

# **Supplemental Material**

**Table S1. Baseline characteristics of the study population according to the total, men and women.**

Variable	Total	Men	Women	P-value
N	5,414	2,568	2,846	
Age (years)	50.1 ± 8.4	50.2 ± 8.4	50.1 ± 8.4	0.819
BMI (kg/m <sup>2</sup> )	24.2 ± 3.0	23.9 ± 2.8	24.4 ± 3.1	<0.001
Waist circumference (cm)	80.9 ± 8.5	82.5 ± 7.3	79.5 ± 9.2	<0.001
Waist to height ratio	0.50 ± 0.06	0.49 ± 0.04	0.52 ± 0.06	<0.001
SBP (mmHg)	112.3 ± 11.5	113.5 ± 10.7	111.1 ± 12.0	<0.001
DBP (mmHg)	75.0 ± 8.0	76.6 ± 7.4	73.5 ± 8.2	<0.001
FPG (mg/dL)	85.9 ± 19.9	88.9 ± 22.4	83.2 ± 17.0	<0.001
Total cholesterol (mg/dL)	189.5 ± 34.3	191.6 ± 34.8	187.6 ± 33.7	<0.001
Triglyceride (mg/dL)	125 (95, 175)	139 (103, 196)	114 (89, 157)	<0.001
HDL-cholesterol (mg/dL)	45.0 ± 10.0	43.4 ± 9.9	46.5 ± 9.9	<0.001
CRP	0.13 (0.06, 0.23)	0.14 (0.07, 0.24)	0.12 (0.05, 0.21)	<0.001
TyG	8.6 ± 0.5	8.8 ± 0.6	8.5 ± 0.5	<0.001
TyG-BMI	208.8 ± 32.2	209.9 ± 32.2	207.9 ± 32.1	0.019
TyG-WC	699.6 ± 98.1	723.9 ± 92.8	677.6 ± 97.5	<0.001
TyG-WHtR	4.4 ± 0.6	4.3 ± 0.6	4.4 ± 0.7	<0.001
Smoking status, n(%)				<0.001
Never smoker	3,176 (58.7%)	470 (18.3%)	2,706 (95.1%)	
Former smoker	809 (14.9%)	773 (30.1%)	36 (1.3%)	
Intermittent smoker	160 (3.0%)	130 (5.1%)	30 (1.1%)	
Every day smoker	1,269 (23.4%)	1,195 (46.5%)	74 (2.6%)	
Alcohol drinking status, n(%)				<0.001
Non alcohol drinker	2,454 (45.3%)	518 (20.2%)	1,936 (68.0%)	
Ex-alcohol drinker	325 (6.0%)	250 (9.7%)	75 (2.6%)	
Current alcohol drinker	2,635 (48.7%)	1,800 (70.1%)	835 (29.3%)	
METs (hour/day)	23.2 ± 14.3	23.9 ± 14.7	22.6 ± 13.9	<0.001
Anti-diabetes drug use , n(%)	91 (1.7%)	58 (2.3%)	33 (1.2%)	0.002
Anti-dyslipidemic drug use, n(%)	16 (0.3%)	12 (0.5%)	4 (0.1%)	0.050

BMI, Body mass index; SBP, Systolic blood pressure; DBP, Diastolic blood pressure; FPG, Fasting plasma glucose; HDL, High density lipoprotein; CRP, C-reactive protein; TyG, Triglyceride and glucose index; WC, Waist circumference; WHtR, Weight to Height ratio; MET, Metabolic equivalent of task.

**Table S2. Incidence of hypertension during follow-up in men and women.**

Year	Follow-up	Men			Women		
		Total numbers, n	Incident cases, n	Incident HTN rate per 2 years	Total numbers, n	Incident cases, n	Incident HTN rate per 2 years
2001-2002	Baseline	2,568			2,846		
2003-2004	2 years	2,436	288	11.8	2,655	262	9.9
2005-2006	4 years	2,259	142	6.3	2,451	144	5.9
2007-2008	6 years	1,888	119	6.3	2,107	119	5.6
2009-2010	8 years	1,909	164	8.6	2,145	174	8.1
2011-2012	10 years	1,766	132	7.5	2,061	112	5.4
2013-2014	12 years	1,672	87	5.2	1,992	97	4.9
2015-2016	14 years	1,785	82	4.6	2,104	104	4.9

