

Supplementary Materials

Associations of percentage body cell mass with insulin resistance and type 2 diabetes: mediation effect of body mass index

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Supplementary Table 1. Association of PBCM with T2D risk biomarkers

Outcomes	PBCM (%)	<i>p</i> value	PBCM (Quartiles)				<i>p</i> for trend
	B (95%CI)		Q1 (<36)	Q2 (36-41)	Q3 (41-48)	Q4 (≥48)	
FPG							
Model 1	0 (-0.01, 0.00)	0.293	0 (Ref)	-0.04 (-0.18, 0.10)	0.05 (-0.08, 0.19)	-0.03 (-0.14, 0.09)	0.895
Model 2	-0.02 (-0.03, -0.02)	<0.001	0 (Ref)	-0.18 (-0.29, -0.06)	-0.32 (-0.49, -0.14)	-0.43 (-0.61, -0.26)	<0.001
Model 3	-0.02 (-0.03, -0.01)	<0.001	0 (Ref)	-0.17 (-0.28, -0.05)	-0.29 (-0.46, -0.11)	-0.38 (-0.56, -0.21)	<0.001
HbA1c							
Model 1	-0.01 (-0.01, -0.00)	0.003	0 (Ref)	-0.01 (-0.10, 0.08)	-0.01 (-0.10, 0.07)	-0.09 (-0.16, -0.02)	0.019
Model 2	-0.01 (-0.02, -0.01)	<0.001	0 (Ref)	-0.04 (-0.12, 0.05)	-0.11 (-0.22, 0.01)	-0.19 (-0.30, -0.07)	0.002
Model 3	-0.01 (-0.02, -0.00)	0.002	0 (Ref)	-0.03 (-0.11, 0.05)	-0.09 (-0.20, 0.02)	-0.16 (-0.27, -0.04)	0.009
FSI							
Model 1	-0.81 (-1.19, -0.44)	<0.001	0 (Ref)	-10.14 (-18.25, -2.02)	-6.92 (-15.57, 1.72)	-16.91 (-25.22, -8.61)	<0.001
Model 2	-2.24 (-2.98, -1.50)	<0.001	0 (Ref)	-16.91 (-25.62, -8.20)	-27.01 (-38.19, -15.83)	-42.25 (-57.09, -27.40)	<0.001
Model 3	-1.87 (-2.62, -1.13)	<0.001	0 (Ref)	-15.56 (-24.49, -6.63)	-23.35 (-35.53, -11.17)	-35.39 (-50.08, -20.71)	<0.001
HOMA-IR							
Model 1	-0.04 (-0.06, -0.02)	<0.001	0 (Ref)	-0.44 (-0.87, -0.01)	-0.34 (-0.77, 0.08)	-0.74 (-1.15, -0.33)	0.002
Model 2	-0.11 (-0.15, -0.07)	<0.001	0 (Ref)	-0.78 (-1.20, -0.36)	-1.35 (-1.95, -0.75)	-1.97 (-2.72, -1.23)	<0.001
Model 3	-0.09 (-0.13, -0.06)	<0.001	0 (Ref)	-0.72 (-1.16, -0.29)	-1.18 (-1.83, -0.53)	-1.66 (-2.40, -0.93)	<0.001

BMI, body mass index; FPG, fasting plasma glucose; FSI, fasting serum insulin; HbA1c, glycated hemoglobin; HOMA-IR, homeostasis model assessment of insulin resistance; NHANES, National Health and Nutrition Examination Survey; PBCM, percentage body cell mass; T2D, type 2 diabetes.

Model 1 was unadjusted for covariates. Model 2 was adjusted for age, gender, race, and NHANES cycle. Model 3 was additionally adjusted for physical activity, smoking status, drinking status, energy intakes, hypertension, and dyslipidemia.

