Supplemental Online Content

Zhang X, Ma N, Lin Q, et al. Body roundness index and all-cause mortality among US adults. *JAMA Netw Open*. 2024;7(6):e2415051.

doi:10.1001/jamanetworkopen.2024.15051

eTable 1. Overall Unweighted Response Rate for Household Interview and Medical Examination, NHANES 1999-2000 to 2017-2018

eTable 2. Estimated Mean Values of BRI by Sociodemographic Factors in US Adults From the NHANES, 1999 to 2018

eTable 3. Adjusted HR of All-Cause Mortality According to the Quintiles of BMI

eTable 4. Adjusted HR of All-Cause Mortality According to the Quintiles of BRI After Excluding Accidental Deaths

eTable 5. Adjusted HR of All-Cause Mortality According to the Quintiles of BRI After Excluding Deaths Within 2 Years After Survey

eTable 6. Adjusted HR of All-Cause Mortality According to the Quintiles of BRI After Reserving Those Reporting a History of Myocardial Infarction, Stroke, Congestive Heart Failure, or Cancer

eFigure 1. Trends of Mean BRI Values in US Adults From the NHANES, 1999 to 2018 **eFigure 2.** Trends of BRI by Socioeconomic Factors in US Adults From 1999 to 2018. **eFigure 3.** The Distribution Plot of In(-In(S(t))) Relative to In(t) for Assessing Cox Assumption of Body Roundness Index in Quintiles

eFigure 4. Adjusted HR of All-Cause Mortality by Sociodemographic Factors Comparing Quintile 1 and Quintile 5 with Quintile 3 of BRI in US Adults From the NHANES Linked Mortality Files, 1999 to 2018, in Fully Adjusted Model

eFigure 5. Adjusted HR of All-Cause Mortality by Sociodemographic Factors Comparing Quintile 1 With Quintile 3 of BRI in US Adults From the NHANES Linked Mortality Files, 1999 to 2018, After Adjusting For Only Age and Sex and in Partially Adjusted Model **eFigure 6.** Adjusted HR of All-Cause Mortality by Sociodemographic Factors Comparing Quintile 1 With Quintile 3 of BRI in US Adults From the NHANES Linked Mortality Files, 1999 to 2018, After Adjusting for Only Age and Sex and in Partially Adjusted Model **eFigure 7.** The Association Between Body Round Index and All-Cause Mortality Risk After Full Adjustment

This supplemental material has been provided by the authors to give readers additional information about their work.

Survey veero	Unweighted response rate for	Unweighted response rate for
Survey years	household interview	medical exam
1999-2000	76.62%	69.83%
2001-2002	69.83%	73.40%
2003-2004	72.87%	69.06%
2005-2006	74.44%	71.46%
2007-2008	73.76%	71.11%
2009-2010	73.76%	71.93%
2011-2012	67.97%	65.22%
2013-2014	66.35%	64.30%
2015-2016	64.30%	64.30%
2017-2018	48.24%	45.70%

eTable 1. Overall unweighted response rate for household interview and medical examination, NHANES 1999-2000 to 2017-2018 (2-year cycles).

Abbreviations: NHANES, National Health and Nutrition Examination Survey.

