

Table S1 Characteristic distribution of participants in NHANES 2011-2018, weighted (population size represented N=144,907,159) (supplement for Table 1)

variables	All	Normal Weight		Overweight		Obese grade 1		Obese grade 2		P-value
		Normal visceral fat	Visceral obesity	Normal visceral fat	Visceral obesity	Normal visceral fat	Visceral obesity	Normal visceral fat	Visceral obesity	
Family income Ratio	2.88 (2.76 ,3.00)	2.93 (2.75 ,3.12)	3.08 (2.59 ,3.57)	2.90 (2.71 ,3.08)	3.09 (2.90 ,3.29)	2.75 (2.49 ,3.02)	2.91 (2.74 ,3.08)	2.13 (1.86 ,2.39)	2.71 (2.52 ,2.90)	<0.0001
Systolic blood pressure (mmHg)	118.33 (117.74 ,118.93)	112.84 (112.11 ,113.58)	123.94 (119.35 ,128.53)	115.90 (114.72 ,117.09)	120.43 (119.23 ,121.64)	118.05 (116.47 ,119.63)	122.97 (121.69 ,124.24)	120.06 (117.36 ,122.77)	125.34 (123.86 ,126.81)	<0.0001
Diastolic blood pressure(mmHg)	70.85 (70.33 ,71.36)	67.02 (66.46 ,67.58)	75.28 (71.58 ,78.99)	68.41 (67.44 ,69.37)	73.80 (72.91 ,74.68)	68.83 (67.33 ,70.34)	74.68 (73.59 ,75.76)	71.07 (68.89 ,73.25)	75.07 (73.88 ,76.27)	<0.0001
Race(%)										<0.0001
Mexican American	10.07 (8.05 ,12.51)	6.45 (4.98 ,8.32)	7.56 (3.91 ,14.12)	9.69 (7.07 ,13.14)	12.60 (9.84 ,15.99)	12.10 (7.09 ,19.89)	13.83 (10.48 ,18.04)	6.44 (2.60 ,15.06)	12.14 (9.46 ,15.46)	

Other Hispanic	7.19 (5.72 ,9.01)	6.85 (5.09 ,9.15)	4.93 (1.85 ,12.48)	6.66 (4.91 ,8.96)	8.63 (6.44 ,11.47)	9.05 (5.41 ,14.76)	8.00 (5.95 ,10.67)	6.65 (3.24 ,13.17)	5.82 (4.28 ,7.86)	
Non-Hispanic White	61.49 (57.48 ,65.35)	62.83 (58.30 ,67.15)	68.07 (57.35 ,77.16)	59.23 (53.84 ,64.41)	64.31 (59.08 ,69.22)	47.77 (38.75 ,56.93)	65.11 (58.71 ,71.00)	29.10 (19.43 ,41.12)	64.90 (59.66 ,69.79)	
Non-Hispanic Black	11.72 (9.72 ,14.05)	9.98 (7.96 ,12.46)	4.69 (2.50 ,8.62)	16.12 (13.43 ,19.23)	3.91 (2.90 ,5.27)	25.07 (18.36 ,33.25)	6.98 (5.38 ,9.00)	50.57 (39.30 ,61.79)	12.70 (9.83 ,16.25)	
Other Race	9.53 (8.33 ,10.89)	13.89 (11.96 ,16.07)	14.75 (9.63 ,21.92)	8.30 (6.45 ,10.62)	10.55 (7.97 ,13.84)	6.01 (3.75 ,9.49)	6.09 (3.96 ,9.25)	7.24 (3.17 ,15.67)	4.44 (3.04 ,6.44)	
Education level(%)										<0.0001
Less than 9th grade	3.95 (3.12 ,4.99)	2.67 (1.83 ,3.88)	3.51 (1.51 ,7.91)	3.37 (2.03 ,5.56)	6.18 (4.69 ,8.11)	1.51 (0.60 ,3.77)	6.03 (4.14 ,8.70)	2.61 (0.78 ,8.43)	4.11 (2.77 ,6.07)	
9-11th grade	9.39 (7.97 ,11.04)	8.88 (6.55 ,11.92)	8.60 (4.65 ,15.38)	6.59 (4.88 ,8.83)	10.91 (7.79 ,15.07)	9.48 (6.58 ,13.48)	11.99 (8.89 ,15.99)	4.74 (1.30 ,15.88)	9.32 (7.10 ,12.14)	
High school graduate	21.17 (18.96 ,23.56)	19.99 (16.71 ,23.72)	21.64 (11.76 ,36.41)	21.48 (17.38 ,26.23)	20.72 (16.62 ,25.53)	24.57 (18.47 ,31.89)	22.21 (18.34 ,26.63)	27.94 (19.76 ,37.90)	20.78 (16.99 ,25.17)	

