated with an increased risk of angina (OR 3.81, 95% CI, 2.00-7.26), coronary heart disease (OR 3.52, 95% CI, 2.03-6.10), congestive heart failure (OR 2.06, 95% CI 1.24-3.43), and heart attack (OR 4.75, 95% CI 2.64-8.55) than the first TyG index quartile.



The triglyceride-glucose index is positively associated with increased risk of angina, coronary heart disease, congestive heart failure, and heart attack.

Further studies in demographics with different comorbidities are needed to investigate the reliability of this association.



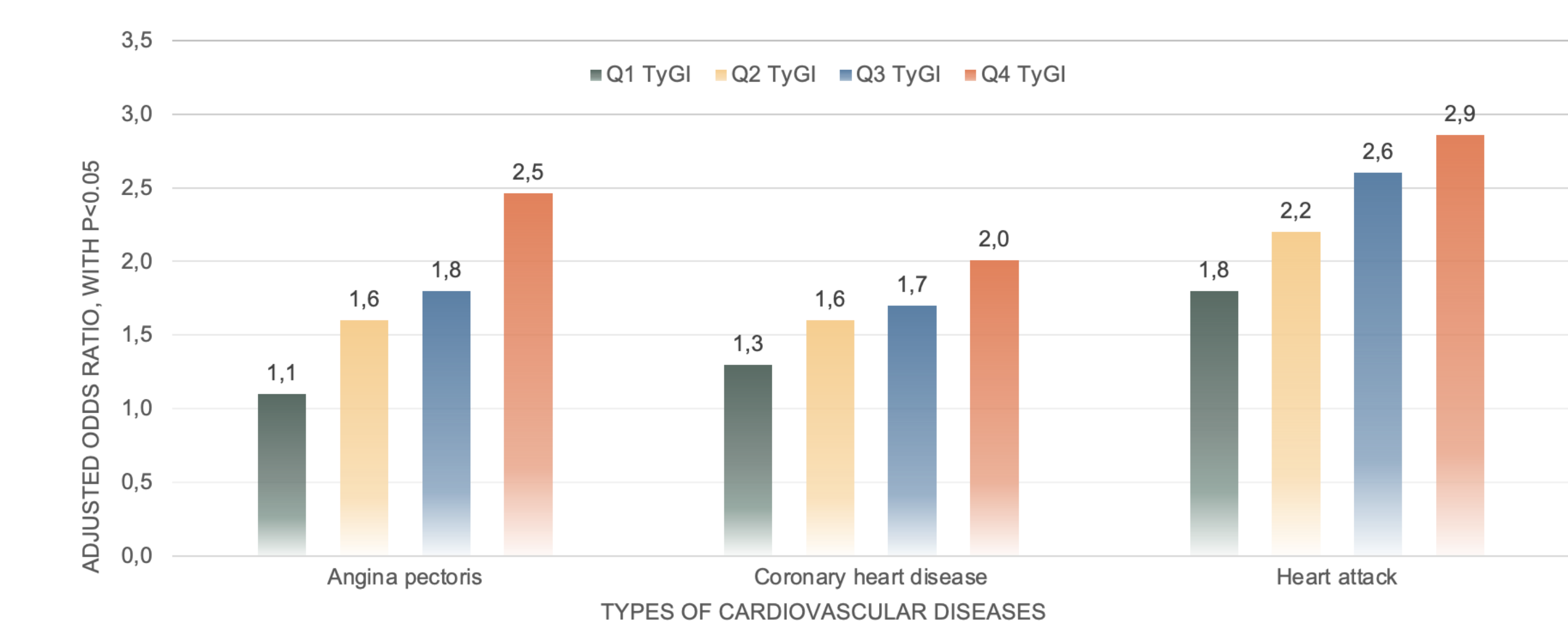
TABLE 1

Demographic distribution.

Total, n (%)	3,746 (100)
Male	1,817 (48.5)
Female	1,929 (51.5)
Median age, mean \pm SD	52.00 \pm 17.28 years
TyG index, mean \pm SD	8.52 (0.69)
Male	9.42 (0.52)
Female	7.85 (0.94)

GRAPH 1

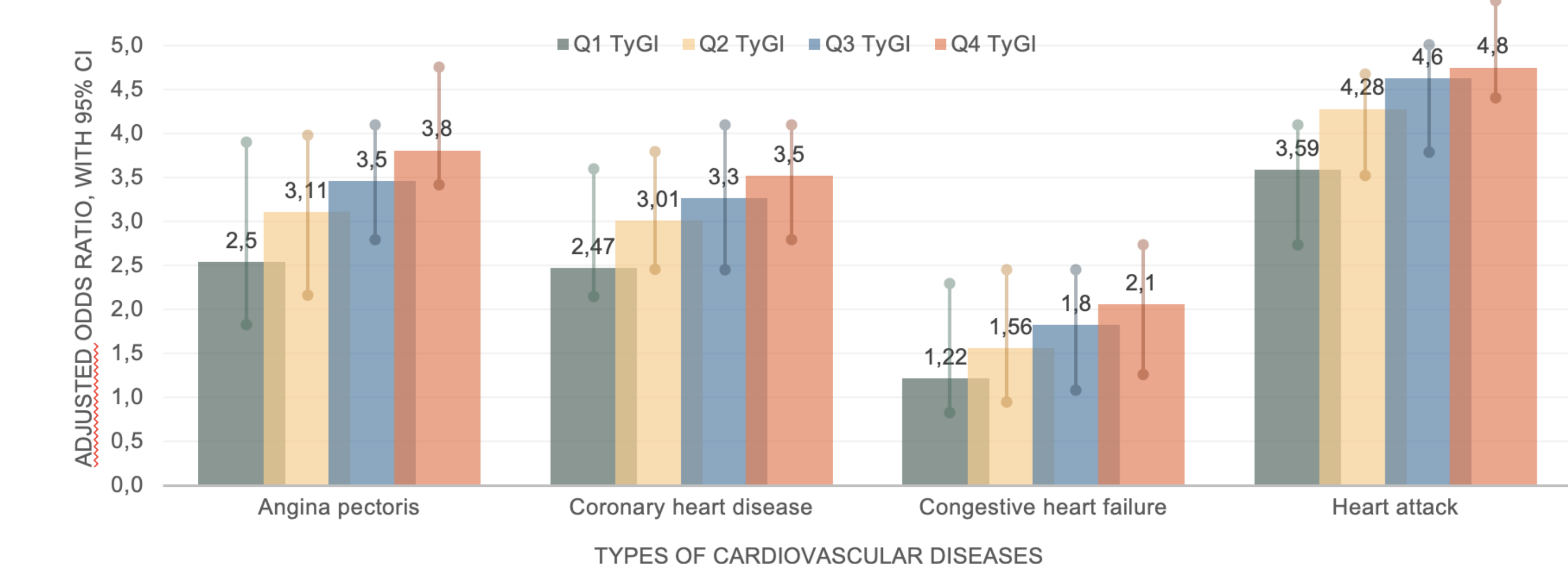
Associations between TyG index and cardiovascular diseases.



There was no significant association with hypertension and congestive heart failure ($p > 0.05$).

GRAPH 2

Sensitivity analyses.



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