ORIGINAL RESEARCH

# Self-Rated Health Status and Risk of Ischemic Heart Disease in the China Kadoorie Biobank Study: A Population-Based Cohort Study

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***Background*—**Self-rated health (SRH) is a strong predictor of mortality in different populations. However, the associations between SRH measures and risk of ischemic heart disease (IHD) have not been extensively explored, especially in a Chinese population.

***Methods and Results*—**More than 500 000 adults from 10 cities in China were followed from baseline (2004–2008) through December 31, 2013. Global and age-comparative SRH were reported from baseline questionnaires. Incident IHD cases were identified through links to well-established disease registry systems and the national health insurance system. During 3 423 542 person-years of follow-up, we identified 24 705 incident cases of IHD. In multivariable-adjusted models, both global and age-comparative SRH was significantly associated with incident IHD. Compared with excellent SRH, the hazard ratios for good, fair, and poor SRH were 1.02 (95% confidence interval [CI], 0.98–1.07), 1.32 (95% CI, 1.27–1.37), and 1.76 (95% CI, 1.68–1.85), respectively. Compared with better age-comparative SRH, the hazard ratios for same and worse age-comparative SRH were 1.23 (95% CI, 1.19–1.27) and 1.78 (95% CI, 1.70–1.86), respectively. The associations persisted in all subgroup analyses, although they were slightly modified by study location, education, and income levels.

***Conclusions*—**A simple questionnaire for self-assessment of health status was significantly associated with incident IHD in Chinese adults. Individuals and healthcare providers can use SRH measures as a convenient tool for assessing future IHD risk. **(*J Am Heart Assoc*. 2017;6:e006595. DOI: 10.1161/JAHA.117.006595.)**

**Key Words:** Chinese • cohort study • ischemic heart disease • self-rated health status

Ischemic heart disease (IHD), also known as coronary heart disease, is a leading cause of disease burden worldwide in terms of both years of life lost from IHD deaths and years of disability lived with nonfatal IHD.[1] Despite a decrease in age-standardized mortality of fatal and nonfatal IHD in high-income countries since 1990, IHD remained as a leading cause of death between 1990 and 2013 in China.[2] A total of 230 million adults suffered from IHD[3] and 1.4 million people died from IHD in China in 2013.[4] Demographic and social transitions including rural-to-urban migration, population growth, and aging were projected to further increase IHD incidence in China.[5] Thus, prediction and early detection of IHD is of great importance for the prevention and control of IHD.

As a simple and relatively subjective index, self-rated health (SRH) status has been used to predict cardiovascular mortality[6–8] and all-cause mortality[6–13] in different populations. The association between SRH and risk of incident IHD has been less frequently explored. In an early prospective study in Danish adults,[14] a positive association was observed,

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## Clinical Perspective

### What Is New?

- Although self-rated health status has been used as a predictor for cardiovascular and all-cause mortality, its association with the risk of ischemic heart disease remains controversial.
- In this prospective megacohort of more than half a million Chinese, participants reporting poor global or worse age-comparative self-rated health had ≈75% higher risk of future ischemic heart disease (independent of multiple traditional risk factors for ischemic heart disease).
- The magnitude of association was different across study locations, education levels, and household income levels. Nevertheless, the associations were robust and persisted in all subgroup and sensitivity analyses.

### What Are the Clinical Implications?

- Although more research is warranted, physicians can use the 2 easily obtained self-rated health measures as screening tools to identify individuals who may have higher risk of incident ischemic heart disease and to provide health education and therapies to improve cardiovascular care.

whereas another study in Finnish men reported that the positive association vanished after adjustment for comorbid diseases, suggesting that perceived health levels mainly reflected underlying disease burden.[13] The US Health and Retirement Study found that SRH predicted onset of major chronic diseases including IHD.[15] However, only global SRH was examined in these studies, and other measures of SRH such as age-comparative SRH were not studied previously. All 3 studies had small sample sizes (<5000) with limited statistical power for subgroup analyses. To the best of our knowledge, no study ever evaluated the predictive value of SRH for incident IHD in the Chinese population, even though SRH was found to predict mortality in Chinese adults.[11,16,17]

We aimed to investigate associations of global SRH and age-comparative SRH with incident IHD using data from the China Kadoorie Biobank. Given the inconsistency and limitations of prior studies, we hypothesized that our study would support the utility of subjective health assessment for predicting IHD.

