Supplemental material

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Heart

Supplementary material

Title: Association Between Age at Onset of Overweight and Risk of Hypertension Across Adulthood

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Table S1. Number of imputed missing data

Variables	Missing (%)
Fasting blood glucose	111(1.2)
Total cholesterol	112(1.2)
Triglycerides	109(1.1)
eGFR	297(3.1)
Parental history of Hypertension	2(0.02)
Cigarette smoking status	153(1.6)
Alcohol consumption status	78(0.8)
Physical activity	589(6.2)
Education attainment	2(0.02)

Table S2. The proportions of hypertensive patients by hypertension diagnostic criteria

Hypertension diagnostic criteria	N (%)
Incident total hypertension	2935(100)
Systolic/diastolic blood pressure ≥140/90 mmHg	2804(95.54)
Self-reported physician diagnosis of hypertension	218(7.43)
Antihypertensive drugs use	173(5.89)

Table S3. Sensitivity analysis excluding incident hypertension within the first two years of follow-up (N = 8,564)

Overweight Onset Age (years)	Normal Weight Case/Total	New-Onset Overweight Case/Total	Subhazard Ratio (95%CI)	p value
Primary analysis (N = 9,484)				
18-39	149/1103	228/1103	1.38(1.11-1.71)	0.004
40-49	291/1255	387/1255	1.27(1.09-1.49)	0.002
50-59	489/1487	627/1487	1.23(1.09-1.38)	0.001
≥ 60	364/897	400/897	1.14(0.99-1.32)	0.072
Sensitivity analysis (N = 8,564)				
18-39	125/1048	188/1048	1.30(1.02-1.66)	0.032
40-49	222/1138	300/1138	1.29(1.08-1.53)	0.005
50-59	389/1322	503/1322	1.22(1.06-1.39)	0.004
≥ 60	286/774	306/774	1.10(0.94-1.30)	0.239

All models were adjusted for systolic blood pressure, fasting blood glucose, total cholesterol, triglycerides, eGFR, parental history of hypertension, cigarette smoking status, alcohol consumption status, physical activity and education attainment.

Table S4. Sensitivity analysis using Cox proportional hazards models (N = 9,484)

Overweight Onset Age (years)	Normal Weight Case/Total	New-Onset Overweight Case/Total	Subhazard Ratio (95%CI)	*p* value
18-39	149/1103	228/1103	1.38(1.11-1.71)	0.003
40-49	291/1255	387/1255	1.27(1.09-1.49)	0.002
50-59	489/1487	627/1487	1.23(1.09-1.38)	<0.001
≥ 60	364/897	400/897	1.14(0.99-1.32)	0.071

All models were adjusted for systolic blood pressure, fasting blood glucose, total cholesterol, triglycerides, eGFR, parental history of hypertension, cigarette smoking status, alcohol consumption status, physical activity and education attainment.

Table S5. Sensitivity analysis excluding individuals who did not remain overweight following its initial manifestation (N = 6,096)

Overweight Onset Age (years)	Normal Weight Case/Total	New-Onset Overweight Case/Total	Subhazard Ratio (95%CI)	*p* value
18-39	109/816	194/816	1.61(1.25-2.06)	<0.001
40-49	203/860	298/860	1.43(1.19-1.72)	<0.001
50-59	297/898	440/898	1.40(1.21-1.63)	<0.001
≥ 60	204/474	242/474	1.29(1.07-1.57)	0.009

All models were adjusted for systolic blood pressure, fasting blood glucose, total cholesterol, triglycerides, eGFR, parental history of hypertension, cigarette smoking status, alcohol consumption status, physical activity and education attainment.

Table S6. Sensitivity analysis excluding overweight individuals who progressed to obesity (N = 9,132)

Overweight Onset Age (years)	Normal Weight Case/Total	New-Onset Overweight Case/Total	Subhazard Ratio (95%CI)	*p* value
18-39	144/1052	214/1052	1.32(1.06-1.65)	0.015
40-49	276/1210	367/1210	1.27(1.09-1.50)	0.003
50-59	470/1433	599/1433	1.22(1.08-1.37)	0.002
≥ 60	348/871	382/871	1.13(0.97-1.31)	0.109

All models were adjusted for systolic blood pressure, fasting blood glucose, total cholesterol, triglycerides, eGFR, parental history of hypertension, cigarette smoking status, alcohol consumption status, physical activity and education attainment.

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Table S7. Sensitivity analysis adjusting for several time-varying covariates (N = 9,484)

Overweight Onset age (years)	Normal Weight Case/Total	New-Onset Overweight Case/Total	Subhazard Ratio (95%CI)	*p* value
18-39	149/1103	228/1103	1.37 (1.08-1.73)	0.008
40-49	297/1255	387/1255	1.27 (1.07-1.49)	0.005
50-59	489/1487	627/1487	1.20 (1.06-1.36)	0.004
≥ 60	367/897	400/897	1.15 (0.99-1.35)	0.068

Fasting blood glucose, total cholesterol, triglycerides, and eGFR were included as time-varying covariates in the model. All models were adjusted for systolic blood pressure, fasting blood glucose, total cholesterol, triglycerides, eGFR, parental history of hypertension, cigarette smoking status, alcohol consumption status, physical activity and education attainment.