**Table S3. Multiple Cox proportional hazards regression analysis for incident hypertension of tertiles of HOMA-IR and HOMA-beta.**

	Hazard ratio with 95% confidence interval							
	Men				Women			
	T1	T2	T3	<i>p</i>	T1	T2	T3	<i>p</i>
<b>HOMA-IR</b>								
Unadjusted	1 (reference)	1.12 (0.96–1.30)	1.34 (1.15–1.55)	<0.001	1 (reference)	1.16 (0.99–1.36)	1.26 (1.08–1.47)	0.013
Model 1	1 (reference)	1.14 (0.98–1.32)	1.42 (1.22–1.65)	<0.001	1 (reference)	1.21 (1.03–1.42)	1.31 (1.12–1.53)	0.002
Model 2	1 (reference)	1.07 (0.92–1.25)	1.18 (1.00–1.38)	0.132	1 (reference)	1.13 (0.97–1.33)	1.11 (0.95–1.30)	0.261
Model 3	1 (reference)	1.06 (0.91–1.24)	1.12 (0.95–1.33)	0.391	1 (reference)	1.13 (0.96–1.32)	1.07 (0.91–1.26)	0.344
<b>HOMA-beta</b>								
Unadjusted	1 (reference)	1.03 (0.89–1.19)	1.09 (0.93–1.27)	0.592	1 (reference)	0.88 (0.75–1.04)	0.89 (0.76–1.04)	0.235
Model 1	1 (reference)	1.07 (0.93–1.23)	1.12 (0.96–1.31)	0.336	1 (reference)	0.95 (0.81–1.12)	1.02 (0.87–1.19)	0.651
Model 2	1 (reference)	1.04 (0.90–1.20)	1.05 (0.90–1.24)	0.771	1 (reference)	0.95 (0.81–1.12)	0.99 (0.85–1.16)	0.786
Model 3	1 (reference)	1.11 (0.96–1.30)	1.16 (0.97–1.38)	0.208	1 (reference)	0.98 (0.83–1.17)	1.05 (0.88–1.25)	0.683

HOMA, homeostatic model assessment; IR, insulin resistance; BMI, body mass index; WC, waist circumference; WHtR, weight to height ratio Significance was set at  $p < 0.05$ .

Model 1: Adjusted for age; Model 2: Adjusted for variables used in Model 1 plus BMI, physical activity, smoking status, and current drinker;

Model 3: Adjusted for variables used in Model 2 plus total cholesterol, high density lipoprotein-cholesterol, fasting plasma glucose, C-reactive protein, anti-diabetes drug, and anti-dyslipidemia drug

**Table S4. Multiple Cox proportional hazards regression analysis for incident hypertension of tertiles of TyG and modified TyG indices applying the 2017 AHA/ACC definition of hypertension.**

	Hazard ratio with 95% confidence interval							
	Men				Women			
	T1	T2	T3	<i>p</i>	T1	T2	T3	<i>p</i>
<b>TyG</b>								
Unadjusted	1 (reference)	1.17 (1.04–1.33)	1.30 (1.15–1.45)	<0.001	1 (reference)	1.39 (1.24–1.55)	1.73 (1.53–1.94)	<0.001
Model 1	1 (reference)	1.18 (1.04–1.33)	1.30 (1.16–1.46)	<0.001	1 (reference)	1.24 (1.10–1.39)	1.44 (1.28–1.63)	<0.001
Model 2	1 (reference)	1.10 (0.97–1.25)	1.11 (0.98–1.26)	0.201	1 (reference)	1.18 (1.05–1.32)	1.26 (1.11–1.42)	<0.001
Model 3	1 (reference)	1.11 (0.98–1.26)	1.12 (0.98–1.29)	0.206	1 (reference)	1.19 (1.06–1.34)	1.29 (1.12–1.50)	0.001
<b>TyG-BMI</b>								
Unadjusted	1 (reference)	1.30 (1.15–1.45)	1.54 (1.38–1.73)	<0.001	1 (reference)	1.38 (1.23–1.56)	2.07 (1.84–2.32)	<0.001
Model 1	1 (reference)	1.31 (1.17–1.47)	1.58 (1.41–1.77)	<0.001	1 (reference)	1.32 (1.17–1.49)	1.85 (1.64–2.08)	<0.001
Model 2	1 (reference)	1.10 (0.95–1.26)	1.12 (0.92–1.36)	0.419	1 (reference)	1.22 (1.05–1.40)	1.50 (1.22–1.84)	<0.001
Model 3	1 (reference)	1.10 (0.95–1.27)	1.11 (0.91–1.37)	0.46	1 (reference)	1.21 (1.05–1.41)	1.50 (1.20–1.86)	0.001
<b>TyG-WC</b>								
Unadjusted	1 (reference)	1.36 (1.20–1.55)	1.74 (1.54–1.97)	<0.001	1 (reference)	1.67 (1.49–1.88)	2.53 (2.26–2.85)	<0.001
Model 1	1 (reference)	1.37 (1.21–1.56)	1.75 (1.55–1.98)	<0.001	1 (reference)	1.46 (1.30–1.65)	2.00 (1.77–2.26)	<0.001