## Methods

### Study Population

The China Kadoorie Biobank study is a large population-based prospective cohort study launched in China in 2004. This study was designed to investigate the influence of environmental factors, genetic variations, and their interactions on the morbidity and mortality of various chronic diseases. Participants were from 10 regions covering 5 rural counties (Gansu, Henan, Zhejiang, Sichuan, and Hunan provinces) and 5 urban cities (Harbin, Qingdao, Suzhou, Liuzhou, and Haikou); among these 10 regions, 4 are located in north China (Harbin, Qingdao, Gansu, and Henan), whereas the other 6 are in the south. The cohort design, sampling strategy, and baseline characteristics were reported elsewhere.[18,19] A total of 512 891 adult residents aged 30 to 79 years were enrolled between 2004 and 2008. Baseline information such as demographic characteristics; socioeconomic status (SES); personal behaviors; general health; family history; mental health; and, for women only, reproductive history was obtained by trained community- or village-level health professionals via a computerized direct data-entry system for the questionnaires. After the interview, various physical measurements such as height, weight, and blood pressure were undertaken for each participant, and a 10-mL blood sample was collected.

We excluded 26 350 participants with prior history of IHD (n=15 472), rheumatic heart disease (n=938), stroke or transient ischemic attack (n=8884), or cancer (n=2577), as well as 2 persons with missing values for body mass index. A total of 486 541 participants (199 113 men and 287 428 women) were included in the final analysis. The study was approved by the ethics review committee of the Chinese Center for Disease Control and Prevention (Beijing, China) and the Oxford Tropical Research Ethics Committee, University of Oxford (UK). Written informed consent forms were obtained from all participants included in the study.

### Exposure Variables

Two questions were asked in baseline interviews to assess the SRH status of each participant: (1) How is your current general health status: excellent, good, fair, or poor? (2) How is your current health status compared with someone your own age: better, about the same, worse, or don't know? We considered the first question as global SRH and the second as age-comparative SRH. Participants answering "don't know" for the second question (n=14 990, 3.08%) were excluded when examining the association between age-comparative SRH and incident IHD. All participants answered the 2 questions, and no data were missing for the 2 assumed exposure variables.

### Outcome Variables

Information on incident IHD was regularly collected through linkage with the regional disease registry system and, through unique national identifiers, with an established national health insurance system, which records details of *International Classification of Diseases, 10th Revision* (ICD-10) coded

hospitalization information.[18] The vital status of each participant was obtained by linkage to China's Disease Surveillance Points system, checked annually against local residential cards, health insurance records, and local street committees.[19] Scanned copies of original disease reporting cards and official death certificates were obtained for each incident event, and new IHD cases were adjudicated by trained physicians blinded to the baseline exposure status and were coded as I20 to I25 (ICD-10).