Table S8. Sensitivity analysis using International Obesity Task Force of overweight for East Asians (N = 8,440)

Overweight Onset Age (years)	Normal Weight Case/Total	New-Onset Overweight Case/Total	Subhazard Ratio (95%CI)	*p* value
18-39	96/998	163/998	1.38(1.07-1.79)	0.015
40-49	233/1168	275/1168	1.19(1.00-1.42)	0.055
50-59	384/1304	449/1304	1.16(1.11-1.33)	0.035
≥ 60	269/750	349/750	1.31(1.11-1.54)	0.001

All models were adjusted for systolic blood pressure, fasting blood glucose, total cholesterol, triglycerides, eGFR, parental history of hypertension, cigarette smoking status, alcohol consumption status, physical activity and education attainment.

Table S9. Sensitivity analysis using pattern-mixture model approach to multiple imputation (N = 9,484)

Overweight Onset Age (years)	Normal Weight Case/Total	New-Onset Overweight Case/Total	Subhazard Ratio (95%CI)	*p* value
18-39	149/1103	228/1103	1.38(1.11-1.71)	0.004
40-49	291/1255	387/1255	1.27(1.09-1.49)	0.002
50-59	489/1487	627/1487	1.23(1.09-1.38)	0.001
≥ 60	364/897	400/897	1.14(0.99-1.32)	0.073

All models were adjusted for systolic blood pressure, fasting blood glucose, total cholesterol, triglycerides, eGFR, parental history of hypertension, cigarette smoking status, alcohol consumption status, physical activity and education attainment.
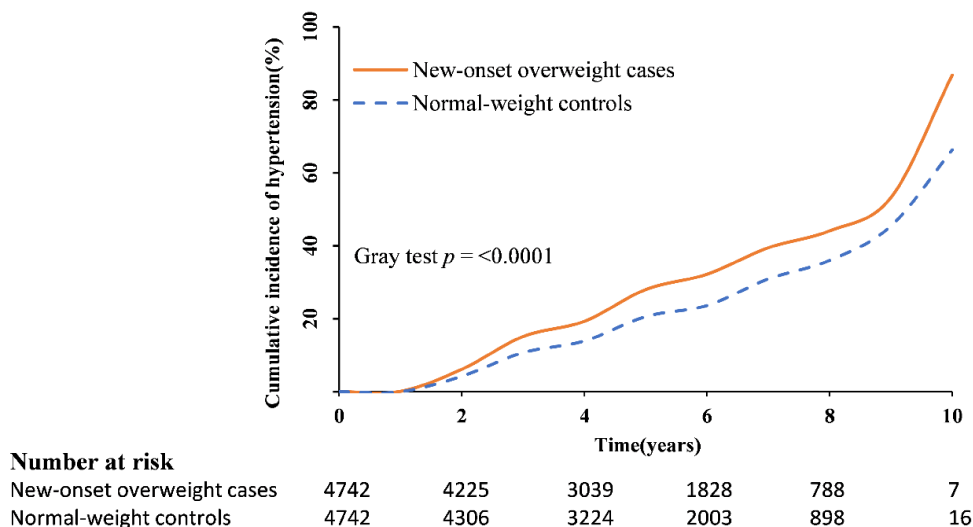
Figure S1. Cumulative incidence of hypertension among new-onset overweight cases or matched normal-weight controls.
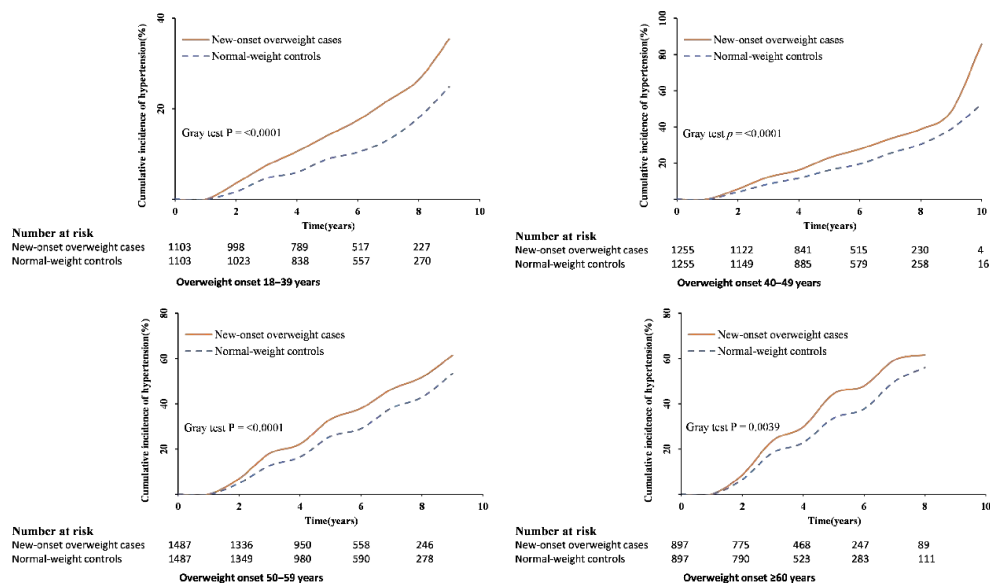

Figure S2. The cumulative incidence of hypertension among participants with new-onset overweight versus controls across onset age groups