Some college or AA degree	32.66 (30.39 ,35.02)	28.33 (24.59 ,32.40)	33.09 (20.62 ,48.48)	30.50 (26.40 ,34.94)	31.38 (27.26 ,35.81)	34.48 (27.70 ,41.96)	33.92 (29.27 ,38.89)	47.82 (38.00 ,57.82)	40.01 (35.06 ,45.18)	
College graduate or above	32.82 (29.60 ,36.21)	40.13 (35.12 ,45.36)	33.16 (21.38 ,47.51)	38.06 (33.31 ,43.04)	30.81 (25.54 ,36.62)	29.95 (23.58 ,37.19)	25.86 (21.69 ,30.52)	16.88 (10.72 ,25.56)	25.77 (20.62 ,31.69)	
Marital status(%)										<0.0001
Married	51.69 (48.73 ,54.64)	45.40 (40.74 ,50.14)	59.08 (45.21 ,71.63)	48.83 (44.30 ,53.37)	60.56 (54.58 ,66.23)	43.18 (34.43 ,52.37)	57.90 (52.10 ,63.49)	31.26 (21.99 ,42.32)	56.72 (51.44 ,61.84)	
Widowed	1.20 (0.94 ,1.53)	1.05 (0.56 ,1.94)	1.07 (0.23 ,4.86)	0.44 (0.21 ,0.92)	2.83 (1.29 ,6.10)	0.71 (0.24 ,2.07)	1.42 (0.67 ,2.98)	0.62 (0.08 ,4.73)	0.83 (0.49 ,1.41)	
Divorced	8.98 (7.79 ,10.33)	6.31 (4.61 ,8.59)	9.98 (5.00 ,18.94)	8.15 (5.83 ,11.28)	11.99 (8.99 ,15.82)	5.67 (2.93 ,10.68)	12.67 (9.14 ,17.30)	7.69 (3.59 ,15.69)	9.63 (6.78 ,13.50)	
Separated	2.47 (1.95 ,3.13)	2.72 (1.82 ,4.04)	1.60 (0.53 ,4.69)	1.66 (0.96 ,2.84)	2.71 (1.72 ,4.26)	1.87 (0.70 ,4.89)	2.56 (1.54 ,4.23)	2.71 (0.90 ,7.86)	3.16 (1.89 ,5.25)	
Never married	25.02 (22.89 ,27.29)	34.03 (30.53 ,37.71)	19.52 (10.11 ,34.34)	27.15 (23.14 ,31.56)	12.21 (9.27 ,15.92)	32.76 (26.21 ,40.05)	17.75 (14.05 ,22.19)	45.03 (34.79 ,55.70)	19.96 (15.86 ,24.80)	
Living with partner	10.64 (9.32 ,12.12)	10.49 (8.13 ,13.44)	8.76 (4.33 ,16.90)	13.78 (10.59 ,17.74)	9.69 (7.34 ,12.69)	15.81 (10.26 ,23.58)	7.69 (5.69 ,10.32)	12.69 (6.82 ,22.40)	9.70 (7.60 ,12.30)	

Leisure time Physical activity (%)										<0.0001
inactive	41.32 (38.98 ,43.70)	33.22 (29.39 ,37.28)	44.44 (32.95 ,56.56)	30.98 (27.16 ,35.09)	47.72 (42.45 ,53.04)	38.16 (31.23 ,45.61)	51.62 (46.38 ,56.81)	41.59 (32.91 ,50.83)	52.74 (48.38 ,57.06)	
Less active	17.97 (16.47 ,19.58)	17.29 (14.76 ,20.15)	26.12 (16.05 ,39.53)	16.88 (13.81 ,20.47)	19.24 (15.83 ,23.17)	13.10 (8.73 ,19.18)	18.79 (15.28 ,22.89)	11.12 (6.94 ,17.35)	19.83 (16.02 ,24.28)	
active	40.67 (38.54 ,42.83)	49.41 (44.97 ,53.87)	29.44 (20.01 ,41.02)	52.09 (48.29 ,55.86)	33.04 (28.36 ,38.09)	48.75 (41.67 ,55.88)	29.60 (25.29 ,34.30)	47.29 (37.48 ,57.32)	27.36 (23.12 ,32.04)	
Smoking(%)										<0.0001
None-smoker	59.36 (57.03 ,61.65)	62.56 (58.32 ,66.62)	43.47 (32.29 ,55.35)	62.44 (58.34 ,66.37)	50.10 (46.08 ,54.11)	62.88 (55.42 ,69.78)	59.43 (54.49 ,64.18)	65.52 (55.14 ,74.60)	58.90 (53.60 ,64.01)	
Past smoker	19.64 (18.04 ,21.34)	14.99 (12.38 ,18.04)	21.66 (12.31 ,35.26)	18.80 (15.54 ,22.56)	28.12 (23.61 ,33.12)	14.21 (9.76 ,20.25)	21.81 (18.00 ,26.17)	15.43 (8.40 ,26.62)	22.22 (17.98 ,27.13)	
Current Smoker	19.90 (17.91 ,22.06)	20.49 (16.99 ,24.50)	34.88 (24.28 ,47.21)	17.21 (14.00 ,20.97)	21.78 (18.11 ,25.96)	20.28 (15.38 ,26.25)	18.65 (15.41 ,22.38)	17.88 (11.89 ,26.01)	18.37 (15.38 ,21.79)	