## Confounding Factors

The following demographic and socioeconomic characteristics were obtained in baseline interviews: age, sex (male, female), study location, marital status (married, widowed, separated or divorced, never married), education level (no formal education, primary, middle or high school, college/university or higher), annual household income (in Chinese yuan: <10 000 [<$1531], 10 000–19 999 [$1531–3062], 20 000–34 999 [$3063–5361], ≥35 000 [≥$5361]), and occupation (farmers, factory workers, professionals and managers, retirees, unemployed and others). Women were asked about their menopausal status (pre-, peri-, and postmenopause). All participants were also asked about their lifestyle behaviors, such as cigarette smoking (never, former, occasionally, and current smoker), alcohol consumption (never, former, occasionally, and weekly), sleep problems (yes or no), and physical activity level (calculated by adding up metabolic equivalent tasks for daily work or leisure activities). Eleven types of chronic comorbidities including tuberculosis, asthma, cirrhosis, chronic hepatitis, peptic ulcer, gall/bladder stone, kidney disease, fracture, rheumatoid arthritis, psychiatric disorder, and head injury were self-reported at baseline. Participants were also asked about diabetes mellitus and hypertension, as well as family history of heart disease. Prevalent diabetes mellitus was defined as self-reported diagnosis of diabetes mellitus, use of antidiabetic medications, or fasting plasma glucose ≥7.0 mmol/L.[20] Prevalent hypertension was defined as measured systolic blood pressure ≥140 mm Hg and/or diastolic blood pressure ≥90 mm Hg, self-reported diagnosis of hypertension, or use of antihypertensive medication.[21] Past-year major depression was assessed using the Chinese version of the computerized Composite International Diagnostic Inventory–Short Form; a detailed description of the assessment procedure was given elsewhere.[22] Body height and weight were measured by trained staff, and body mass index was calculated as weight in kilograms divided by the square of height in meters.

## Statistical Analyses

Baseline characteristics by global SRH categories and age-comparative SRH groups were compared using ANOVA and $\chi^2$ tests for continuous and categorical variables, respectively. Person-years were calculated by entry into the study until the onset of IHD; death; loss to follow-up; or December 31, 2013, whichever came first. Cox proportional hazards regression models were used to estimate hazard ratios (HRs) and 95% confidence intervals (CIs) for associations between 2 measures of SRH and incident IHD, with stratification according to age at baseline (at 5-year intervals), sex, and study location. We adjusted for putative IHD risk factors and potential confounders in sequential steps: Model 1 adjusted for sociodemographic factors (continuous age, marital status, education level, household income, occupation, and menopausal status); model 2 further adjusted for lifestyle factors (sleep problems, cigarette smoking, alcohol consumption, and physical activity level), body mass index, and family history of heart disease; and model 3 also adjusted for baseline major depression, diabetes mellitus, hypertension, and presence of other comorbidities (yes if participant has any of the eleven chronic diseases and no if participant has none of the eleven chronic diseases.

Global SRH and age-comparative SRH were analyzed separately as exposures and were incorporated in the same model to explore whether they were independent of each other. To compare the predictive power of the 2 exposures, Harrell's C statistic was calculated in both model 3 plus global SRH and model 3 plus age-comparative SRH. Stratified analyses were performed by age (30–59, 60–69, and ≥70 years), sex, administrative regions (urban and rural), geographical regions (north and south), study location (10 locations), education level (no formal education, primary school, middle school or higher), household income (<10 000, 10 000–34 999, and ≥35 000 Chinese yuan), cigarette smoking (never, former, and current smoker), alcohol consumption (never, former, and current drinker), physical activity (low, moderate, high), body mass index (<18.5, 18.5–23.9, 24.0–27.9, and ≥28.0 kg/m$^2$), hypertension, and diabetes mellitus. Tests for interaction were conducted by adding interaction terms in model 3. Sensitivity analyses were conducted to test the robustness of the association by excluding major depression, baseline comorbidities (diabetes mellitus, hypertension, and other comorbidities), and those who died or developed IHD in the first 2 years of follow-up. Sensitivity analysis was also conducted by including those reporting "don't know" to the age-comparative SRH question. All analysis was performed using SAS 9.3 (SAS Institute Inc), and 2-sided $P<0.05$ was considered statistically significant.