Model 2	1 (reference)	1.22 (1.06–1.40)	1.42 (1.20–1.68)	<0.001	1 (reference)	1.31 (1.15–1.49)	1.62 (1.39–1.90)	<0.001
Model 3	1 (reference)	1.25 (1.08–1.44)	1.48 (1.24–1.77)	<0.001	1 (reference)	1.31 (1.15–1.50)	1.64 (1.39–1.94)	<0.001
TyG-WHtR								
Unadjusted	1 (reference)	1.45 (1.30–1.63)	1.71 (1.53–1.92)	<0.001	1 (reference)	1.79 (1.58–2.04)	2.68 (2.37–3.02)	<0.001
Model 1	1 (reference)	1.46 (1.30–1.63)	1.71 (1.52–1.92)	<0.001	1 (reference)	1.59 (1.39–1.81)	2.07 (1.82–2.36)	<0.001
Model 2	1 (reference)	1.29 (1.13–1.46)	1.40 (1.19–1.64)	<0.001	1 (reference)	1.42 (1.24–1.64)	1.69 (1.44–1.99)	<0.001
Model 3	1 (reference)	1.31 (1.15–1.50)	1.45 (1.22–1.72)	<0.001	1 (reference)	1.42 (1.23–1.64)	1.71 (1.44–2.02)	<0.001

: TyG, triglyceride and glucose index; BMI, body mass index; WC, waist circumference; WHtR, weight to height ratio, Significance was set at  $p < 0.05$ .

Model 1: Adjusted for age. Model 2: Adjusted for variables used in Model 1 plus body mass index, physical activity, smoking status, and current drinker.

