

Supplementary Table S1. Basic characteristics of study participants

Characteristics	T2D (n = 397)	Control (n = 794)	χ^2/Z	P
Male	156 (39.3%)	312 (39.3%)	0	1.000
Age (years)	60 (52.5–67.5)	60.5 (51.00–67.00)	−0.02	0.982
Smoking	295 (25.7%)	576 (27.5%)	0.42	0.518
Alcohol drinking	50 (12.6%)	98 (12.3%)	0.02	0.901
Physical activity			15.40	< 0.001
Low	193 (39.2%)	311(48.7%)		
Moderate	76 (17.0%)	135 (19.2%)		
High	127 (43.8%)	347 (32.1%)		
Family history of T2D	71 (17.9%)	56 (7.1%)	32.59	< 0.001
BMI (kg/m ²)	26.33 (23.98–28.70)	24.80 (22.30–27.20)	−6.28	< 0.001
WC (cm)	91.25 (84.13–97.50)	86.00 (78.00–93.50)	−7.76	< 0.001
FPG (mmHg)	8.46 (6.84–10.94)	4.98 (4.52–5.42)	−23.77	< 0.001
FINS (mIU/L)	13.25 (9.55–18.97)	11.04 (8.65–13.77)	−6.68	< 0.001
HOMA-β	54.61 (29.81–96.93)	153.57 (110.26–217.01)	−19.14	< 0.001
HOMA-IR	5.02 (3.29–7.80)	2.42 (1.80–3.23)	−17.76	< 0.001
TC (mmol/L)	4.61 (4.06–5.29)	4.51 (3.94–5.16)	−2.21	0.027
TG (mmol/L)	1.81 (1.19–2.80)	1.36 (0.90–2.04)	−7.12	< 0.001
HDL-C (mmol/L)	1.13 (0.96–1.34)	1.18 (0.99–1.39)	−2.66	0.008
LDL-C (mmol/L)	2.63 (2.19–3.17)	2.53 (2.02–3.09)	−2.47	0.014
25(OH)D3 (ng/mL)	19.1 (15.02–27.21)	19.36 (15.5–24.5)	−0.52	0.601

Note. Data are given as number (%) or median (interquartile range). Age refers to the age at which the participants were enrolled in the study. Physical activity was divided into three categories (low, moderate, and high) according to the International Physical Activity Questionnaire. BMI, body mass index; WC, waist circumference; FPG, fasting plasma glucose; FINS, fasting insulin; HOMA-β, Homeostasis Model Assessment-β [HOMA-β (%) = $20 \times \text{FINS (mIU/L)} / (\text{FPG (mmol/L)} - 3.5)$]; HOMA-IR, Homeostasis Model Assessment Insulin Resistance [HOMA-IR = $\text{FPG (mmol/L)} \times \text{FINS (mIU/L)} / 22.5$]; TC, total cholesterol; TG, triglyceride; HDL-C, high-density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol. *P*-value > alpha (0.05) means not statistically significant.

Supplementary Table S2. Association of BMI and WC levels with the risk of T2D

Continuous	Model 1	Model 2
BMI		
Continuous		
T1 (< 23.7 kg/m ²)	1	1
T2 (23.7–26.8 kg/m ²)	1.68 (1.22–2.31)*	1.35 (0.97–1.89)
T3 (≥ 26.8 kg/m ²)	2.52 (1.84–3.43)*	1.88 (1.35–2.63)*
<i>P</i> -trend	< 0.001	0.003
WC		
Continuous		
T1 (< 82.5 cm)	1	1
T2 (82.5–92.5 cm)	2.15 (1.56–2.97)*	1.87 (1.34–2.61)*
T3 (≥ 92.5 cm)	2.94 (2.13–4.04)*	2.22 (1.58–3.14)*
<i>P</i> -trend	< 0.001	< 0.001

Note. Model 1: Adjusted for age, sex, smoking, alcohol drinking, exercise, family history of T2D; Model 2: Adjusted for age, sex, smoking, alcohol drinking, exercise, family history of T2D, SBP, DBP, TC, TG, HDL-C, LDL-C. BMI, body mass index; WC, waist circumference **P* < 0.05. *P*-value > alpha (0.05) means not statistically significant.