## Results

The mean age (±SD) of participants was 51.0±10.5 years at baseline (Table 1). Among the 486 541 participants, 18.2% reported excellent SRH, 29.0% reported good SRH, 43.6%

**Table 1.** Characteristics of the China Kadoorie Biobank Study by Global Self-Rated Health Status at Baseline*

| Variables | Total, N (%) | Global Self-Rated Health, N (%) | | | |
|---|---|---|---|---|---|
| | | Excellent | Good | Fair | Poor |
| N | 486 541 (100) | 88 340 (18.2) | 141 022 (29.0) | 212 158 (43.6) | 45 021 (9.2) |
| Age, y† | 51.0 (10.5) | 49.4 (10.4) | 50.4 (10.3) | 51.8 (10.6) | 52.7 (10.7) |
| Sex | | | | | |
| Male | 199 113 (40.9) | 41 050 (46.5) | 60 002 (42.5) | 82 715 (39.0) | 15 346 (34.1) |
| Female | 287 428 (59.1) | 47 290 (53.5) | 81 020 (57.5) | 129 443 (61.0) | 29 675 (65.9) |
| Marital status | | | | | |
| Married | 44 228 (90.9) | 81 482 (92.2) | 130 083 (92.2) | 191 112 (90.1) | 39 551 (87.9) |
| Widowed | 33 081 (6.8) | 4648 (5.3) | 8375 (6.0) | 15 867 (7.5) | 4191 (9.3) |
| Separated/divorced | 7579 (1.6) | 1611 (1.8) | 1719 (1.2) | 3431 (1.6) | 818 (1.8) |
| Never married | 3653 (0.7) | 599 (0.7) | 845 (0.6) | 1748 (0.8) | 461 (1.0) |
| Education level | | | | | |
| No formal school | 90 829 (18.7) | 13 334 (15.1) | 28 823 (20.4) | 37 529 (17.7) | 11 143 (24.8) |
| Primary | 156 407 (32.1) | 23 148 (26.2) | 45 874 (32.5) | 71 239 (33.6) | 16 146 (35.9) |
| Middle or high school | 211 683 (43.5) | 43 668 (49.4) | 59 356 (42.1) | 92 248 (43.5) | 16 411 (36.4) |
| College/university or higher | 27 622 (5.7) | 8190 (9.3) | 6969 (5.0) | 11 142 (5.2) | 1321 (2.9) |
| Household income, RMB | | | | | |
| <10 000 | 137 893 (28.3) | 19 141 (21.7) | 36 437 (25.8) | 61 966 (29.2) | 20 439 (45.4) |
| 10 000–19 999 | 140 432 (28.9) | 23 369 (26.4) | 39 598 (28.0) | 64 733 (30.5) | 12 732 (28.3) |
| 20 000–34 999 | 120 197 (24.7) | 24 457 (27.7) | 36 346 (25.8) | 52 046 (24.5) | 7348 (16.3) |
| ≥35 000 | 88 019 (18.1) | 21 373 (24.2) | 28 731 (20.4) | 33 413 (15.8) | 4502 (10.0) |
| Occupation | | | | | |
| Farmers | 208 754 (42.9) | 28 356 (32.1) | 65 913 (46.7) | 91 496 (43.1) | 22 989 (51.1) |
| Factory workers | 71 331 (14.7) | 18 606 (21.1) | 22 618 (16.1) | 26 435 (12.5) | 3672 (8.2) |
| Professionals and managers | 64 533 (13.3) | 17 557 (19.9) | 18 223 (12.9) | 25 131 (11.8) | 3622 (8.0) |
| Retired | 72 156 (14.8) | 13 307 (15.0) | 17 102 (12.1) | 35 868 (16.9) | 5879 (13.0) |
| Unemployed and others | 69 767 (14.3) | 10 514 (11.9) | 17 166 (12.2) | 33 228 (15.7) | 8859 (19.7) |
| Administrative region | | | | | |
| Rural | 276 755 (56.9) | 38 840 (44.0) | 89 112 (63.2) | 119 890 (56.5) | 28 913 (64.2) |
| Urban | 209 786 (43.1) | 49 500 (56.0) | 51 910 (36.8) | 92 268 (43.5) | 16 108 (35.8) |
| Geographic region | | | | | |
| North | 190 992 (39.3) | 42 784 (48.4) | 53 293 (37.8) | 77 851 (36.7) | 17 064 (37.9) |
| South | 295 549 (60.7) | 45 556 (51.6) | 87 729 (62.2) | 134 307 (63.3) | 27 957 (62.1) |
| Sleep problems (yes) | 79 756 (16.4) | 8295 (9.4) | 18 301 (13.0) | 38 238 (18.0) | 14 922 (33.1) |
| Cigarette smoking | | | | | |
| Never | 301 601 (62.0) | 51 235 (58.0) | 85 768 (60.8) | 135 700 (64.0) | 28 898 (64.2) |
| Former | 26 807 (5.5) | 4845 (5.5) | 7618 (5.4) | 11 392 (5.4) | 2952 (6.6) |
| Occasionally | 27 872 (5.7) | 5329 (6.0) | 7793 (5.5) | 12 175 (5.7) | 2575 (5.7) |
| Current | 130 261 (26.8) | 26 931 (30.5) | 39 843 (28.3) | 52 891 (24.9) | 10 596 (23.5) |