Drinking(%)										0.0183
None	10.01 (8.51 ,11.74)	10.30 (8.22 ,12.83)	10.87 (4.95 ,22.21)	8.18 (6.30 ,10.57)	7.92 (5.69 ,10.92)	14.35 (9.39 ,21.32)	10.43 (7.67 ,14.04)	11.29 (5.82 ,20.76)	10.09 (7.46 ,13.50)	
moderate	29.43 (27.22 ,31.75)	30.62 (26.74 ,34.79)	33.35 (21.90 ,47.18)	31.66 (26.97 ,36.77)	33.49 (29.46 ,37.77)	28.90 (23.21 ,35.35)	25.45 (21.40 ,29.97)	26.79 (19.59 ,35.47)	25.21 (21.48 ,29.35)	
heavy	49.20 (46.81 ,51.59)	48.49 (44.55 ,52.45)	45.89 (33.99 ,58.27)	50.99 (46.10 ,55.86)	45.67 (40.56 ,50.88)	47.54 (40.49 ,54.68)	52.81 (48.77 ,56.82)	49.39 (39.79 ,59.02)	49.92 (45.39 ,54.46)	

For continuous variables: survey-weighted mean (95% CI) , P-value was by survey-weighted linear regression (svyglm)

For categorical variables: survey-weighted percentage (95% CI) , P-value was by survey-weighted Chi-square test (svytable)

Abbreviations: ePWV: estimated pulse wave velocity; CI, confidence interval.

Table S2 Effect size of BMI with visceral fat area status on ePWV(cm/s) in prespecified and exploratory subgroups,weighted (supplement for Table 4)

Sub-group	BMI/VFA Status								P-interaction
	normal weight normal visceral fat β (95% CI) P	normal Weight visceral obesity β (95% CI) P	overweight normal visceral fat β (95% CI) P	overweightvisceral obesity β (95% CI) P	obese grade 1 normal visceral fat β (95% CI) P	obese grade 1 visceral obesity β (95% CI) P	obese grade 2 normal visceral fat β (95% CI) P	obese grade 2 visceral obesity β (95% CI) P	
Race									<0.0001***
Mexican American	Reference 0.4205	29.4 (-15.4, 74.1) 0.4205	-11.7 (-27.3, 3.8) 0.3785	19.0 (0.0, 37.9) 0.3000	-3.8 (-19.8, 12.2) 0.7253	19.8 (3.8, 35.7) 0.2484	63.2 (35.2, 91.1) 0.1414	29.7 (11.8, 47.6) 0.1903	
Other Hispanic	Reference 0.1958	43.3 (16.3, 70.3) 0.1958	13.3 (-9.3, 35.8) 0.4549	42.1 (15.4, 68.8) 0.1995	21.2 (-9.5, 51.9) 0.4049	46.4 (18.3, 74.4) 0.1905	24.3 (-10.4, 59.1) 0.4012	9.7 (-14.8, 34.2) 0.5804	
Non-Hispanic White	Reference 0.1677	57.1 (26.9, 87.2) 0.1677	4.2 (-7.7, 16.0) 0.6163	20.3 (6.8, 33.9) 0.2083	2.8 (-14.9, 20.4) 0.8086	36.2 (18.9, 53.6) 0.1526	20.7 (-4.8, 46.2) 0.3579	29.8 (11.4, 48.3) 0.1949	
Non-Hispanic	Reference	29.0 (-31.6, 89.5)	-14.4 (-28.6, -0.2)	40.5 (11.5, 69.5)	-22.8 (-41.0, -4.6)	4.8 (-19.1, 28.6)	-7.2 (-31.4, 17.0)	13.3 (-11.2, 37.7)	

