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## **Association between adiposity measures and COPD risk in Chinese adults**

### **Online Data Supplement**

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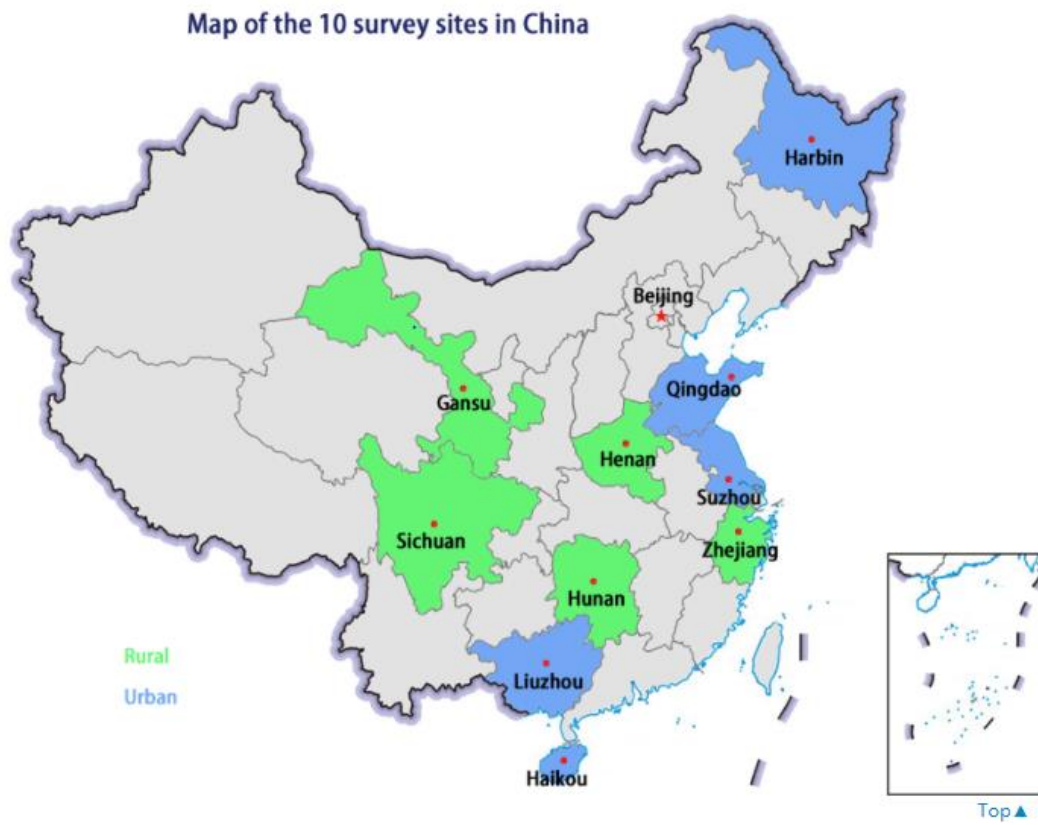
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Figure S1. Geographic locations of the CKB study regions



**Table S1. Baseline characteristics of participants by baseline waist-to-hip ratio and waist-to-height ratio (n=452,259)**

	WHR		WHtR	
	< 0.9 (male)	≥ 0.9 (male)	< 0.5	≥ 0.5
	< 0.8 (female)	≥ 0.8 (female)		
Number of participants	124,096	328,163	217,831	234,428
Age (years)	49.5	51.8	49.4	52.7
Female (%)	33.3	69.7	54.9	64.1
Urban (%)	45.7	42.8	39.5	47.4
Married (%)	89.6	91.7	90.3	91.9
Primary school or lower (%)	49.3	49.8	49.0	50.2
Current smoker (%)	27.3	25.6	27.9	24.6
Passive smoker (%)	44.8	44.6	44.7	44.6
Cooking with solid fuel (%)	37.8	36.0	37.1	35.7
Heating with solid fuel (%)	37.0	37.3	37.2	37.2
Drinking weekly (%)	13.7	15.7	14.6	15.2
Consuming fruits daily (%)	18.8	18.4	18.6	18.5
Consuming fresh vegetables daily (%)	94.5	94.7	94.4	94.9
Consuming meat daily (%)	27.6	30.2	28.1	30.5
Physical activity (Met-h/d)	22.5	21.3	22.3	21.1
Respiratory symptoms (%)	11.4	12.7	11.4	13.1

Note: WHR, waist-to-hip ratio; WHtR, waist-to-height ratio

Predictive margins adjusting for age, sex and region were presented.