	BRI, weigh	BRI, weighted mean (95% CI)									
Subgroups	1999-2000	2001-2002	2003-2004	2005-2006	2007-2008	2009-2010	2011-2012	2013-2014	2015-2016	2017-2018	- P TOF
	(n = 2722)	(n = 3138)	(n = 2954)	(n = 3082)	(n = 3653)	(n = 3769)	(n = 3389)	(n = 3653)	(n = 3407)	(n = 3228)	trend
Age, yrs											
00.45	4.38 (4.18,	4.32 (4.19,	4.64 (4.49,	4.57 (4.34,	4.70 (4.53,	4.70 (4.52,	4.76 (4.53,	4.95 (4.74,	5.07 (4.84,	5.17 (4.88,	10 001
20-45	4.59)	4.45)	4.80)	4.80)	4.88)	4.87)	5.00)	5.15)	5.31)	5.46)	<0.001
45.05	5.28 (4.90,	5.14 (4.93,	5.23 (5.02,	5.43 (5.17,	5.47 (5.31,	5.36 (5.18,	5.60 (5.28,	5.66 (5.47,	5.77 (5.47,	5.87 (5.55,	0.001
45-65	5.66)	5.36)	5.45)	5.68)	5.63)	5.55)	5.91)	5.85)	6.07)	6.18)	0.001
205	5.61 (5.41,	5.56 (5.43,	5.72 (5.56,	5.66 (5.50,	5.66 (5.42,	5.95 (5.70,	5.82 (5.52,	5.88 (5.58,	6.12 (5.84,	6.03 (5.81,	0.005
200	5.81)	5.70)	5.88)	5.82)	5.89)	6.21)	6.12)	6.18)	6.41)	6.25)	0.005
Sex											
Female	4.97 (4.70,	4.84 (4.68,	5.09 (4.91,	5.10 (4.85,	5.27 (5.10,	5.30 (5.18,	5.47 (5.27,	5.62 (5.39,	5.81 (5.54,	5.86 (5.48,	<0.001
	5.24)	5.00)	5.27)	5.35)	5.44)	5.41)	5.67)	5.85)	6.09)	6.23)	
Male	4.64 (4.44,	4.64 (4.55,	4.83 (4.69,	4.89 (4.68,	4.89 (4.78,	4.87 (4.68,	4.95 (4.73,	5.01 (4.91,	5.10 (4.85,	5.22 (5.05,	<0.001
	4.84)	4.74)	4.96)	5.10)	5.01)	5.07)	5.16)	5.10)	5.36)	5.40)	
Race and Ethnicity											
	5.16 (4.98,	5.04 (3.43,	5.34 (4.16,	5.25 (4.52,	5.54 (5.46,	5.6 (5.03,	5.71 (5.11,	5.85 (2.98,	6.18 (6.00,	6.07 (5.05,	<0.001
Mexican American	5.33)	6.65)	6.52)	5.99)	5.62)	6.16)	6.31)	8.72)	6.35)	7.08)	<0.001
New Llienewie W/hite	4.74 (4.28,	4.71 (4.60,	4.89 (3.25,	4.96 (2.68,	5.03 (4.45,	5.02 (4.73,	5.14 (4.84,	5.30 (3.80,	5.42 (2.46,	5.54 (5.52,	-0.001
Non-Hispanic White	5.20)	4.82)	6.52)	7.23)	5.61)	5.30)	5.44)	6.80)	8.37)	5.56)	<0.001
New Hise anis Disels	4.92 (4.75,	4.76 (1.75,	5.34 (4.97,	5.20 (3.73,	5.29 (2.73,	5.42 (5.21,	5.57 (5.17,	5.55 (5.27,	5.54 (4.34,	5.67 (4.91,	0.004
Non-Hispanic Black	5.09)	7.77)	5.70)	6.67)	7.86)	5.63)	5.98)	5.83)	6.73)	6.43)	0.004
	4.87 (3.95,	4.71 (3.52,	4.73 (1.74,	4.79 (3.47,	4.86 (3.87,	4.77 (4.64,	4.94 (4.82,	4.81 (4.80,	5.18 (2.01,	5.19 (5.06,	0.00
Other race [®]	5.79)	5.91)	7.72)	6.11)	5.85)	4.90)	5.06)	4.83)	8.34)	5.32)	0.03
Education											
Less then Otherwoods	5.22 (4.56,	5.38 (2.47,	5.38 (4.43,	5.39 (4.83,	5.59 (0.83,	5.74 (5.32,	5.87 (5.53,	5.88 (4.36,	6.00 (4.40,	5.96 (4.65,	-0.001
Less than 9th grade	5.89)	8.30)	6.33)	5.95)	10.35)	6.16)	6.21)	7.39)	7.60)	7.28)	<0.001
0 11th grada	5.29 (4.5,	4.83 (2.83,	5.22 (2.11,	5.26 (2.74,	5.33 (3.64,	5.48 (5.31,	5.55 (4.80,	5.52 (3.02,	5.81 (5.77,	5.56 (0.43,	0.002
9- min grade	6.09)	6.82)	8.34)	7.77)	7.01)	5.65)	6.31)	8.03)	5.86)	10.69)	0.002

eTable 2. Estimated Mean Values of BRI by Sociodemographic Factors in US Adults From the NHANES, 1999 to 2018.^a

© 2024 Zhang X et al. JAMA Network Open.