Supplementary Table S3. Associations (β , 95% CI) of BMI and WC with blood glucose related parameters

Outcomes	BMI		WC	
	Model 1	Model 2	Model 1	Model 2
FPG	0.076 (0.032–0.119)*	0.010 (–0.035–0.055)	0.040 (0.025–0.054)*	0.017 (0.002–0.032)*
FINS	0.592 (0.479–0.706)*	0.493 (0.367–0.619)*	0.233 (0.194–0.271)*	0.202 (0.159–0.245)*
HOMA-IR	0.249 (0.198–0.299)*	0.186 (0.132–0.241)*	0.100 (0.084–0.117)*	0.080 (0.062–0.098)*
HOMA- β	3.183 (–11.166–17.531)	2.837 (–13.628–19.301)	0.671 (–4.246–5.587)	0.690 (–4.946–6.326)

Note. Model 1: Adjusted for age, sex, smoking, alcohol drinking, exercise, family history of T2D; Model 2: Adjusted for age, sex, smoking, alcohol drinking, exercise, family history of T2D, SBP, DBP, TC, TG, HDL-C, LDL-C. BMI, body mass index; WC, waist circumference; FPG, fasting plasma glucose; FINS, fasting insulin; HOMA-IR, Homeostasis Model Assessment Insulin Resistance [HOMA-IR = FPG (mmol/L) × FINS (mIU/L) / 22.5]; HOMA- β , Homeostasis Model Assessment- β [HOMA- β (%) = 20 × FINS (mIU/L) / (FPG (mmol/L) – 3.5)]; **P* < 0.05. *P*-value > alpha (0.05) means not statistically significant.

Supplementary Table S4. Associations of VDR variants (rs2189480 and rs739837) genotypes with cardiovascular metabolic indexes

Cardiovascular metabolic indexes	rs2189480			rs739837		
	GA+GG	AA	<i>P</i> *	GG	GC+CC	<i>P</i> *
TG (mmol/L)	1.65 ± 1.04	1.67 ± 1.26	0.957	1.70 ± 1.15	1.60 ± 1.18	0.215
TC (mmol/L)	4.62 ± 0.95	4.57 ± 0.98	0.277	4.63 ± 0.98	4.54 ± 0.96	0.325
HDL-C (mmol/L)	1.17 ± 0.31	1.17 ± 0.31	0.962	1.19 ± 0.31	1.15 ± 0.30	0.189
LDL-C (mmol/L)	2.73 ± 0.77	2.68 ± 0.80	0.333	2.70 ± 0.80	2.69 ± 0.76	0.936
SBP (mmHg)	128.14 ± 20.19	128.80 ± 19.23	0.818	127.45 ± 18.94	130.00 ± 20.37	0.030
DBP (mmHg)	78.17 ± 10.48	78.98 ± 10.95	0.406	78.10 ± 10.85	79.47 ± 10.63	0.084
FPG (mmol/L)	4.96 ± 0.76	4.99 ± 0.71	0.552	4.98 ± 0.73	4.97 ± 0.73	0.825
FINS (mIU/L)	11.98 ± 5.70	12.17 ± 6.19	0.795	11.28 ± 4.32	12.60 ± 6.51	0.001
HOMA-β	2.67 ± 1.37	2.73 ± 1.51	0.761	2.23 ± 0.32	2.21 ± 0.26	0.238
HOMA-β	2.22 ± 0.28	2.22 ± 0.31	0.989	2.72 ± 1.50	2.70 ± 1.37	0.757

Note. * Adjusted for age, smoking, alcohol drinking, exercise. TC, total cholesterol; TG, triglyceride; HDL-C, high-density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol; SBP, systolic blood pressure; DBP, diastolic blood pressure; FPG, fasting plasma glucose; FINS, Fasting insulin; HOMA-β, Homeostasis Model Assessment-β [HOMA-β (%) = 20 × FINS (mIU/L) / (FPG (mmol/L) - 3.5)]; HOMA-IR, Homeostasis Model Assessment Insulin Resistance [HOMA-IR = FPG (mmol/L) × FINS (mIU/L) / 22.5]; *P*-value > alpha (0.05) means not statistically significant.