**Table S2. Subgroup analysis for BMI and COPD according to age, area, education level, smoking status, physical activity, and menopause status**

	Number	BMI (kg/m <sup>2</sup> )				P <sub>interaction</sub>
		< 18.5	18.5 to < 24.0	24.0 to < 28.0	≥ 28.0	
<b>Age (years)</b>						0.0225
<50	217,796	1.40 (1.12-1.76)	1.00	0.88 (0.76-1.01)	0.95 (0.74-1.21)	
50-59	139,336	2.04 (1.80-2.32)	1.00	0.97 (0.87-1.07)	1.05 (0.89-1.24)	
≥60	95,127	1.73 (1.60-1.88)	1.00	0.84 (0.77-0.91)	0.89 (0.78-1.01)	
<b>Area</b>						0.0004
Urban	197,228	1.83 (1.55-2.16)	1.00	0.78 (0.69-0.88)	0.85 (0.71-1.01)	
Rural	255,031	1.77 (1.65-1.90)	1.00	0.93 (0.87-0.99)	1.01 (0.90-1.13)	
<b>Education</b>						0.2853
Primary school or lower	224,483	1.79 (1.67-1.92)	1.00	0.90 (0.84-0.96)	0.97 (0.87-1.08)	
Middle/high School	201,723	1.73 (1.46-2.04)	1.00	0.85 (0.75-0.96)	0.92 (0.76-1.12)	
College or higher	26,053	1.79 (0.81-3.94)	1.00	1.22 (0.83-1.81)	0.99 (0.55-1.79)	
<b>Smoking</b>						0.0024
Non-current smoker	333,263	1.68 (1.54-1.84)	1.00	0.92 (0.86-0.99)	1.00 (0.90-1.11)	
Current smoker	118,996	1.87 (1.70-2.06)	1.00	0.82 (0.74-0.91)	0.82 (0.68-0.99)	
<b>Physical activity<sup>a</sup></b>						0.0325
Low	150,351	1.76 (1.61-1.93)	1.00	0.88 (0.81-0.96)	0.93 (0.81-1.07)	
Middle	151,125	1.72 (1.53-1.93)	1.00	0.96 (0.87-1.06)	0.96 (0.81-1.14)	
High	150,783	1.82 (1.57-2.10)	1.00	0.81 (0.72-0.91)	0.97 (0.80-1.19)	
<b>Menopause<sup>b</sup></b>						0.2271
No	122,093	1.38 (1.01-1.90)	1.00	0.81 (0.67-0.98)	0.88 (0.64-1.22)	
Yes	147,917	1.68 (1.52-1.86)	1.00	0.95 (0.87-1.04)	1.08 (0.96-1.23)	

Note: BMI, body mass index



	Number	Waist circumference (cm)					P <sub>interaction</sub>
Low	150,351	1.15 (1.04-1.27)	1.00	1.14 (1.04-1.25)	1.24 (1.11-1.39)	1.56 (1.36-1.78)	
Middle	151,125	1.16 (1.04-1.30)	1.00	1.07 (0.96-1.19)	1.35 (1.18-1.54)	1.43 (1.21-1.69)	
High	150,783	1.20 (1.05-1.38)	1.00	1.27 (1.11-1.45)	1.37 (1.16-1.62)	1.84 (1.51-2.25)	
Menopause <sup>b</sup>							0.9419
No	122,093	1.18 (0.89-1.57)	1.00	1.14 (0.93-1.40)	1.25 (0.95-1.64)	1.51 (1.08-2.11)	
Yes	147,917	1.30 (1.15-1.46)	1.00	1.15 (1.05-1.26)	1.28 (1.15-1.43)	1.39 (1.22-1.58)	

Note: Results were based on model 3. *P* values for interaction were calculated by likelihood ratio test comparing models with and without a cross-product term.

<sup>a</sup> Three groups were defined by gender-specific tertiles of metabolic Equivalent Task-hours.

<sup>b</sup> Among 270,010 female participants who had menopause status data at baseline

**Table S4. Association of baseline waist-to-hip ratio and waist-to-height ratio with risk of COPD**

	WHR			WHtR	
	<0.9 (male)	0.9-0.95 (male)	≥0.95 (male)	<0.5	≥0.5
	<0.8 (female)	0.8-0.85 (female)	≥0.85 (female)		
Total (n=452,259)					
Cases	3,241	2,321	5,177	5,228	5,511
Rate (per/1000 person-years)	2.63	1.97	2.50	2.40	2.40
HR (95% CI) model 1	1.00	0.88 (0.83-0.93)	0.94 (0.90-0.99)	1.00	0.94 (0.90-0.98)
HR (95% CI) model 2	1.00	0.91 (0.86-0.96)	0.95 (0.91-1.00)	1.00	0.95 (0.91-0.99)
HR (95% CI) model 3	1.00	0.97 (0.91-1.02)	1.10 (1.04-1.17)	1.00	1.12 (1.07-1.19)
Male (n=182,209)					
Cases	2,631	1,299	1,283	3,151	2,062
Rate (per/1000 person-years)	3.29	2.50	2.80	3.32	2.49
HR (95% CI) model 1	1.00	0.89 (0.83-0.95)	0.97 (0.90-1.03)	1.00	0.87 (0.82-0.92)
HR (95% CI) model 2	1.00	0.91 (0.85-0.98)	0.98 (0.91-1.05)	1.00	0.90 (0.85-0.95)
HR (95% CI) model 3	1.00	1.09 (1.02-1.18)	1.37 (1.26-1.49)	1.00	1.29 (1.19-1.40)
Female (n=270,050)					
Cases	610	1,022	3,894	2,077	3,449
Rate (per/1000 person-years)	1.41	1.55	2.42	1.67	2.35
HR (95% CI) model 1	1.00	0.89 (0.81-0.99)	0.94 (0.86-1.03)	1.00	1.01 (0.96-1.07)
HR (95% CI) model 2	1.00	0.90 (0.81-1.00)	0.94 (0.86-1.03)	1.00	1.00 (0.95-1.06)
HR (95% CI) model 3	1.00	0.91 (0.82-1.01)	0.97 (0.88-1.06)	1.00	1.05 (0.98-1.13)

