

Supplementary Files

Supplementary Method 1

All of the relevant measurements were performed by trained research doctors in strict accordance with the standard of measurement. Anthropometric measurements: A corrected RGZ-120 weighting scale was used to measure height and weight. Individuals to be measured were required to be thin clothed, shoes off and hats off. Height measurements accurate to 0.1cm and weight measurement accurate to 0.1kg. Waist circumference and hip circumference measurement: When the waist circumference was measured, individuals were required to stand vertically and feet separated 30-40cm, arms dropped naturally, kept normal breathing and without tucking up. Measurements used inelastic tapes with an accuracy of 1mm to measure hip circumference. The tape was put horizontally between the hip and the narrowest part of the ribs(that is the finest part of the waist),around the waist for 1 lap and measure at the end of expiration. When the hip circumference was measured, the tape was put on the widest part of hip and then cross the two ends of the tape horizontally to get the indication. The measurement error was required to less than 0.1cm. BMI was calculated as body weight (kg) divided by the square of height (m²). BP measurement: Individuals were required to stop smoking, stop drinking tea or coffee for more than 30 minutes and then sit and rest for 15 minutes. Sitting blood pressure was measured three times with a 30 minutes' interval. The mean of three measurements was regarded as one's final blood pressure. Biochemical measurements: 5 ml blood samples from the antecubital vein were collected between 7:00 am to 9:00 am after an overnight fast. All biochemical variables were measured using an automatic analyzer (Hitachi 7600 automatic analyzer).

Supplementary Method 2

Values of baPWV was obtained using a networked arteriosclerosis detection device (Omron BP-203RPE III). The room temperature was maintained between 22-25°C. Individuals to be measured were required to be thin clothed, stop smoking, stop drinking tea or coffee for more than 30 minutes, sit and rest for 15 minutes. When the measurement began, individuals were kept quiet, supine without pillow, palms up on body sides. Put the 4 cuffs on upper arms and ankles. Lower edge of the cuff was 2-3 cm from the cubital fossa and 1-2 cm from the medial malleolus. Heart sound acquisition device was placed on precordia area of participants.

Supplementary Method 3

Health behaviors

Categories of cigarette smoking were as follows: ideal, never smoker; intermediate, used to smoke but not now; poor, current smoker. BMI categories were as follows: ideal, $<25 \text{ kg/m}^2$; intermediate, $25\text{--}30 \text{ kg/m}^2$; poor, $\geq 30 \text{ kg/m}^2$. Physical activity categories were as follows: ideal, $\geq 90 \text{ min/week}$; intermediate, $0\text{--}90 \text{ min/week}$; poor, never exercise. In contrast, the AHA defines ideal exercise as >5 times per week for >30 minutes each time. Salt intake greatly impacts cardiovascular disease in the Chinese population and thus our questionnaire included salt intake rather than vegetable intake as a health behavior. Diet categories were as follows: ideal, light salt ($<6\text{g/d}$); intermediate, moderate salt ($6\text{--}11\text{g/d}$); poor, heavy salt ($\geq 12\text{g/d}$).

Health factors

Untreated $\text{TC} < 200\text{mg/dL}$ was considered ideal, TC of $200\text{--}239\text{mg/dL}$ or treated $\text{TC} < 200\text{mg/dL}$ was intermediate, and $\text{TC} \geq 240 \text{ mg/dL}$ was poor. Untreated $\text{SBP} < 120 \text{ mmHg}$

(1mmHg=0.133kPa) and DBP<80 mmHg was considered ideal, SBP of 120–139 mmHg or DBP 80–89 mmHg or treated BP<140/90 mmHg was considered intermediate, and SBP≥140 mmHg or DBP ≥90 mmHg was considered poor. Untreated FBG of <100 mg/dL was considered ideal, FBG 100-125mg/dL or treated FBG<100 mg/dL was considered intermediate, and FBG≥126 mg/dL was poor.

Supplementary Method 4

Methods of missing values replacement

As for the missing values of SBP, DBP, BMI, FBG, and TC in the third physical examination, we adopted the mean value of corresponding data in the first and second examinations. As for the missing values of DBP, BMI, FBG, and TC in the fourth physical examination, we adopted the mean value of corresponding data in the first, second and third examinations. As for the missing information of smoking, physical activity, and diet in the fourth physical examination, we adopted the corresponding information of the previous three examinations if their categories remains unchanged. If the information still lacking and the category of the third examination is "ideal", we regarded "ideal" as the category of the fourth examination. If the information still lacking, we regarded the corresponding category of the third examination as the information of the fourth examination.

Numbers of missing values replacement

The numbers of missing values of SBP, DBP, BMI, FBG, and TC in the third physical examination are 10, 10, 1, 18, and 5 respectively. The numbers of missing values of DBP, BMI, FBG, TC, smoking, physical activity, and diet in the fourth physical examination are 2,

29, 764, 573, 86, 607 and 89 respectively.

Supplementary Table 1. Baseline characteristics of the included and excluded

	included	excluded	p value
n	3951	1489	
Age, y	53.66±10.97	59.19±12.87	<.0001
Male (%)	2267 (57.38)	990 (66.49)	<.0001
SBP, mmHg	129.73±19.27	134.94±21.43	<.0001
DBP, mmHg	82.73±10.89	83±11.56	0.435
BMI, kg/m ²	24.96±3.22	24.88±3.38	0.392
TC, mg/dl	195.77±38.59	196.57±40.46	0.500
FBG, mg/dl	99.88±25.35	104.28±32.12	<.0001
Ideal smoking category (%)	2519 (63.76)	881 (59.17)	0.001
Ideal diet category (%)	811 (20.53)	324 (21.76)	0.594
Ideal physical activity category (%)	1355 (34.3)	519 (34.86)	0.205

SBP, systolic blood pressure; DBP, diastolic blood pressure; BMI, body mass index; TC, total cholesterol; FBG, fasting plasma glucose.

Supplementary Table 2. Δ baPWV of groups with Δ CHS \geq 4

	Δ CHS				
	\geq 4	4	5	6	7

n	83	54	21	7	1
Δ baPWV, cm/s	-29.90 \pm 215.92	-11.91 \pm 184.07	-83.62 \pm 277.55	-1.00 \pm 258.38	-76

CHS, cardiovascular health score; baPWV, brachial–ankle pulse wave velocity; changes (Δ).

Supplementary Table 3. Linear regression analysis of the relationships between each individual CHS and Δ baPWV

Model	B value	95% CI	β	p value
Δ BP	-54.08	-66.25–41.91	-0.14	<0.001
Δ BMI	-21.25	-40.63–1.87	-0.03	0.032
Δ FBG	2.74	-12.69–18.17	0.01	0.728
Δ TC	-1.11	-4.18–1.96	-0.01	0.479
Δ Diet	-8.81	-22.12–4.50	-0.02	0.194
Δ Smoke	9.25	-8.89–27.39	0.02	0.317
Δ Exercise	-1.13	-10.70–8.44	-0.01	0.817

CHS, cardiovascular health score; baPWV, brachial–ankle pulse wave velocity; changes (Δ).

Age and gender were adjusted in each model.