High school	5.01 (5.00,	4.88 (4.87,	5.27 (4.13,	5.25 (2.74,	5.34 (4.05,	5.29 (5.07,	5.63 (5.53,	5.53 (3.47,	5.68 (2.58,	5.85 (3.81,	0.001
graduate	5.02)	4.90)	6.41)	7.76)	6.64)	5.51)	5.73)	7.58)	8.78)	7.89)	0.001
	4.77 (4.46,	4.76 (4.16,	4.95 (4.48,	5.03 (4.51,	5.08 (4.99,	5.12 (4.97,	5.23 (4.78,	5.60 (5.00,	5.66 (4.56,	5.74 (5.71,	-0.001
Some college	5.09)	5.36)	5.42)	5.56)	5.17)	5.26)	5.69)	6.20)	6.76)	5.78)	<0.001
College graduate or	4.20 (3.85,	4.42 (3.89,	4.49 (2.65,	4.55 (2.05,	4.62 (3.46,	4.61 (4.45,	4.70 (4.61,	4.72 (4.56,	4.98 (1.73,	5.05 (3.28,	-0.001
above	4.56)	4.95)	6.33)	7.04)	5.79)	4.77)	4.80)	4.88)	8.22)	6.81)	<0.001
Poverty impact ratio											
-1	5.10 (4.84,	4.92 (4.66,	5.19 (4.81,	5.11 (4.79,	5.21 (4.91,	5.22 (4.92,	5.22 (4.82,	5.50 (5.17,	5.78 (5.48,	5.77 (5.27,	-0.001
<	5.35)	5.19)	5.58)	5.42)	5.51)	5.51)	5.63)	5.82)	6.08)	6.27)	<0.001
>1	4.76 (4.55,	4.72 (4.62,	4.93 (4.81,	4.98 (4.77,	5.07 (4.95,	5.06 (4.93,	5.20 (4.99,	5.28 (5.13,	5.42 (5.17,	5.51 (5.29,	-0.001
21	4.97)	4.81)	5.05)	5.19)	5.19)	5.20)	5.41)	5.43)	5.66)	5.73)	<0.001
Cigarette smoking											
Vaa	4.86 (4.63,	4.74 (4.65,	4.98 (4.81,	4.93 (4.67,	5.09 (4.98,	5.08 (4.94,	5.26 (5.09,	5.41 (5.24,	5.64 (5.32,	5.72 (5.43,	-0.001
165	5.09)	4.84)	5.15)	5.20)	5.19)	5.21)	5.42)	5.58)	5.95)	6.01)	<0.001
No	4.75 (4.49,	4.74 (4.58,	4.95 (4.73,	5.05 (4.84,	5.08 (4.90,	5.09 (4.90,	5.17 (4.93,	5.24 (4.99,	5.34 (5.10,	5.42 (5.21,	-0.001
INO	5.01)	4.89)	5.16)	5.26)	5.27)	5.28)	5.41)	5.50)	5.58)	5.63)	<0.001
Alcohol drinking											
Vaa	4.67 (4.44,	4.56 (4.48,	4.80 (4.66,	4.85 (4.61,	4.93 (4.79,	4.95 (4.82,	5.10 (4.89,	5.21 (5.06,	5.34 (5.09,	5.55 (5.32,	~0.001
ies	4.90)	4.65)	4.93)	5.08)	5.06)	5.08)	5.31)	5.36)	5.6)	5.78)	<0.001
No	5.17 (4.92,	5.24 (4.94,	5.43 (5.18,	5.45 (5.13,	5.59 (5.41,	5.63 (5.43,	5.67 (5.49,	5.68 (5.35,	5.87 (5.60,	5.47 (4.88,	0.002
NO	5.42)	5.55)	5.67)	5.76)	5.77)	5.82)	5.84)	6.02)	6.14)	6.06)	0.002
Family history of CVD											
Voc	4.86 (4.74,	5.01 (3.70,	5.24 (5.12,	5.36 (4.98,	5.47 (5.01,	5.59 (5.22,	5.76 (5.38,	5.78 (3.14,	6.29 (3.44,	6.25 (4.38,	~0.001
ies	4.98)	6.32)	5.35)	5.73)	5.93)	5.96)	6.15)	8.41)	9.13)	8.13)	<0.001
No	4.80 (4.51,	4.71 (4.45,	4.93 (4.37,	4.93 (2.69,	5.03 (4.91,	5.02 (4.99,	5.13 (5.11,	5.25 (4.78,	5.35 (2.67,	5.45 (5.42,	~0.001
NO	5.09)	4.97)	5.49)	7.17)	5.16)	5.06)	5.15)	5.72)	8.03)	5.47)	<0.001
Family history of											
diabetes											
Ves	5.09 (4.78,	4.97 (4.83,	5.22 (5.05,	5.46 (5.19,	5.58 (5.43,	5.49 (5.36,	5.76 (5.55,	5.89 (5.61,	6.08 (5.82,	5.92 (5.56,	<0.001
163	5.41)	5.12)	5.40)	5.74)	5.74)	5.62)	5.96)	6.16)	6.34)	6.27)	\U.UU

© 2024 Zhang X et al. JAMA Network Open.