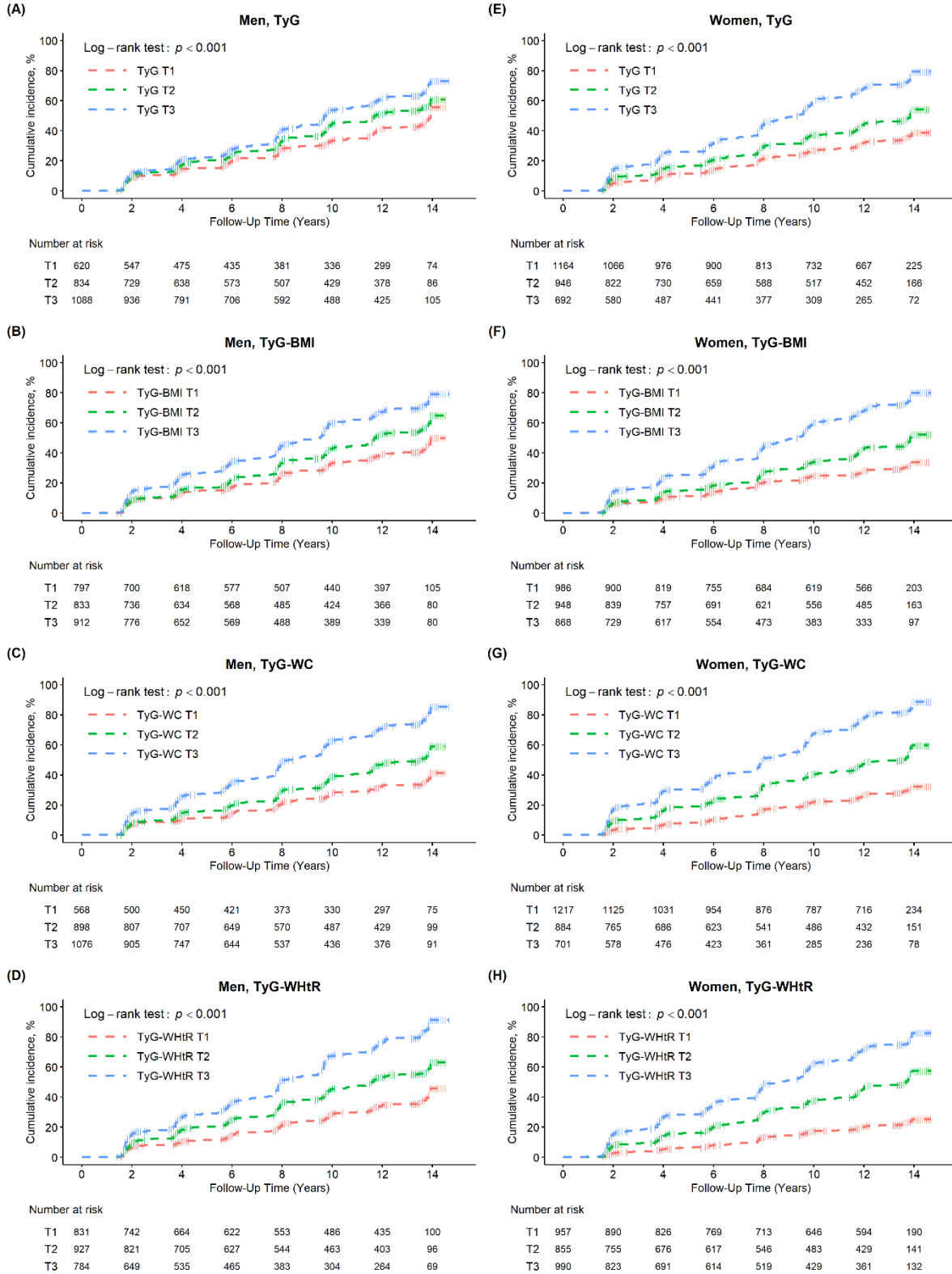
Model 3: Adjusted for variables used in Model 2 plus total cholesterol, high density lipoprotein-cholesterol, fasting plasma glucose, C- reactive protein, anti-diabetes drug, and anti-dyslipidemic drug

**Table S5. Harrell's concordance index and 95% confidence intervals for predicting hypertension incidence of the TyG, TyG-BMI, TyG-WC and TyG-WHtR using the 2017 AHA/ACC definition of hypertension.**

	Men					Women				
	C-index	95% CI	P1	P2	P3	C-index	95% CI	P1	P2	P3
TyG	0.546	0.531–0.560	ref			0.567	0.553–0.582	ref		
TyG–BMI	0.565	0.550–0.579	<0.001	ref		0.582	0.568–0.597	0.033	ref	
TyG-WC	0.578	0.564–0.593	<0.001	<0.001	ref	0.622	0.608–0.636	<0.001	<0.001	ref
TyG–WHtR	0.578	0.564–0.593	<0.001	<0.001	0.984	0.629	0.615–0.643	<0.001	<0.001	<0.001

TyG, triglyceride and glucose index; BMI, body mass index; WC, waist circumference; WHtR, weight to height