Continued

**Table 1.** Continued

| Variables | Total, N (%) | Global Self-Rated Health, N (%) | | | |
|---|---|---|---|---|---|
| | | Excellent | Good | Fair | Poor |
| Alcohol consumption | | | | | |
| Never | 222 161 (45.7) | 35 164 (39.8) | 63 648 (45.1) | 100 758 (47.5) | 22 591 (50.2) |
| Formerly | 7751 (1.6) | 851 (1.0) | 1658 (1.2) | 3692 (1.7) | 1550 (3.4) |
| Occasionally | 172 550 (35.4) | 33 226 (37.6) | 49 317 (35.0) | 75 142 (35.4) | 14 865 (33.0) |
| Weekly | 84 079 (17.3) | 19 099 (21.6) | 26 339 (18.7) | 32 566 (15.4) | 6015 (13.4) |
| Physical activity, MET h/d‡ | 18.1 (10.8–30.6) | 19.7 (12.0–31.6) | 20.2 (11.7–33.5) | 16.8 (10.0–29.1) | 15.5 (8.4–27.0) |
| Menopausal status (women only) | | | | | |
| Premenopause | 127 325 (44.3) | 25 360 (53.6) | 38 646 (47.7) | 53 125 (41.0) | 10 194 (34.4) |
| Perimenopause | 14 354 (5.0) | 2271 (4.8) | 4162 (5.1) | 6489 (5.0) | 1432 (4.8) |
| Postmenopause | 145 749 (50.7) | 19 659 (41.6) | 38 212 (47.2) | 69 829 (54.0) | 18 049 (60.8) |
| BMI, kg/m$^2$ | | | | | |
| <18.5 | 21 428 (4.4) | 2585 (2.9) | 4751 (3.4) | 10 602 (5.0) | 3490 (7.8) |
| 18.5–23.9 | 255 773 (52.6) | 45 574 (51.6) | 74 277 (52.7) | 112 460 (53.0) | 23 462 (52.1) |
| 24.0–27.9 | 159 677 (32.8) | 31 126 (35.2) | 47 812 (33.9) | 67 625 (31.9) | 13 114 (29.1) |
| ≥28.0 | 49 663 (10.2) | 9055 (10.3) | 14 182 (10.0) | 21 471 (10.1) | 4955 (11.0) |
| Family history of heart disease (yes) | 15 379 (3.2) | 2976 (3.4) | 4171 (3.0) | 6727 (3.2) | 1505 (3.3) |
| Baseline major depression (yes) | 2972 (0.6) | 216 (0.2) | 471 (0.3) | 1328 (0.6) | 957 (2.1) |
| Baseline diabetes mellitus (yes) | 26 118 (5.4) | 3143 (3.6) | 5433 (3.9) | 12 839 (6.1) | 4703 (10.5) |
| Baseline hypertension (yes) | 158 473 (32.6) | 24 959 (28.3) | 44 694 (31.7) | 72 026 (34.0) | 16 794 (37.3) |
| Other baseline comorbidities (yes) | 229 350 (47.1) | 35 715 (40.4) | 61 852 (43.9) | 104 243 (49.1) | 27 540 (61.2) |