No	4.53 (4.32,	4.51 (4.40,	4.69 (4.53,	4.68 (4.52,	4.78 (4.61,	4.86 (4.68,	4.91 (4.71,	4.97 (4.84,	5.04 (4.82,	5.25 (5.05,	~0.001
NO	4.75)	4.61)	4.85)	4.85)	4.96)	5.03)	5.11)	5.10)	5.26)	5.44)	<0.001

Abbreviations: NHANES, National Health and Nutrition Examination Survey; BRI, body roundness index; 95% CI, 95% confidence interval; CVD: cardiovascular disease.

^a Nationally representative estimates of the nonpregnant US population aged 20 years or more. Estimates were nationally representative through the use of survey weights.

^b P value for trend was calculated using the Mann-Kendall trend test within each subgroup.

^c Other race included non-Hispanic Asian, American Indian or Alaska Native, and Native Hawaiian or Pacifc Islander.

eTable 3. Adjusted HR of All-Cause Mortality According to the Quintiles (Q1 to Q5) of BMI.^a

Waibull Pagragaian Madal	HR (95% CI)							
weibuli Regression model	Q1	Q2	Q3	Q4	Q5			
Range (13.18 to 82.10)	13.18 to <23.40	23.40 to <26.39	26.40 to <29.30	29.31 to <33.50	≥33.51			
Without adjustment	0.92 (0.80, 1.10)	0.91 (0.79, 1.04)	1 [Ref]	1.10 (0.95, 1.27)	1.10 (0.93, 1.22)			
Adjusted only for age and sex	1.46 (1.28, 1.66)***	1.05 (0.92, 1.19)	1 [Ref]	1.16 (1.02, 1.33) [*]	1.34 (1.17, 1.53)***			
Partially adjusted ^b	1.47 (1.29, 1.68)***	1.07 (0.94, 1.21)	1 [Ref]	1.15 (1.00, 1.31)*	1.33 (1.16, 1.53)***			
Fully adjusted ^c	1.44 (1.26, 1.64)***	1.06 (0.93, 1.20)	1 [Ref]	1.14 (0.99, 1.30)	1.31 (1.14, 1.51)***			

Abbreviations: HR, hazard ratio; 95% CI, 95% confidence interval; BMI, body mass index; Ref, reference.

^a Data on US adults 20 years or older from the National Health and Nutrition Examination Survey Linked Mortality Files, 1999 to 2018. There were 3452 all-cause deaths in 32995 participants (329393 total person-years).

^b Adjusted for age, sex, race/ethnicity, education, and income.

^c Adjusted for age, sex, race/ethnicity, education, income, smoking, drinking, family history of cardiovascular disease, and family history of diabetes.

eTable 4. Adjusted HR of All-Cause Mortality According to the Quintiles (Q1 to Q5) of BRI After Excluding Accidental Deaths.^a

Weibull Pegraecian Model	HR (95% CI)							
Weibuli Kegression model	Q1	Q2	Q3	Q4	Q5			
Without adjustment	0.56 (0.47, 0.67)***	0.81 (0.69, 0.96)*	1 [Ref]	1.48 (1.29, 1.70)***	1.66 (1.44, 1.92)***			
Adjusted only for age and sex	1.22 (1.03, 1.47)*	1.12 (0.96, 1.30)	1 [Ref]	1.30 (1.13, 1.50)***	1.61 (1.40, 1.88)***			
Partially adjusted ^b	1.25 (1.04, 1.49)*	1.13 (0.98, 1.32)	1 [Ref]	1.26 (1.09, 1.46)**	1.56 (1.35, 1.81)***			
Fully adjusted ^c	1.23 (1.03, 1.47)*	1.13 (0.97, 1.32)	1 [Ref]	1.25 (1.08, 1.44)**	1.53 (1.33, 1.77)***			

Abbreviations: HR, hazard ratio; 95% CI, 95% confidence interval; BRI, body roundness index; Ref, reference.

^a Data on US adults 20 years or older from the National Health and Nutrition Examination Survey Linked Mortality Files, 1999 to 2018. After excluding accidental deaths, there were 3317 all-cause deaths in 32860 participants (328285 total person-years).

^b Adjusted for age, sex, race/ethnicity, education and income.

