Supplementary Table 1. Distribution and Number of Metabolic Syndrome Components Across Metabolic Obesity Phenotypes

	Metabolically healthy normal weight (MHNW) N=875	Metabolically healthy obesity (MHO) N=349	Metabolically unhealthy normal weight (MUNW) N=104	Metabolically unhealthy obesity (MUO) N=457
Elevated waist circumference	48	286	25	439
Elevated blood pressure or antihypertensive treatment	232	122	84	366
Elevated fasting glucose or antidiabetic treatment	254	83	86	358
Elevated TG or treatment	67	24	72	236
Low HDL-C	81	36	66	252
0 Metabolic components	382	15	0	0
1 component	304	117	0	0
2 components	189	217	0	0
≥3 components	0	0	104	457

Supplementary Table 2. Sensitivity analysis of the associations between metabolic obesity phenotypes and prevalent kidney abnormalities with additional adjustment for alcohol use and serum uric acid

	Adjusted OR[1] (95% CI)	P value
UACR ≥ 30 mg/g or eGFR < 60 mL/min/1.73 m^2		
Metabolically healthy normal weight	1.00 (Reference)	
Metabolically healthy obesity	2.13 (1.32-3.43)	0.002
Metabolically unhealthy normal weight	2.10 (1.07-4.11)	0.03
Metabolically unhealthy obesity	4.21 (2.83-6.27)	<0.001
UACR ≥ 30 mg/g		
Metabolically healthy normal weight	1.00 (Reference)	
Metabolically healthy obesity	2.23 (1.36-3.65)	0.001
Metabolically unhealthy normal weight	2.26 (1.13-4.54)	0.02
Metabolically unhealthy obesity	4.30 (2.84-6.52)	<0.001

[1] Adjusted model: age, sex, smoking, alcohol, uric acid

Supplementary Table 3. Associations between metabolic obesity phenotypes and prevalent kidney abnormalities in the study cohort including participants with eGFR<30 mL/min/1.73 m^2

	Event N (%)	Crude OR (95% CI)	P value	Adjusted OR[1] (95% CI)	P value
UACR ≥ 30 mg/g or eGFR < 60 mL/min/1.73 m^2	191(10.7)				
Metabolically healthy normal weight	44(5.0)	1.00(Reference)		1.00(Reference)	
Metabolically healthy obesity	35(10.0)	2.09(1.32-3.32)	0.002	1.98(1.24-3.17)	0.004
Metabolically unhealthy normal weight	13(12.5)	2.71(1.40-5.22)	0.003	1.97(1.01-3.85)	0.046
Metabolically unhealthy obesity	99(21.6)	5.25(3.61-7.66)	<0.001	4.15(2.82-6.10)	<0.001
UACR ≥ 30 mg/g	174(9.7)				
Metabolically healthy normal weight	40 (4.6)	1.00(Reference)		1.00(Reference)	
Metabolically healthy obesity	34(9.7)	2.21(1.38-3.56)	0.001	2.12(1.31-3.42)	0.002
Metabolically unhealthy normal weight	12(11.5)	2.71(1.37-5.36)	0.004	2.09(1.05-4.17)	0.04
Metabolically unhealthy obesity	88(19.2)	5.00(3.37-7.41)	<0.001	4.11(2.75-6.15)	<0.001
eGFR < 60 mL/min/1.73 m^2 #	39(2.2)				
Metabolically healthy normal weight	10(1.1)	1.00(Reference)		1.00(Reference)	
Metabolically healthy obesity	4(1.1)	1.08(0.35-3.27)	0.90	0.91(0.30-2.79)	0.87
Metabolically unhealthy normal weight	2(1.9)	2.02(0.50-8.17)	0.33	1.18(0.29-4.81)	0.82
Metabolically unhealthy obesity	23(5.0)	4.45(2.13-9.30)	<0.001	2.31(1.08-4.94)	0.03

[1] Adjusted model: age, sex, smoking

For reduced eGFR, crude and adjusted ORs were estimated using Firth penalized logistic regression.

Supplementary Table 4. Stricter metabolic-health sensitivity analysis for associations between metabolic obesity phenotypes and prevalent kidney abnormalities in the study cohort

	Event N (%)	Crude OR (95% CI)	P value	Adjusted OR[1] (95% CI)	P value
UACR ≥ 30 mg/g or eGFR < 60 mL/min/1.73 m^2	187(10.5)				
Metabolically healthy normal weight(n=382)	11(2.9)	1.00(Reference)		1.00(Reference)	
Metabolically healthy obesity(n=15)	1(6.7)	2.37(0.29-19.66)	0.42	1.80(0.21-15.27)	0.59
Metabolically unhealthy normal weight (n=597)	44(7.4)	2.71(1.38-5.31)	0.004	1.81(0.91-3.62)	0.09
Metabolically unhealthy obesity(n=791)	131(16.6)	6.74(3.60-12.64)	<0.001	4.60(2.41-8.78)	<0.001
UACR ≥ 30 mg/g	170(9.5)				
Metabolically healthy normal weight(n=382)	10 (2.6)	1.00(Reference)		1.00(Reference)	
Metabolically healthy obesity(n=15)	1(6.7)	2.61(0.31-21.87)	0.38	2.06(0.24-17.54)	0.51
Metabolically unhealthy normal weight (n=597)	40(6.7)	2.70(1.33-5.46)	0.006	1.96(0.95-4.04)	0.07
Metabolically unhealthy obesity(n=791)	119(15.0)	6.63(3.43-12.80)	<0.001	4.88(2.48-9.60)	<0.001
eGFR < 60 mL/min/1.73 $m^{2\,\#}$	35(2.0)				
Metabolically healthy normal weight (n=382)	1(0.3)	1.00(Reference)		1.00(Reference)	
Metabolically healthy obesity (n=15)	0(0)	8.20(0.06-160.39)	0.21	3.79(0.03-81.10)	0.45
Metabolically unhealthy normal weight (n=597)	9(1.5)	4.10(0.94-38.38)	0.11	1.20(0.26-11.56)	0.84
Metabolically unhealthy obesity (n=791)	25(3.2)	8.46(2.20-75.90)	0.01	2.25(0.54-20.80)	0.35

1 Adjusted model: age, sex, smoking

For reduced eGFR, crude and adjusted ORs were estimated using Firth penalized logistic regression.