

Full title: Cumulative Resting Heart Rate Exposure and Risk of All-Cause Mortality:
Results from the Kailuan Cohort Study

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Supplementary Information

Supplemental Table 1. Baseline characteristics stratified by completed data and missing data on rest heart rate from Kailuan cohort study

Characteristic	Completed data	Missing rest heart rate	<i>P</i>
No. of subjects	47311	8930	
Age, year	48.70 ± 11.68	51.78 ± 12.78	<0.001*
Men, n (%)	37010 (78.2)	5929 (66.4)	<0.001#
Current smoker, n (%)	14480 (30.6)	2346 (27.3)	<0.001#
Current drinker, n (%)	8471 (17.9)	1348 (15.7)	<0.001#
Physical activity, n (%)	6424 (13.6)	1333 (16.4)	<0.001#
SBP, mmHg	128.61 ± 19.90	127.03 ± 20.15	<0.001*
DBP, mmHg	82.73 ± 11.40	81.31 ± 11.20	<0.001*
BMI, kg/m ²	25.06 ± 3.47	25.04 ± 3.49	0.678*
FBG, mmol/L	5.40 ± 1.54	5.36 ± 1.56	0.011*
TC, mmol/L	4.94 ± 1.14	4.89 ± 1.10	0.002*
HDL-C, mmol/L	1.56 ± 0.40	1.50 ± 0.36	<0.001*
LDL-C, mmol/L	2.30 ± 0.92	2.25 ± 0.78	<0.001*
Hypertension, n (%)	19174 (40.5)	3334 (37.3)	0.001#
Diabetes mellitus, n (%)	4816 (10.2)	807 (9.0)	0.001#
Hyperlipidemia, n (%)	22045 (46.6)	4072 (45.5)	0.064#
Stroke, n (%)	628 (1.3)	233 (2.6)	<0.001#
Cancer, n (%)	126 (0.3)	37 (0.5)	0.006#

Data shown as mean±SD or frequency (percentage).

Key: SBP, systolic blood pressure; DBP, Diastolic blood pressure; RHR, resting heart rate; BMI, body mass index; FBG, fasting blood glucose; TC, total cholesterol; HDL-C, higher-density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol.

*Analysis of variance test (ANOVA) or Kruskal-Wallis test used for continuous variables;

χ^2 test used for categorical variables.

Supplemental Table 2. Baseline characteristics of 47,311 men and women stratified by the number of higher RHR status

Characteristic	Total	The number of visits with a higher RHR (≥ 80 beats/min)				<i>P</i>
		Never	At 1 study visit	At 2 study visits	At 3 study visits	
No. of subjects	47311	29690	11105	4816	1700	
Age, year	48.70 \pm 11.68	49.07 \pm 11.59	48.24 \pm 11.76	47.75 \pm 11.83	47.82 \pm 12.10	<0.001*
Men, n (%)	37010 (78.2)	22831 (76.9)	8862 (79.8)	3929 (81.6)	1388 (81.6)	<0.001#
Current smoker, n (%)	14480 (30.6)	8491 (28.6)	3590 (32.3)	1754 (36.4)	645 (37.9)	<0.001#
Current drinker, n (%)	8471 (17.9)	5041 (17.0)	2079 (18.7)	977 (20.3)	374 (22.0)	<0.001#
Physical activity, n (%)	6424 (13.6)	4350 (14.7)	1311 (11.8)	563 (11.7)	200 (11.8)	<0.001#
SBP, mmHg	126.81 \pm 19.90	126.73 \pm 19.14	130.24 \pm 20.19	133.63 \pm 21.21	136.45 \pm 21.70	<0.001*
DBP, mmHg	82.73 \pm 11.40	81.57 \pm 10.87	83.87 \pm 11.63	85.84 \pm 12.43	86.75 \pm 12.53	<0.001*
RHR, beats/min	73.41 \pm 9.83	69.43 \pm 6.56	76.89 \pm 9.23	83.11 \pm 10.38	92.71 \pm 9.08	<0.001*
BMI, kg/m ²	25.06 \pm 3.47	25.03 \pm 3.04	25.05 \pm 3.48	25.23 \pm 3.73	25.05 \pm 3.70	0.030*
FBG, mmol/L	5.40 \pm 1.54	5.27 \pm 1.35	5.50 \pm 1.64	5.79 \pm 1.93	6.02 \pm 2.09	<0.001*
TC, mmol/L	4.94 \pm 1.14	4.88 \pm 1.23	4.98 \pm 1.12	5.11 \pm 1.18	5.15 \pm 1.20	<0.001*
HDL-C, mmol/L	1.56 \pm 0.40	1.55 \pm 0.40	1.56 \pm 0.40	1.58 \pm 0.41	1.59 \pm 0.42	<0.001*
LDL-C, mmol/L	2.30 \pm 0.92	2.26 \pm 0.93	2.34 \pm 0.90	2.46 \pm 0.93	2.44 \pm 0.90	<0.001*
Hypertension, n (%)	19174 (40.5)	11017 (37.1)	4806 (43.3)	2422 (50.3)	929 (54.6)	<0.001#
Diabetes mellitus, n (%)	4816 (10.2)	2729 (9.2)	1136 (10.2)	660 (13.7)	291 (17.1)	<0.001#
Hyperlipidemia, n (%)	22045 (46.6)	13186 (44.4)	5345 (48.1)	2576 (53.5)	938 (55.2)	<0.001#
Stroke, n (%)	628 (1.3)	397 (1.3)	142 (1.3)	76 (1.6)	13 (0.8)	0.084#
Cancer, n (%)	126 (0.3)	75 (0.3)	18 (0.2)	27 (0.6)	6 (0.4)	<0.001#