^c Adjusted for age, sex, race/ethnicity, education, income, smoking, drinking, family history of cardiovascular disease and family history of diabetes.

eTable 5. Adjusted HR of All-Cause Mortality According to the Quintiles (Q1 to Q5) of BRI After Excluding Deaths within 2 years after Survey.^a

Weihull Pegrossion Model	HR (95% CI)							
Weibuli Kegression Model	Q1	Q2	Q3	Q4	Q5			
Without adjustment	0.55 (0.47, 0.66)***	0.81 (0.68, 0.95)*	1 [Ref]	1.47 (1.29, 1.69)***	1.64 (1.43, 1.88)***			
Adjusted only for age and sex	1.20 (1.01, 1.43)*	1.11 (0.94, 1.29)	1 [Ref]	1.30 (1.12, 1.50)***	1.59 (1.39, 1.84)***			
Partially adjusted ^b	1.25 (1.05, 1.49)*	1.13 (0.97, 1.33)	1 [Ref]	1.24 (1.07, 1.44)**	1.53 (1.32, 1.76)***			
Fully adjusted ^c	1.23 (1.03, 1.47)*	1.13 (0.97, 1.32)	1 [Ref]	1.23 (1.06, 1.42)**	1.50 (1.31, 1.73)***			

Abbreviations: HR, hazard ratio; 95% CI, 95% confidence interval; BRI, body roundness index; Ref, reference.

^a Data on US adults 20 years or older from the National Health and Nutrition Examination Survey Linked Mortality Files, 1999 to 2018. After excluding deaths within 2 years after survey, there were

3107 all-cause deaths in 32650 participants (329002 total person-years).

^bAdjusted for age, sex, race/ethnicity, education and income.

^c Adjusted for age, sex, race/ethnicity, education, income, smoking, drinking, family history of cardiovascular disease and family history of diabetes.

eTable 6. Adjusted HR of All-Cause Mortality According to the Quintiles (Q1 to Q5) of BRI After reserving those reporting a history of myocardial infarction, stroke, congestive heart failure, or cancer.^a

Weibull Pagrossion Model	HR (95% CI)							
Weibuli Regression model	Q1	Q2	Q3	Q4	Q5			
Without adjustment	0.53 (0.47, 0.60)***	0.76 (0.67, 0.86)***	1 [Ref]	1.38 (1.25, 1.53)***	1.53 (1.38, 1.70)***			
Adjusted only for age and sex	1.19 (1.05, 1.34)***	1.02 (0.91, 1.15)	1 [Ref]	1.26 (1.14, 1.40)***	1.50 (1.34, 1.66)***			
Partially adjusted ^b	1.24 (1.10, 1.40)***	1.06 (0.94, 1.18)	1 [Ref]	1.22 (1.10, 1.36)***	1.43 (1.29, 1.60)***			
Fully adjusted ^c	1.22 (1.09, 1.37)***	1.07 (0.95, 1.20)	1 [Ref]	1.21 (1.09, 1.35)***	1.40 (1.26, 1.56)***			

Abbreviations: HR, hazard ratio; 95% CI, 95% confidence interval; BRI, body roundness index; Ref, reference.

^a Data on US adults 20 years or older from the National Health and Nutrition Examination Survey Linked Mortality Files, 1999 to 2018. After excluding accidental deaths, there were 5905 allcause deaths in 39509 participants (380787 total person-years).

^b Adjusted for age, sex, race/ethnicity, education and income.

° Adjusted for age, sex, race/ethnicity, education, income, smoking, drinking, family history of cardiovascular disease and family history of diabetes.

eFigure 1. Trends of Mean BRI Values in US Adults From the NHANES, 1999 to 2018.^a



Abbreviations: BRI, body roundness index; NHANES, National Health and Nutrition Examination Survey; 95% CI, 95% confidence interval.

^a Nationally representative estimates of the nonpregnant US population aged 20 years or more. Estimates were nationally representative through the use of survey weights.

Solid circle stands for mean BRI value of each NHANES cycle, and the upper and lower vertical extremes of each circles represents the corresponding 95% CI.

The y-axis does not necessarily start at 0 for clearer visualization of trends.



eFigure 2. Trends of BRI by Socioeconomic Factors in US Adults From 1999 to 2018.

Abbreviations: BRI, body roundness index; PIR: poverty impact ratio; FCVD, family history of cardiovascular disease; FDM, family history of diabetes. ^a Nationally representative estimates of the nonpregnant US population aged 20 years or more. Estimates were nationally representative through the use of survey weights. The y-axis does not necessarily start at 0 for clearer visualization of trends. Solid circle stands for mean BRI value of each NHANES cycle. eFigure 3. The distribution plot of ln(-ln(S(t))) relative to ln(t) for assessing Cox assumption of body roundness index (BRI) in quintiles.



eFigure 4. Adjusted HR of All-Cause Mortality by Sociodemographic Factors Comparing Quintile 1 (Q1) (Left Panel) and Quintile 5 (Q5) (Right Panel) with Quintile 3 (Q3) of BRI in US Adults from the NHANES Linked Mortality Files, 1999 to 2018, in Fully Adjusted Model.^a