Supplementary Table 2. Associations of PBCM with IR among by gender

Variable	Total	Event (%)	Model 1		Model 2		Model 3	
			OR (95%CI)	<i>p</i> value	OR (95%CI)	<i>p</i> value	OR (95%CI)	<i>p</i> value
Men								
PBCM (%)	1544	754 (48.8)	0.91 (0.88, 0.94)	<0.001	0.91 (0.88, 0.94)	<0.001	0.92 (0.89, 0.95)	<0.001
PBCM (Quartiles)								
Q1 (<44)	386	268 (69.4)	1 (Ref)		1 (Ref)		1 (Ref)	
Q2 (44-48)	386	191 (49.5)	0.38 (0.22, 0.66)	<0.001	0.39 (0.22, 0.66)	0.001	0.40 (0.23, 0.72)	0.003
Q3 (48-52)	386	185 (47.9)	0.38 (0.22, 0.67)	0.001	0.37 (0.21, 0.66)	0.001	0.42 (0.24, 0.72)	0.003
Q4 (≥52)	386	110 (28.5)	0.20 (0.12, 0.34)	<0.001	0.20 (0.12, 0.35)	<0.001	0.22 (0.13, 0.38)	<0.001
<i>p</i> for trend				<0.001		<0.001		<0.001
Women								
PBCM (%)	1379	708 (51.3)	0.89 (0.86, 0.93)	<0.001	0.89 (0.85, 0.93)	<0.001	0.90 (0.86, 0.94)	<0.001
PBCM (Quartiles)								
Q1 (<33)	345	226 (65.5)	1 (Ref)		1 (Ref)		1 (Ref)	
Q2 (33-36)	344	189 (54.9)	0.57 (0.38, 0.87)	0.011	0.57 (0.37, 0.86)	0.009	0.62 (0.39, 0.98)	0.041
Q3 (36-39)	345	172 (49.9)	0.49 (0.30, 0.79)	0.005	0.49 (0.29, 0.84)	0.010	0.55 (0.32, 0.92)	0.025
Q4 (≥39)	345	121 (35.1)	0.19 (0.11, 0.33)	<0.001	0.19 (0.11, 0.33)	<0.001	0.21 (0.11, 0.39)	<0.001
<i>p</i> for trend				<0.001		<0.001		<0.001

IR, insulin resistance; NHANES, National Health and Nutrition Examination Survey; PBCM, percentage body cell mass.

Model 1 was unadjusted for covariates. Model 2 was adjusted for age, race, and NHANES cycle. Model 3 was additionally adjusted for physical activity, smoking status, drinking status, energy intakes, hypertension, and dyslipidemia.

Supplementary Table 3. Associations of PBCM with T2D among by gender

Variable	Total	Event (%)	Model 1		Model 2		Model 3	
			OR (95%CI)	<i>p</i> value	OR (95%CI)	<i>p</i> value	OR (95%CI)	<i>p</i> value
Men								
PBCM (%)	1544	53 (3.4)	0.84 (0.79, 0.90)	<0.001	0.85 (0.78, 0.91)	<0.001	0.83 (0.77, 0.90)	<0.001
PBCM (Quartiles)								
Q1 (<44)	386	30 (7.8)	1 (Ref)		1 (Ref)		1 (Ref)	
Q2 (44-48)	386	10 (2.6)	0.14 (0.06, 0.33)	<0.001	0.15 (0.06, 0.36)	<0.001	0.14 (0.05, 0.35)	<0.001
Q3 (48-52)	386	12 (3.1)	0.43 (0.21, 0.88)	0.023	0.43 (0.20, 0.93)	0.033	0.42 (0.19, 0.93)	0.033
Q4 (≥52)	386	1 (0.3)	0.00 (0.00, 0.04)	<0.001	0.01 (0.00, 0.06)	<0.001	0.01 (0.00, 0.07)	<0.001
<i>p</i> for trend				<0.001		<0.001		0.001
Women								
PBCM (%)	1379	62 (4.5)	0.92 (0.84, 1.01)	<0.095	0.95 (0.86, 1.04)	0.227	0.96 (0.88, 1.05)	<0.356
PBCM (Quartiles)								
Q1 (<33)	345	26 (7.5)	1 (Ref)		1 (Ref)		1 (Ref)	
Q2 (33-36)	344	12 (3.5)	0.55 (0.21, 1.41)	0.205	0.58 (0.22, 1.59)	0.283	0.63 (0.23, 1.73)	0.358
Q3 (36-39)	345	14 (4.1)	0.54 (0.22, 1.31)	0.168	0.63 (0.25, 1.58)	0.318	0.73 (0.30, 1.80)	0.488
Q4 (≥39)	345	10 (2.9)	0.32 (0.10, 0.97)	0.045	0.43 (0.14, 1.33)	0.137	0.50 (0.15, 1.67)	0.249
<i>p</i> for trend				0.046		0.142		0.271

NHANES, National Health and Nutrition Examination Survey; PBCM, percentage body cell mass; T2D, type 2 diabetes.

Model 1 was unadjusted for covariates. Model 2 was adjusted for age, race, and NHANES cycle. Model 3 was additionally adjusted for physical activity, smoking status, drinking status, energy intakes, hypertension, and dyslipidemia.

