

The Association between Red Blood Cell Distribution Width and Sarcopenia in U.S. Adults

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Supplementary Material

Supplemental Material, Table S1. Body mass index-adjusted OR (95% CIs) for sarcopenia by red cell distribution width

Red cell distribution width	Sarcopenia/ Participants	Non-adjustment ^a for body mass index		Adjustment ^b for body mass index	
		OR	(95% CI)	OR	(95% CI)
Q1 (10.5-12.0 %)	641/2676	1.00	(Reference)	1.00	(Reference)
Q2 (12.1-12.4 %)	786/2732	0.98	(0.87, 1.10)	0.83	(0.73, 0.94)
Q3 (12.5-13.0 %)	1220/3315	1.41	(1.23, 1.61)	1.04	(0.89, 1.22)
Q4 (13.1-31.6 %)	1234/3038	1.72	(1.43, 2.06)	1.23	(0.97, 1.55)
<i>P for trend</i>		<i><0.001</i>		<i>0.046</i>	

^aAdjusted for age, sex, race/ethnicity, education, household income, smoking pack-years, moderate-to-vigorous physical activity, hypertension, diabetes, cardiovascular disease, C-reactive protein, and hemoglobin (Model D in Table 3).

^bFurther adjusted for body mass index.

Supplemental Material, Table S2. Characteristics of study population by obesity status

Characteristics	Normal weight (n=3722)	Overweight (n=4260)	Obesity (n=3779)	<i>P</i> -value
Age [years] ^a	42.32 ±0.32	46.90 ±0.33	46.84 ±0.35	<.001
BMI [kg/m ²]	22.19 ±0.04	27.41 ±0.03	34.67 ±0.08	<.001
CRP [mg/dL]	0.24 ±0.01	0.37 ±0.01	0.59 ±0.02	<.001
Hemoglobin [g/dL]	14.4 ±0.05	14.8 ±0.04	14.5 ±0.04	0.158
ASM [%]	29.34 ±0.12	28.07 ±0.10	25.29 ±0.08	<.001
RDW [%]	12.47 ±0.02	12.55 ±0.02	12.79 ±0.03	<.001
Sex [n (%)] ^b				
Male	1782 (43.0)	2527 (59.6)	1656 (45.5)	<.001
Female	1940 (57.0)	1733 (40.4)	2123 (54.5)	
Race/ethnicity [n (%)]				
Non-Hispanic White	2142 (76.2)	2171 (73.3)	1810 (72.1)	<.001
Non-Hispanic Black	605 (7.9)	732 (8.9)	904 (12.9)	
Mexican American	642 (5.4)	1033 (7.6)	834 (7.0)	
Other	333 (10.5)	324 (10.2)	231 (8.0)	
Education [n (%)]				
<High School	972 (16.2)	1286 (18.1)	1124 (18.4)	<.001
High School	851 (23.4)	992 (25.7)	961 (28.1)	
>High School	1899 (60.4)	1982 (56.2)	1694 (53.5)	
Household income [n (%)]				
PIR <1	646 (13.1)	665 (10.2)	627 (12.3)	<.001
PIR 1 to <3	1460 (33.7)	1744 (34.6)	1639 (37.6)	
PIR ≥3	1616 (53.2)	1851 (55.2)	1513 (50.2)	
Smoking pack-years				
Never	2009 (54.2)	2312 (53.1)	2163 (55.6)	<.001
<20	1210 (34.2)	1297 (31.9)	1052 (28.8)	
≥20	503 (11.5)	651 (15.0)	564 (15.6)	
MVPA [n (%)]				
Low	2311 (56.7)	2766 (59.6)	2674 (68.0)	<.001
High	1411 (43.3)	1494 (40.4)	1105 (32.0)	
Diabetes [n (%)]				
No	3516 (96.8)	3800 (93.3)	3157 (87.2)	<.001
Yes	206 (3.2)	460 (6.7)	622 (12.8)	
Hypertension [n (%)]				
No	2811 (83.0)	2640 (69.3)	1991 (57.7)	<.001
Yes	911 (17.0)	1620 (30.7)	1788 (42.3)	
CVD [n (%)]				
No	3434 (95.2)	3817 (92.2)	3296 (89.5)	<.001
Yes	288 (4.8)	443 (7.8)	483 (10.5)	

^a Weighted mean±SE from survey mean (all such values).

^b Weighted percentages from survey frequency (all such values).

P for trend was calculated using linear regression for continuous variables; *P* for difference was calculated using Rao-Scott chi-square test for categorical variables.