Subgroup	Sample size	HR (95% CI)	Subgroup	Sample size	HR (95% CI)
Age, yrs			Age, yrs		
20-45	4738	0.71 (0.46 to 1.10)	20-45	2510	1.58 (1.05 to 2.38)
45-65	1395	1.41 (1.04 to 1.90)	45-65	2645	1.94 (1.52 to 2.48)
≥65	466	1.51 (1.22 to 1.86)	≥65	1444	1.28 (1.08 to 1.51)
Sex			Sex	1	
Female	3085 🛏 📥	0.97 (0.76 to 1.24)	Female	4301 H	1.18 (0.96 to 1.44)
Male	3514	1.41 (1.13 to 1.77)	Male	2298	1.92 (1.58 to 2.33)
Race and Ethnicity			Race and Ethnicity		
Mexican American	606		Mexican American	1421	1.43 (1.30 to 1.58)
Non-Hispanic White	3167	1.25 (0.86 to 1.81)	Non-Hispanic White	2699 🍽	1.48 (1.39 to 1.57)
Non-Hispanic Black	1585	1.06 (0.62 to 1.81)	Non-Hispanic Black	1613	1.09 (1.07 to 1.11)
Other race	1241	0.91 (0.39 to 2.11)	Other race	866	→2.21 (0.73 to 6.68)
Education			Education		
Less than 9th grade	289	→1.85 (0.76 to 4.53)	Less than 9th grade	840	1.58 (1.08 to 2.33)
9-11th grade	837	1.12 (0.73 to 1.72)	9-11th grade	1046	1.33 (1.06 to 1.67)
High school graduate	1438	→1.50 (0.51 to 4.41)	High school graduate	1682	1.53 (0.98 to 2.40)
Some college	2029 H	1.14 (0.65 to 2.00)	Some college	2017 	1.76 (1.46 to 2.11)
College graduate or abo	ve 2006	0.94 (0.64 to 1.37)	College graduate or abo	ve 1014	1.24 (0.93 to 1.65)
Poverty impact ratio			Poverty impact ratio		
<1	1334	0.96 (0.72 to 1.29)	<1	1514	1.21 (0.92 to 1.60)
≥1	5265	1.28 (1.06 to 1.54)	≥1	5085	1.55 (1.34 to 1.78)
Smoking			Smoking		
Yes	2847	1.26 (1.03 to 1.54)	Yes	2849	1.63 (1.39 to 1.92)
No	3752	1.17 (0.87 to 1.58)	No	3750 H	1.36 (1.07 to 1.73)
Drinking			Drinking		
Yes	5208	1.23 (1.01 to 1.50)	Yes	4411	1.56 (1.34 to 1.81)
No	1391	1.13 (0.83 to 1.55)	No	2188	1.35 (1.04 to 1.76)
Family history of CVD			Family history of CVD		
Yes	566 🗕 🔶		Yes	963	1.38 (0.97 to 1.96)
No	6033 	1.23 (0.97 to 1.57)	No	5636 	1.53 (1.29 to 1.81)
Family history of diabet	es		Family history of diabet	es	
Yes	2248 4	1.21 (0.95 to 1.55)	Yes	3645	1.62 (1.33 to 1.96)
No	4351	1.23 (1.00 to 1.51)	No	2954	1.42 (1.20 to 1.68)
	0.0 1.0 2.0 Lower risk Higher	3.0 _isk		0.0 1.0 2.0 Lover risk Higtor	3.0 zisk

Abbreviations: BRI, body roundness index; NHANES, National Health and Nutrition Examination Survey; HR, hazard ratio; 95% CI, 95% confidence interval; CVD, cardiovascular disease. ^a Estimates were nationally representative through the use of survey weights. HR and 95% CI were calculated after adjusting for age, sex, race/ethnicity, education, income, smoking, drinking, family history of

cardiovascular disease, and family history of diabetes under the Weibull regression model.

^b Other race included non-Hispanic Asian, American Indian or Alaska Native, and Native Hawaiian or Pacifc Islander.

eFigure 5. Adjusted HR of All-Cause Mortality by Sociodemographic Factors Comparing Quintile 1 (Q1) With Quintile 3 (Q3) of BRI in US Adults From the NHANES Linked Mortality Files, 1999 to 2018, After Adjusting For Only Age and Sex (Left Panel),^a and in Partially Adjusted Model (Right Panel).^b