Note: WHR, waist-to-hip ratio; WHtR, waist-to-height ratio



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Models were adjusted for: model 1: sex (only in total population); Model 2: additionally included education (none or primary school, middle or high school, college or university), marital status (married, widowed, divorced or separated, never married), smoking (never or occasional, former and having quit <5, or  $\geq$ 5 years, current smoking <15, 15 to 24, or  $\geq$ 25 cigarettes/day), passive smoking (never lived with smoker, lived with smoker for <20 years, lived with smoker for  $\geq$ 20 years and exposure < 20 hours/week, lived with smoker for  $\geq$ 20 years and exposure  $\geq$ 20 hours/week), cooking and heating fuel type (coal, wood/charcoal, cleaner fuel, other fuels, no cooking/heating), alcohol drinking (non-drinker, occasional drinker, former drinker, regular drinker), intake frequencies of red meat, fresh fruits, and vegetables (daily, 4-6 days/week, 1-3 days/week, monthly, rarely or never), physical activity (MET h/day), and respiratory symptoms (presence or absence); model3: additionally adjusted for BMI.

**Table S5. Sensitivity analysis for the association between adiposity measures and COPD (HR and 95% CI)**

	Among never smokers (n= 284,259)	Excluding cases in the first three years (n= 450,410)	LLN definition for airflow obstruction (n= 445,350)	Excluding prevalent diabetes (n= 424,045)
<b>BMI (kg/m<sup>2</sup>)</b>				
< 18.5	1.64 (1.48-1.81)	1.70 (1.58-1.83)	1.79 (1.67-1.90)	1.76 (1.64-1.88)
18.5 to < 24.0	1.00	1.00	1.00	1.00
24.0 to < 28.0	0.94 (0.87-1.02)	0.91 (0.86-0.97)	0.89 (0.84-0.95)	0.89 (0.84-0.94)
≥ 28.0	1.06 (0.94-1.20)	0.99 (0.90-1.10)	0.95 (0.86-1.04)	0.96 (0.87-1.06)
<b>Waist circumference (cm)</b>				
< 70 (male)	1.26 (1.13-1.41)	1.19 (1.10-1.28)	1.17 (1.09-1.25)	1.16 (1.08-1.24)
< 65 (female)				
70 to < 85 (male)	1.00	1.00	1.00	1.00
65 to < 80 (female)				
85 to < 90 (male)	1.15 (1.05-1.25)	1.10 (1.03-1.18)	1.15 (1.08-1.23)	1.15 (1.08-1.23)
80 to < 85 (female)				
90 to < 95 (male)	1.25 (1.13-1.38)	1.20 (1.10-1.31)	1.31 (1.21-1.42)	1.31 (1.21-1.41)
85 to < 90 (female)				
≥ 95 (male)	1.40 (1.23-1.59)	1.48 (1.34-1.64)	1.57 (1.43-1.72)	1.58 (1.43-1.74)
≥ 90 (female)				
<b>WHR</b>				
< 0.9 (male)	1.00	1.00	1.00	1.00
< 0.8 (female)				
0.9-0.95 (male)	0.90 (0.82-0.99)	0.96 (0.90-1.02)	0.97 (0.92-1.03)	0.96 (0.91-1.02)
0.8-0.85 (female)				
≥ 0.95 (male)	0.97 (0.89-1.07)	1.06 (1.00-1.14)	1.11 (1.04-1.18)	1.11 (1.04-1.18)

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	Among never smokers (n= 284,259)	Excluding cases in the first three years (n= 450,410)	LLN definition for airflow obstruction (n= 445,350)	Excluding prevalent diabetes (n= 424,045)
$\geq 0.85$ (female)				
<b>WHtR</b>				
< 0.5	1.00	1.00	1.00	1.00
$\geq 0.5$	1.06 (0.98-1.15)	1.06 (1.00-1.13)	1.13 (1.07-1.19)	1.12 (1.06-1.18)

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Note: BMI, body mass index; WHR, waist-to-hip ratio; WHtR, waist-to-height ratio; LLN, lower-limit of normal

Results were based on model 3.