BMI, body mass index; CRP, C-reactive protein; ASM, appendicular skeletal muscle mass; RDW, red cell distribution width; PIR, poverty income ratio; MVPA, moderate-to-vigorous physical activity; CVD, cardiovascular disease.

Supplemental Material, Table S3. OR (95% CIs) for sarcopenic obesity by red cell distribution width

Red blood cell distribution width	Sarcopenic obesity/Participants	OR 95% CI
Sarcopenic obesity defined using appendicular skeletal muscle mass^a plus body mass index^b		
Q1 (10.5-12.0 %)	321/2676	1.00 (Reference)
Q2 (12.1-12.4 %)	395/2732	1.15 (0.92, 1.42)
Q3 (12.5-13.0 %)	685/3315	1.83 (1.49, 2.23)
Q4 (13.1-31.6 %)	710/3038	2.22 (1.79, 2.77)
<i>P for trend</i>		<0.001
Sarcopenic obesity defined using both appendicular skeletal muscle mass^a and walking speed^c plus body mass index^b		
Q1 (10.5-12.0 %)	14/481	1.00 (Reference)
Q2 (12.1-12.4 %)	29/592	1.89 (0.66, 5.42)
Q3 (12.5-13.0 %)	42/888	1.27 (0.46, 3.54)
Q4 (13.1-31.6 %)	83/864	3.50 (1.26, 9.70)
<i>P for trend</i>		0.019

^aLow muscle mass defined as appendicular skeletal muscle mass <29.36% for males and <22.41% for females.

^bObesity defined as body mass index ≥ 30 kg/m².

^cDecline physical function defined as walking speed ≤ 0.8 m/s.

^dData for these analyses (n=2,825) used subpopulation (≥ 50 years) that had walking speed information.

Adjusted for age, sex, race/ethnicity, education, household income, smoking pack-years, moderate-to-vigorous physical activity, hypertension, diabetes, cardiovascular disease, C-reactive protein, and hemoglobin (Model D in Table 3).

Supplemental Material, Table S4. OR (95% CIs) for sarcopenia and sarcopenic obesity by red cell distribution width by age group

Red blood cell distribution width	Sarcopenia or sarcopenic obesity/ Participants	Overall		Age: 20-39 years		Age: 40-59 years		Age: ≥60 years	
		OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Sarcopenia defined using appendicular skeletal muscle mass^a									
Q1 (10.5-12.0 %)	641/2676	1.00	(Reference)	1.00	(Reference)	1.00	(Reference)	1.00	(Reference)
Q2 (12.1-12.4 %)	786/2732	0.98	(0.87, 1.10)	0.99	(0.75, 1.31)	0.82	(0.68, 0.99)	1.24	(0.97, 1.58)
Q3 (12.5-13.0 %)	1220/3315	1.41	(1.23, 1.61)	1.39	(1.05, 1.84)	1.43	(1.16, 1.76)	1.31	(1.05, 1.63)
Q4 (13.1-31.6 %)	1234/3038	1.72	(1.43, 2.06)	2.45	(1.79, 3.34)	1.58	(1.15, 2.17)	1.52	(1.24, 1.87)
<i>P for trend</i>		<0.001		<0.001		<0.001		<0.001	
Sarcopenic obesity defined using appendicular skeletal muscle mass^a plus body mass index^b									
Q1 (10.5-12.0 %)	321/2676	1.00	(Reference)	1.00	(Reference)	1.00	(Reference)	1.00	(Reference)
Q2 (12.1-12.4 %)	395/2732	1.15	(0.92, 1.42)	1.07	(0.76, 1.56)	0.99	(0.74, 1.32)	1.42	(0.96, 2.10)
Q3 (12.5-13.0 %)	685/3315	1.83	(1.49, 2.23)	1.83	(1.26, 2.66)	1.84	(1.41, 2.39)	1.60	(1.17, 2.20)
Q4 (13.1-31.6 %)	710/3038	2.22	(1.79, 2.77)	2.57	(1.81, 3.65)	2.04	(1.42, 2.93)	2.05	(1.55, 2.73)
<i>P for trend</i>		<0.001		<0.001		<0.001		<0.001	

^aLow muscle mass defined as appendicular skeletal muscle mass <29.36% for males and <22.41% for females.

^bObesity defined as body mass index ≥30kg/m².

Adjusted for age, sex, race/ethnicity, education, household income, smoking pack-years, moderate-to-vigorous physical activity, hypertension, diabetes, cardiovascular disease, C-reactive protein, and hemoglobin (Model D in Table 3).

P for interaction by age = 0.189 for sarcopenia and 0.569 for sarcopenic obesity.