Subgroup	Sample size	1	HR (95% CI)	Subgroup	Sample size	!	HR (95% CI)
Age, yrs				Age, yrs			
20-45	4738 🛏 🗕	<u> </u>	0.69 (0.45 to 1.06)	20-45	4738	⊢ ●	0.71 (0.46 to 1.09)
45-65	1395	·•	1.43 (1.06 to 1.93)	45-65	1395	·•	1.45 (1.07 to 1.96)
≥65	466	¦ ⊢-●	1.49 (1.20 to 1.85)	≥65	466	¦ ⊢-●'	1.53 (1.23 to 1.89)
Sex				Sex			
Female	3085 F	_ ●¦ i	0.92 (0.72 to 1.18)	Female	3085	⊢	0.99 (0.78 to 1.27)
Male	3514	⊢ ●−−−1	1.51 (1.22 to 1.88)	Male	3514	⊢ ●−−1	1.42 (1.14 to 1.77)
Race and Ethnicity				Race and Ethnicity			
Mexican American	606 H	•		Mexican American	606 -	•	→0.91 (0.16 to 5.13)
Non-Hispanic White	3167	⊢	1.22 (0.83 to 1.78)	Non-Hispanic White	3167	⊢∔ ● − − − − 1	1.27 (0.86 to 1.87)
Non-Hispanic Black	1585 -		1.20 (0.65 to 2.20)	Non-Hispanic Black	1585	⊢ <u> </u> ●	1.11 (0.61 to 2.00)
Other race	1241	• <u>'</u>	0.87 (0.42 to 1.79)	Other race	1241	⊢ ● ¦	0.89 (0.41 to 1.92)
Education				Education			
Less than 9th grade	289	• • • • • • • • • • • • • • • • • • •	►2.03 (1.20 to 3.46)	Less than 9th grade	289	•	→1.83 (0.97 to 3.42)
9-11th grade	837	· · · · · · · · · · · · · · · · · · ·	1.21 (0.78 to 1.87)	9-11th grade	837	⊢	1.13 (0.67 to 1.90)
High school graduate	1438	•	►1.57 (0.54 to 4.62)	High school graduate	1438	• · · · · •	→1.54 (0.54 to 4.41)
Some college	2029 —	•	1.18 (0.59 to 2.37)	Some college	2029	· · · · · · · · · · · · · · · · · · ·	1.17 (0.64 to 2.15)
College graduate or abo	ove 2006 -	-••¦+	0.94 (0.66 to 1.33)	College graduate or abo	ove 2006		0.93 (0.67 to 1.29)
Poverty impact ratio				Poverty impact ratio		1	
<1	1334	\	1.01 (0.75 to 1.37)	<1	1334	⊢ •	0.96 (0.71 to 1.31)
≥1	5265		1.25 (1.04 to 1.51)	≥1	5265	⊢ ●1	1.29 (1.08 to 1.56)
Smoking				Smoking			
Yes	2847	⊢ ●i	1.27 (1.04 to 1.56)	Yes	2847	⊢	1.24 (1.02 to 1.52)
No	3752	⊢ <u></u>	1.09 (0.81 to 1.47)	No	3752	⊢ <mark>¦ ●</mark> 1	1.15 (0.85 to 1.56)
Drinking				Drinking			
Yes	5208	¦ ⊢ ●−−1	1.25 (1.03 to 1.52)	Yes	5208	• •••	1.23 (1.01 to 1.49)
No	1391		1.11 (0.82 to 1.49)	No	1391	⊢	1.17 (0.86 to 1.59)
Family history of CVD				Family history of CVD			
Yes	566		►1.05 (0.27 to 4.05)	Yes	566 .		→1.08 (0.30 to 3.96)
No	6033	¦ ●I	1.24 (0.97 to 1.58)	No	6033	i <mark>.</mark>	1.25 (0.97 to 1.61)
Family history of diabet	tes			Family history of diabet	les		
Yes	2248	⊢ ●i	1.17 (0.92 to 1.49)	Yes	2248	⊢	1.24 (0.97 to 1.57)
No	4351	⊢−● −−1	1.26 (1.02 to 1.56)	No	4351	⊢ ●i	1.25 (1.01 to 1.54)
	ə.c	1.0 2.0	3.0		3.0	1.0 2.0	3.0
	Lower risk		er risk		Lower	risk High	er risk

Abbreviations: BRI, body roundness index; NHANES, National Health and Nutrition Examination Survey; HR, hazard ratio; 95% CI, 95% confidence interval; CVD, cardiovascular disease.

^a Estimates were nationally representative through the use of survey weights. HR and 95% CI were calculated after adjusting for age and sex under the Weibull regression model.