BMI indicates body mass index; MET, metabolic equivalent; RMB, Chinese yuan renminbi.
*Two-sided *P* values were derived from ANOVA for continuous variables and from the $\chi^2$ test for categorical variables, all $P<0.001$.
†Data are shown as mean (SD).
‡Data are shown as median (25th–75th percentiles).

reported fair SRH, and 9.2% reported poor SRH. Compared with participants with excellent global SRH, those who reported poor SRH were older, poorer, and less educated; they had higher prevalence of sleep problems, preexisting major depression, diabetes mellitus, hypertension, and other comorbidities; and they were less likely to be physically active, current drinkers, and smokers, but they were more likely to be farmers, female, single, and underweight (all $P<0.001$).

Most participants (63.5%) reported age-comparative SRH as same, whereas 18.7% reported better, 14.8% reported worse, another 3.1% reported "don't know" (Table S1). Comparisons of characteristics between better and worse age-comparative SRH were consistent with those between excellent and poor global SRH.

A total of 24 705 incident IHD cases were identified during 7.0±1.5 years of follow-up. Absolute incidence rates according to global SRH categories were 6.0, 5.3, 8.2, and 11.0 incident IHD cases per 1000 person-years for participants reporting excellent, good, fair, and poor global SRH, respectively. Relative to those reporting excellent baseline SRH, people with poor SRH were 1.96 times more likely to develop IHD after adjustment for age, sex, study location, marital status, education level, household income, occupation, and menopausal status (Table 2). The association was attenuated but remained significant (HR 1.76; 95% CI, 1.68–1.85) after further controlling for various cardiovascular risk factors such as baseline hypertension and diabetes mellitus. Although the association between SRH and incident IHD was modified by geographical region, education, and income (all *P* for interaction <0.05), significantly increased risk was observed across all subgroups in stratified analyses (Figure 1 and Table S2). No effect modifications by other covariates were observed.

Substantial variations in different study locations were found for the association between SRH and IHD risk: The HRs comparing poor with excellent SRH ranged from 1.24 (95% CI, 1.09–1.41) in Gansu residents to 2.77 (95% CI, 2.06–3.73) in Sichuan residents (Figure S1).

The absolute incidence rates according to age-comparative SRH groups were 6.2, 6.9, and 10.1 incident IHD cases per 1000 person-years for participants reporting better, same, and worse age-comparative SRH, respectively. Compared with participants who reported better age-comparative SRH status,

**Table 2.** Risk of Ischemic Heart Disease According to 2 Measures of Self-Rated Health Status

| | Cases/person-years | Model 1* | Model 2† | Model 3‡ |
|---|---|---|---|---|
| | | HR (95% CI) | HR (95% CI) | HR (95% CI) |
| Global self-rated health | | | | |
| Excellent | 3738/624 346 | 1.00 | 1.00 | 1.00 |
| Good | 5405/1 012 118 | 1.04 (1.00–1.08) | 1.04 (0.99–1.08) | 1.02 (0.98–1.07) |
| Fair | 12 148/1 475 816 | 1.38 (1.33–1.44) | 1.37 (1.31–1.42) | 1.32 (1.27–1.37) |
| Poor | 3414/311 262 | 1.96 (1.87–2.06) | 1.90 (1.81–1.99) | 1.76 (1.68–1.85) |
| Age-comparative self-rated health | | | | |
| Better | 4038/649 835 | 1.00 | 1.00 | 1.00 |
| Same | 14 939/2 172 181 | 1.27 (1.22–1.31) | 1.26 (1.21–1.31) | 1.23 (1.19–1.27) |
| Worse | 5048/501 051 | 1.95 (1.87–2.04) | 1.90 (1.82–1.99) | 1.78 (1.70–1.86) |