Data shown as mean \pm SD or frequency (percentage).

Key: SBP, systolic blood pressure; DBP, Diastolic blood pressure; RHR, resting heart rate; BMI, body mass index; FBG, fasting blood glucose; TC, total cholesterol; HDL-C, higher-density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol.

* Analysis of variance test (ANOVA) or Kruskal-Wallis test used for continuous variables;

χ^2 test used for categorical variables.

Supplemental Table 3. Hazard ratios (95% CI) for all-cause mortality according to time-weighted cumRHR

RHR [(beat/min)*year]	Participants (No.)	Death (No.)	Mortality rate*	Hazard ratio (95% CI)#			
				Model 1†	Model 2‡	Model 3§	Model 4
Change per SD (8.05)	47311	1025	54.43	1.20 (1.13-1.27)	1.26 (1.20-1.34)	1.22 (1.15-1.30)	1.30 (1.20-1.41)
Quartiles							
Q1:<68.70	11822	220	47.11	1(Reference)	1(Reference)	1(Reference)	1(Reference)
Q2:68.70-73.20	11829	224	47.34	1.01 (0.84-1.21)	1.17 (0.97-1.41)	1.17 (0.96-1.43)	1.19 (0.97-1.46)
Q3:73.20-78.26	11833	252	53.64	1.14 (0.95-1.36)	1.34 (1.11-1.60)	1.30 (1.08-1.58)	1.34 (1.09-1.64)
Q4:≥78.26	11827	329	69.89	1.48 (1.25-1.76)	1.80 (1.52-2.14)	1.67 (1.39-2.01)	1.77 (1.41-2.21)
<i>P</i> for trend				<0.001	<0.001	<0.001	<0.001

Hazard ratio (95% CI) was calculated from Cox models

*Mortality rate per 10,000 person-years

†Univariate analysis

‡Adjusted for age, sex.

§Adjusted for age, sex, mean systolic blood pressure, smoking, drinking, physical activity, body mass index, hypertension, diabetes mellitus, hyperlipidemia, stroke and cancer.

||Adjusted for risks factor in model 3 plus baseline resting heart rate.

Supplemental Table 4. Hazard ratios (95% CI) for all-cause mortality according to baseline resting heart rate

RHR [(beat/min)*year]	Participants (No.)	Death (No.)	Mortality rate*	Hazard ratio (95% CI)#		
				Model 1†	Model 2‡	Model 3§
Change per SD (9.83)	47311	1025	54.43	1.07 (1.00-1.13)	1.13 (1.07-1.20)	1.11 (1.05-1.18)
Quartiles						
Q1:<68.00	10666	232	55.06	1(Reference)	1(Reference)	1(Reference)
Q2:68.00-72.00	11102	221	49.76	0.91 (0.75-1.09)	1.13 (0.94-1.36)	1.09 (0.89-1.33)
Q3:72.00-79.00	13047	271	52.32	0.93 (0.78-1.11)	1.07 (0.90-1.28)	1.03 (0.89-1.24)
Q4:≥79.00	12496	301	60.52	1.10 (0.93-1.30)	1.37 (1.16-1.63)	1.23 (1.03-1.48)
<i>P</i> for trend				0.108	0.002	0.093

Hazard ratio (95% CI) was calculated from Cox models

*Mortality rate per 10, 000 person-years

†Univariate analysis

‡Adjusted for age, sex.

§Adjusted for age, sex, mean systolic blood pressure, smoking, drinking, physical activity, body mass index, hypertension, diabetes mellitus, hyperlipidemia, stroke and cancer.