Supplementary Table 4. Threshold effect analysis of the relationship of PBCM with IR

PBCM (%)	Case/Total	OR (95% CI)	<i>p</i> value
<41	824/1461	0.87 (0.82, 0.92)	<0.001
≥41	638/1462	0.95 (0.91, 0.99)	0.010

IR, insulin resistance; PBCM, percentage body cell mass.

Supplementary Table 5. Threshold effect analysis of the relationship of PBCM with IR among men

PBCM (%)	Case/Total	OR (95% CI)	<i>p</i> value
<48	475/800	0.84 (0.76, 0.92)	<0.001
≥48	279/744	0.96 (0.90, 1.02)	0.170

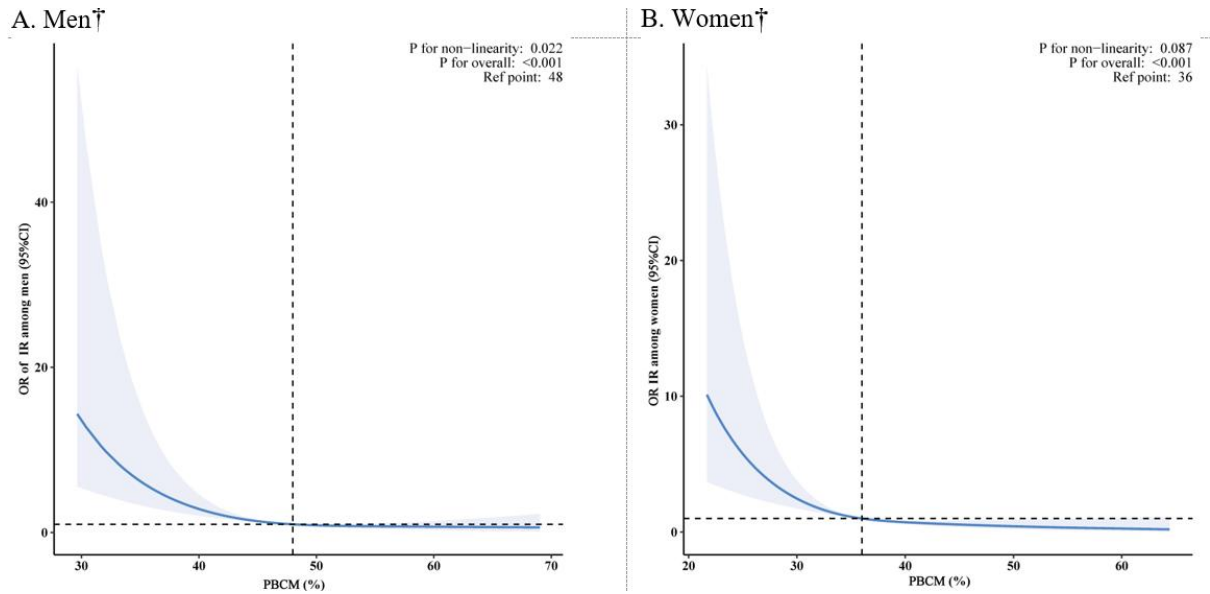
IR, insulin resistance; PBCM, percentage body cell mass.

Supplementary Table 6. Associations of PBCM with IR and T2D after excluding subjects with missing covariate data

Variable	Total	Event (%)	Model 1		Model 2		Model 3	
			OR (95%CI)	<i>p</i> value	OR (95%CI)	<i>p</i> value	OR (95%CI)	<i>p</i> value
IR								
PBCM (%)	2172	1056 (44.3)	0.97 (0.95, 0.98)	<0.001	0.90 (0.88, 0.93)	<0.001	0.91 (0.89, 0.94)	<0.001
PBCM (Quartiles)								
Q1 (<44)	543	320 (53.7)	1 (Ref)		1 (Ref)		1 (Ref)	
Q2 (44-48)	543	264 (43.4)	0.66 (0.49, 0.89)	0.008	0.46 (0.32, 0.67)	<0.001	0.49 (0.34, 0.71)	<0.001
Q3 (48-52)	543	257 (42.7)	0.64 (0.49, 0.84)	0.002	0.25 (0.16, 0.38)	<0.001	0.26 (0.16, 0.42)	<0.001
Q4 (≥52)	543	215 (37.6)	0.52 (0.38, 0.71)	<0.001	0.16 (0.10, 0.26)	<0.001	0.19 (0.12, 0.31)	<0.001
<i>p</i> for trend				<0.001		<0.001		<0.001
T2D								
PBCM (%)	2172	100 (3.6)	0.94 (0.91, 0.96)	<0.001	0.89 (0.84, 0.94)	<0.001	0.89 (0.84, 0.94)	<0.001
PBCM (Quartiles)								
Q1 (<33)	543	33 (4.8)	1 (Ref)		1 (Ref)		1 (Ref)	
Q2 (33-36)	543	30 (4.5)	0.93 (0.45, 1.92)	0.846	0.74 (0.32, 1.70)	0.461	0.75 (0.32, 1.80)	0.508
Q3 (36-39)	543	25 (2.8)	0.57 (0.24, 1.35)	0.193	0.35 (0.11, 1.18)	0.088	0.36 (0.11, 1.22)	0.099
Q4 (≥39)	543	12 (2.0)	0.41 (0.21, 0.78)	0.008	0.23 (0.08, 0.71)	0.012	0.26 (0.08, 0.81)	0.022
<i>p</i> for trend				0.008		0.012		0.021