**Figure S1. Kaplan–Meier curves for incident hypertension according to TyG, TyG-BMI, TyG-WC and TyG-WHtR tertiles.**

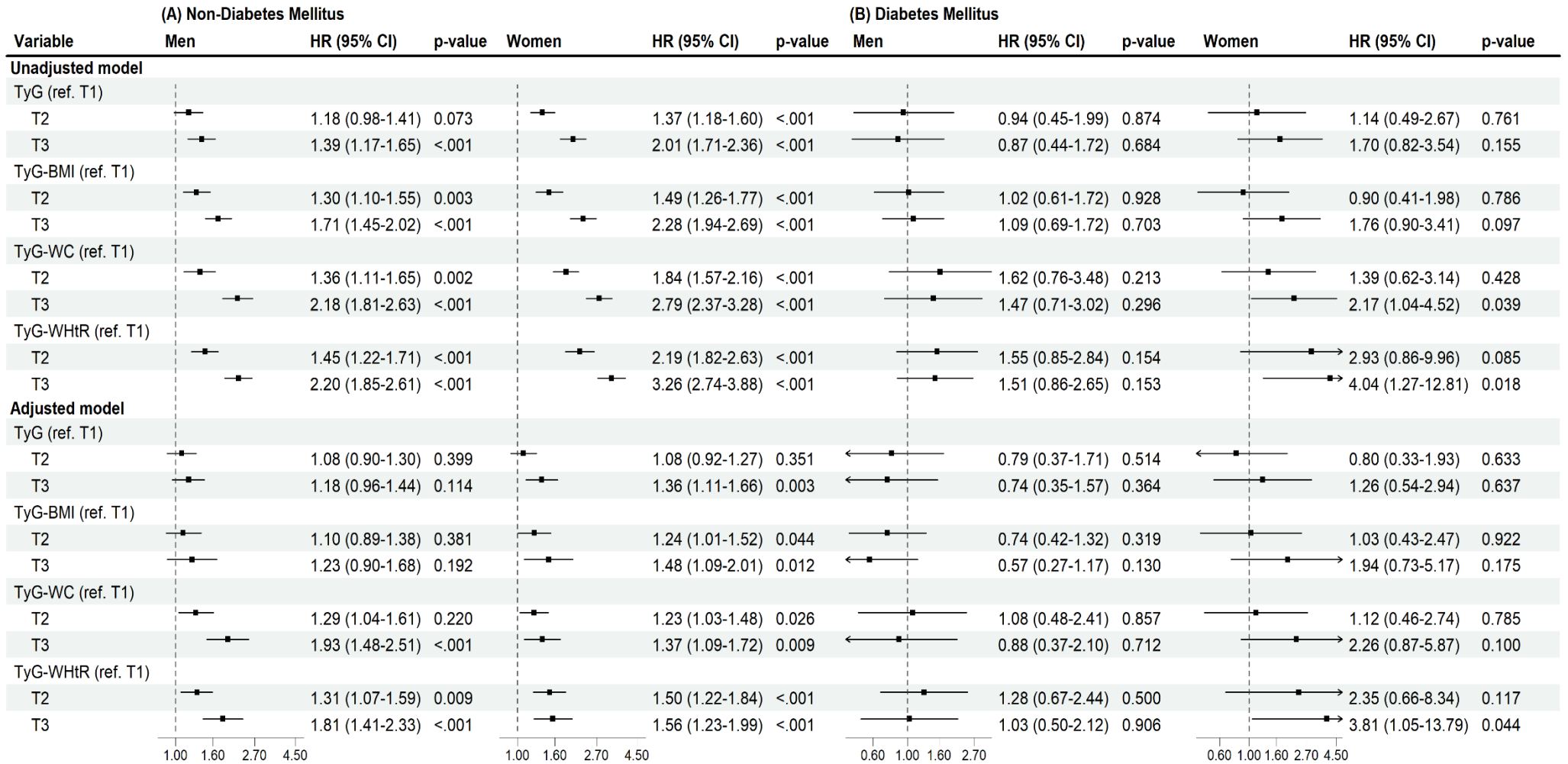




Relationship between incident HTN in men and TyG tertile (A), TyG-BMI (B), TyG-WC (C), and TyG-WHtR (D). Relationship between incident HTN in women and TyG tertile (E), TyG-BMI (F), TyG-WC (G), and TyG-WHtR (H) and

TyG, triglyceride to glucose index; BMI, body mass index; WC, waist circumference; WHtR, waist to height ratio; HTN, hypertension

**Figure S2. Subgroup analysis according to presence of diabetes.**



(A) Men and women without diabetes mellitus, (B) Men and women with diabetes mellitus

TyG, triglyceride-glucose; BMI, body mass index; WC, waist circumference; WHtR, waist to height ratio; TyG-BMI, TyG index × BMI; TyG-WC, TyG index × WC; TyG-WHtR, TyG index × WHtR