^b Estimates were nationally representative through the use of survey weights. HR and 95% CI were calculated after adjusting for age, sex, race/ethnicity, education, and income under the Weibull regression model. ^c Other race included non-Hispanic Asian, American Indian or Alaska Native, and Native Hawaiian or Pacifc Islander.

eFigure 6. Adjusted HR of All-Cause Mortality by Sociodemographic Factors Comparing Quintile 1 (Q5) With Quintile 3 (Q3) of BRI in US Adults From the NHANES Linked Mortality Files, 1999 to 2018, After Adjusting For Only Age and Sex (Left Panel),^a and in Partially Adjusted Model (Right Panel).^b

	/00 OL/
Age, yrs	
20-45 2510 1.75 (1.16 to 2.63) 20-45 2510 1.57	(1.04 to 2.37)
45-65 2645 2.07 (1.63 to 2.63) 45-65 2645 1.96	(1.54 to 2.50)
≥65 1444 → 1.33 (1.12 to 1.57) ≥65 1444 → 1.29	(1.09 to 1.53)
Sex Sex	
Female 4301 1.23 (1.00 to 1.52) Female 4301 1.19	(0.97 to 1.46)
Male 2298 2.03 (1.68 to 2.46) Male 2298 1.96	(1.62 to 2.38)
Race and Ethnicity Race and Ethnicity	
Mexican American 1421 • 1.46 (1.39 to 1.52) Mexican American 1421 • 1.45	(1.35 to 1.55)
Non-Hispanic White 2699 1.59 (1.41 to 1.81) Non-Hispanic White 2699 1.50	(1.42 to 1.59)
Non-Hispanic Black 1613 1.17 (1.04 to 1.33) Non-Hispanic Black 1613 1.12	(1.00 to 1.24)
Other race 866 2.17 (0.86 to 5.43) Other race 866 2.16	(0.84 to 5.59)
Education Education	
Less than 9th grade 840 1.56 (1.17 to 2.08) Less than 9th grade 840 1.64	(1.18 to 2.29)
9-11th grade 1046 1.35 (1.05 to 1.75) 9-11th grade 1046 1.30	(1.01 to 1.68)
High school graduate 1682 1.58 (1.02 to 2.44) High school graduate 1682 1.55	(0.98 to 2.46)
Some college 2017 Image: 1.76 (1.66 to 1.87) Some college 2017 Image: 1.77	(1.65 to 1.91)
College graduate or above 1014 1.29 (0.97 to 1.73) College graduate or above 1014 1.28	(0.98 to 1.67)
Poverty impact ratio Poverty impact ratio	
<1 1514 1.18 (0.90 to 1.55) <1 1514 1.20	(0.91 to 1.58)
≥1 5085 · · · 1.64 (1.42 to 1.89) ≥1 5085 · · · 1.58	(1.37 to 1.82)
Smoking Smoking	
Yes 2849 1.71 (1.45 to 2.01) Yes 2849 1.65	(1.40 to 1.94)
No 3750 1.42 (1.11 to 1.80) No 3750 1.37	(1.08 to 1.74)
Drinking Drinking	
Yes 4411 1.68 (1.45 to 1.96) Yes 4411 1.58	(1.35 to 1.84)
No 2188 1.37 (1.05 to 1.79) No 2188 1.38	(1.06 to 1.80)
Family history of CVD Family history of CVD	
Yes 963 1.46 (0.87 to 2.45) Yes 963 1.41	(1.02 to 1.94)
No 5636 - 1.60 (1.35 to 1.90) No 5636 - 1.54	(1.34 to 1.77)
Family history of diabetes Family history of diabetes	
Yes 3645 - 1.61 (1.32 to 1.97) Yes 3645 - 1.62	(1.34 to 1.96)
No 2954 - 1.53 (1.29 to 1.81) No 2954 - 1.44	(1.21 to 1.71)
Lower risk fligher risk lower risk lower risk	

Abbreviations: BRI, body roundness index; NHANES, National Health and Nutrition Examination Survey; HR, hazard ratio; 95% CI, 95% confidence interval; CVD, cardiovascular disease.

^a Estimates were nationally representative through the use of survey weights. HR and 95% CI were calculated after adjusting for age and sex under the Weibull regression model.

^b Estimates were nationally representative through the use of survey weights. HR and 95% CI were calculated after adjusting for age, sex, race/ethnicity, education, and income under the Weibull regression model. ^c Other race included non-Hispanic Asian, American Indian or Alaska Native, and Native Hawaiian or Pacifc Islander. **eFigure 7**. The relationship between body mass index and all-cause mortality risk after full adjustment.



The relationship between BMI and all-cause mortality risk

The solid curve line represents the effect-size estimates for the association of BMI with all-cause mortality, and the light shadow represents the 95% confidence interval.