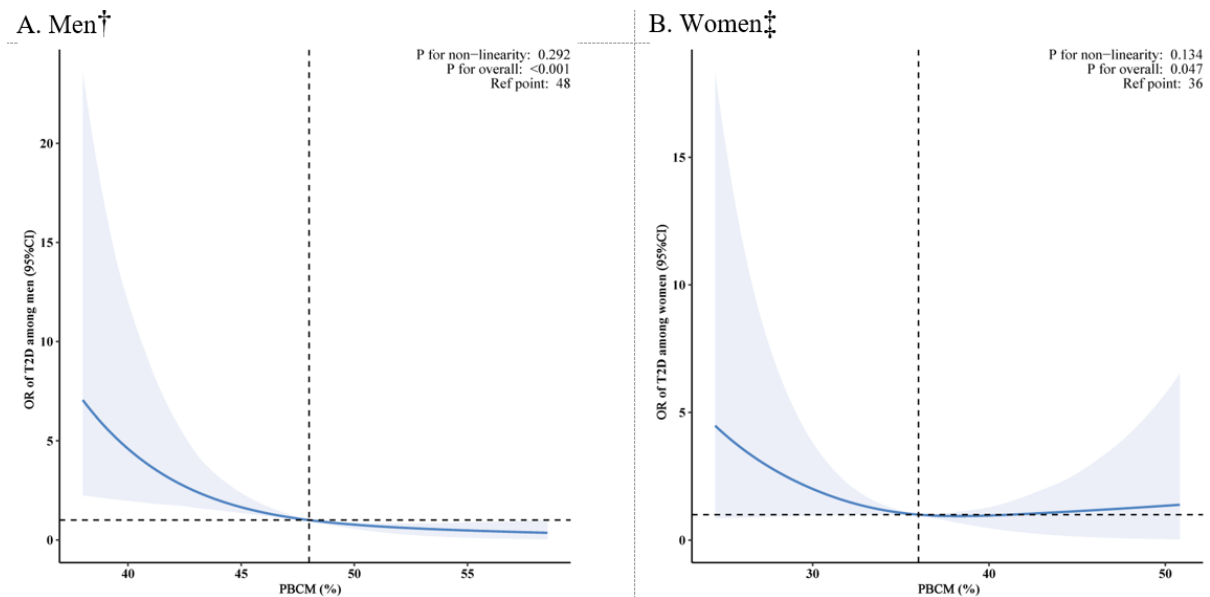
IR, insulin resistance; NHANES, National Health and Nutrition Examination Survey; PBCM, percentage body cell mass; T2D, type 2 diabetes.

Model 1 was unadjusted for covariates. Model 2 was adjusted for age, gender, race, and NHANES cycle. Model 3 was additionally adjusted for physical activity, smoking status, drinking status, energy intakes, hypertension, and dyslipidemia.



Supplementary Figure 1. The complex sampling-weighted RCS analysis of PBCM with IR by gender. The solid curved line represents the estimates for the association of PBCM with IR, and shading, the 95% CI. IR, insulin resistance; PBCM, percentage body cell mass; T2D, type 2 diabetes

[†]Adjusted for age, race, physical activity, smoking status, drinking status, energy intakes, hypertension, dyslipidemia, and NHANES cycle.



Supplementary Figure 2. The complex sampling-weighted RCS analysis of PBCM with T2D by gender. The solid curved line represents the estimates for the association of PBCM with T2D, and shading, the 95% CI. IR, insulin resistance; PBCM, percentage body cell mass; T2D, type 2 diabetes

[†]Adjusted for age, race, physical activity, smoking status, drinking status, energy intakes, hypertension, dyslipidemia, and NHANES cycle.

[‡]Adjusted for age and the NHANES survey cycle due to the limited number of events for overt outcomes.