*Model 1: adjusted for age, marital status, education level, household income, occupation, and menopausal status.
†Model 2: model 1 plus sleep problems, cigarette smoking, alcohol consumption, physical activity, body mass index, and family history of heart disease.
‡Model 3: model 2 plus baseline major depression, diabetes mellitus, hypertension, and other comorbidities.

participants reporting worse age-comparative SRH had an 78% increased risk of developing IHD (HR: 1.78; 95% CI, 1.70–1.86; Table 2). The association merely changed in sensitivity analyses including those answering "don't know" (Table S3). Participants from north China with lower income showed a relatively weaker association (all $P<0.05$ for interaction), whereas the association was stronger among current drinkers versus never drinkers ($P<0.001$ for interaction; Figure 2 and Table S4). Effect modification by other covariates was not observed. When age-comparative SRH and global SRH were incorporated into the same model, their effect sizes were attenuated, but both remained independently associated with incident IHD (Table S5). The distribution of global SRH by age-comparative SRH was shown in Table S6. The weighted κ value of the consistency test for the 2 exposures was 0.29 (95% CI, 0.28–0.29), suggesting that they may provide overlapping information about health but are not interchangeable. The Harrel's C statistic values were both 0.77 in the final model with the 2 measures separately ($P=0.39$ comparing the 2 models).

Substantial variations were observed in the association among different regions, and the HR for IHD ranged from 1.19 (95% CI, 1.06–1.33) in Gansu residents to 2.92 (95% CI, 2.16–3.96) in Zhejiang residents when comparing worse versus better age-comparative SRH (Figure S2).

After excluding those with major depression or baseline comorbidities or those who died or developed IHD in the first 2 years of follow-up, associations between both global and age-comparative SRH and risk of IHD merely changed (Table S7).

## Discussion

In this large population-based prospective study, we found that both global and age-comparative SRH was associated with the risk of developing IHD in Chinese adults. The associations were independent of multiple well-established cardiovascular risk factors and might be modified by study location, education level, and household income.

Although SRH was considered a strong predictor of cardiovascular mortality[6–8] and all-cause mortality,[6–13] its utility for predicting risk of incident IHD has rarely been examined. In a Danish cohort of 1052 men and women,[14] Moller et al first reported that poor or miserable SRH was associated with a substantially higher risk of IHD; however, the sample size was small, with only 50 incident cases during 16 years of follow-up. In study of US adults aged 51 to 61 years,[15] SRH was a significant predictor of new-onset IHD, stroke, and other major chronic diseases except cancer. In this study, 691 incident IHD cases in 4770 participants were identified over a maximum of 16 years' follow-up. Another study among 2682 men aged 42 to 60 years in eastern Finland also reported a significant association between perceived health status and risk of myocardial infarction[13]; however, the association was attenuated to null after adjustment for baseline comorbidities (including symptomatic and asymptomatic coronary heart disease, stroke, diabetes mellitus, cancer, etc). The study followed participants for an average of 5.8 years and identified 205 incident myocardial infarction cases, but baseline cardiovascular diseases were not excluded. These studies suffered from limitations such as small sample size, single-sex participants, and small number of incident cases,[13–15] and their findings were largely inconsistent. Our study is thus the largest prospective study on this topic and the first in an Asian population. We used data from an ongoing Chinese megacohort study with participants who had different SES, lifestyles, and disease profiles. Consequently, we believe that our study provides compelling evidence of the association between SRH and incident IHD.