nic Black		0.5203	0.2969	0.2232	0.2458	0.7632	0.6631	0.4802	
Other Race	Reference	78.7 (46.1, 111.4) 0.1327	-19.9 (-41.3, 1.4) 0.3182	26.2 (7.3, 45.2) 0.2249	-27.0 (-57.3, 3.3) 0.3311	4.2 (-24.0, 32.3) 0.8197	-17.5 (-41.9, 7.0) 0.3946	31.5 (-3.5, 66.6) 0.3283	
Smoking status									0.007*
None	Reference	80.3 (49.1, 111.6) 0.0001	0.9 (-7.3, 9.2) 0.8260	28.5 (17.0, 40.0) 0.0002	6.9 (-6.1, 19.9) 0.3117	33.1 (17.9, 48.2) 0.0007	5.7 (-8.5, 19.8) 0.4456	30.9 (12.9, 48.9) 0.0042	
Past smoker	Reference	25.5 (-15.3, 66.3) 0.2391	-12.0 (-29.0, 5.0) 0.1869	20.6 (-0.6, 41.8) 0.0763	-16.1 (-37.3, 5.0) 0.1553	23.6 (-3.7, 50.9) 0.1114	23.6 (-27.1, 74.2) 0.3762	23.0 (2.5, 43.4) 0.0435	
Current Smoker	Reference	37.7 (-11.7, 87.0) 0.1557	6.5 (-16.4, 29.4) 0.5872	10.5 (-10.6, 31.6) 0.3458	-15.9 (-37.6, 5.7) 0.1691	34.4 (3.3, 65.5) 0.0465	12.1 (-24.2, 48.4) 0.5221	24.8 (-1.3, 51.0) 0.0827	
Drinking status									<0.0001***
None	Reference	95.1 (65.7, 124.5) <0.0001	-7.5 (-24.6, 9.7) 0.4069	34.8 (11.8, 57.8) 0.0095	-22.1 (-46.9, 2.7) 0.1015	36.6 (12.4, 60.7) 0.0096	20.9 (-1.1, 43.0) 0.0821	46.7 (19.4, 73.9) 0.0043	
moderate	Reference	93.1 (56.6,	-0.6 (-13.9, 12.7)	30.5 (13.3, 47.8)	13.3 (-2.5, 29.2)	22.5 (3.0, 42.0)	10.5 (-15.1, 36.2)	32.1 (9.4, 54.7)	

		129.6) 0.0002	0.9298	0.0035	0.1207	0.0391	0.4327	0.0141	
heavy	Reference	23.2 (-9.0, 55.4) 0.1785	0.5 (-12.9, 13.8) 0.9469	15.6 (0.9, 30.3) 0.0550	-5.7 (-18.5, 7.0) 0.3925	34.6 (17.9, 51.4) 0.0010	7.2 (-12.5, 27.0) 0.4827	23.1 (6.7, 39.5) 0.0144	

* * * P<0.001, * * P<0.01, * P<0.05

Results are showed as(for ePWV): survey-weighted coefficients (95%CI) p-value

P-interaction is calculated by global Chi-square test

Abbreviations: ePWV: estimated pulse wave velocity; BMI: body mass index; VFA: visceral fat area; CI, confidence interval.

Table S3 association of BMI and visceral fat area status with all-cause mortality, weighted

	Number of death	Crude model
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		HR (95% CI)P
Normal Weight Normal visceral fat	18	Reference
Normal Weight Visceral Obesity	7	5.47 (0.47,3.25) 0.006
Overweight Normal visceral fat	8	1.24 (0.47,3.25) 0.664
Overweight Visceral Obesity	10	1.18 (0.45,3.08) 0.737
Obese grade 1 Normal visceral fat	0	0(0,0) < 0.001
Obese grade 1 Visceral obesity	15	2.76 (1.01, 7.56) 0.05

<p>Obese grade 2</p> <p>Normal visceral fat</p>	<p>2</p>	<p>3.49(0.60,20.19)0.162</p>
<p>Obese grade 2</p> <p>Visceral obesity</p>	<p>13</p>	<p>2.37 (1.11,5.08) 0.027</p>

Abbreviations: ePWV: estimated pulse wave velocity; BMI: body mass index; VFA: visceral fat area; CI, confidence interval; HR: hazard ratio