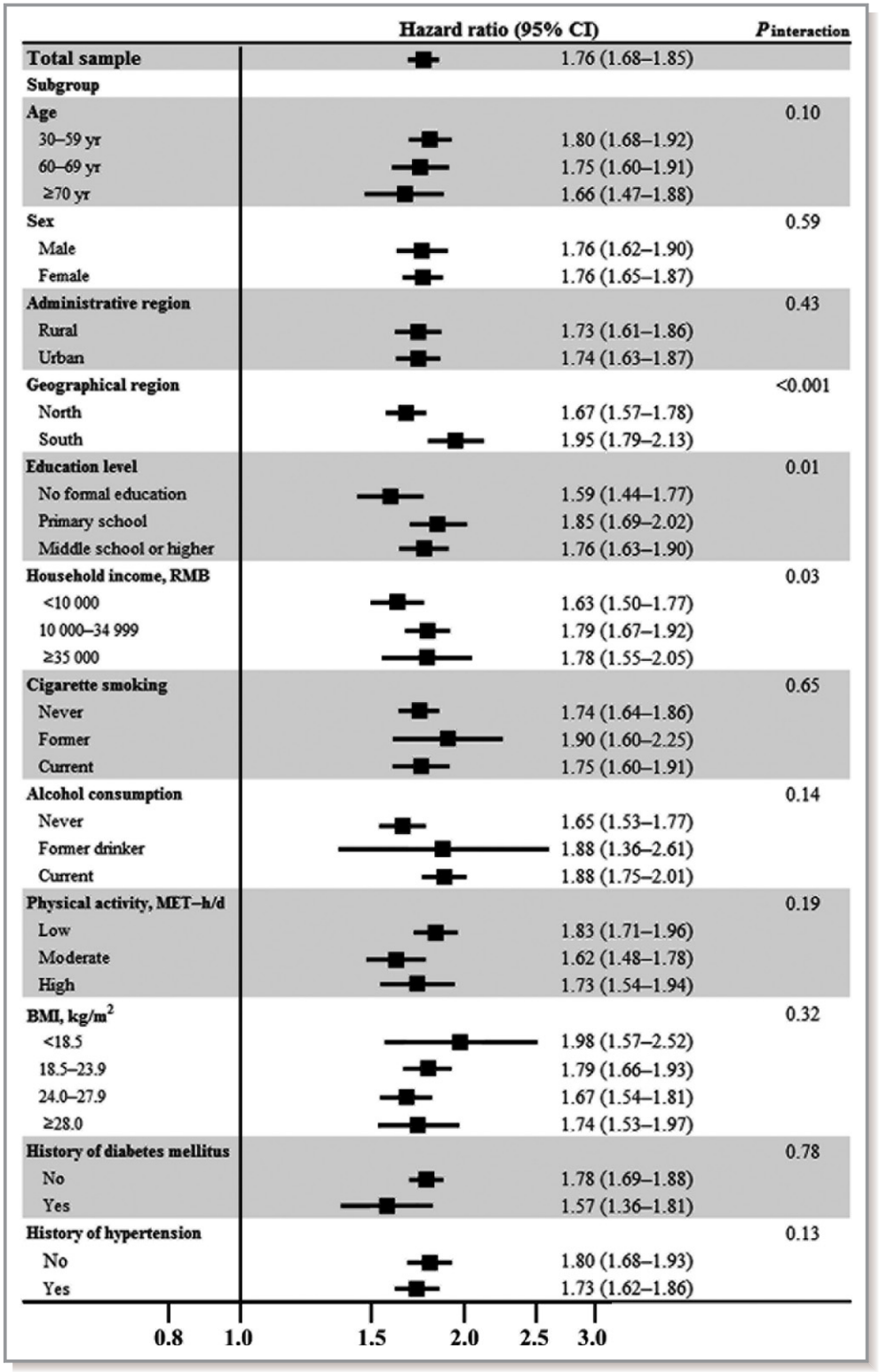


**Figure 1.** Poor vs excellent global self-rated health and risk of ischemic heart disease in the China Kadoorie Biobank study: stratified analysis. Hazard ratios (95% CIs) were calculated after adjustment for age, marital status, household income, education level, occupation, menopausal status, sleep problems, alcohol consumption, cigarette smoking, physical activity, body mass index, family history of heart disease, baseline major depression, diabetes mellitus, hypertension, and other comorbidities, except for the stratified variable in the corresponding stratified analysis. BMI indicates body mass index; CI, confidence interval; MET, metabolic equivalent; RMB, Chinese yuan renminbi.

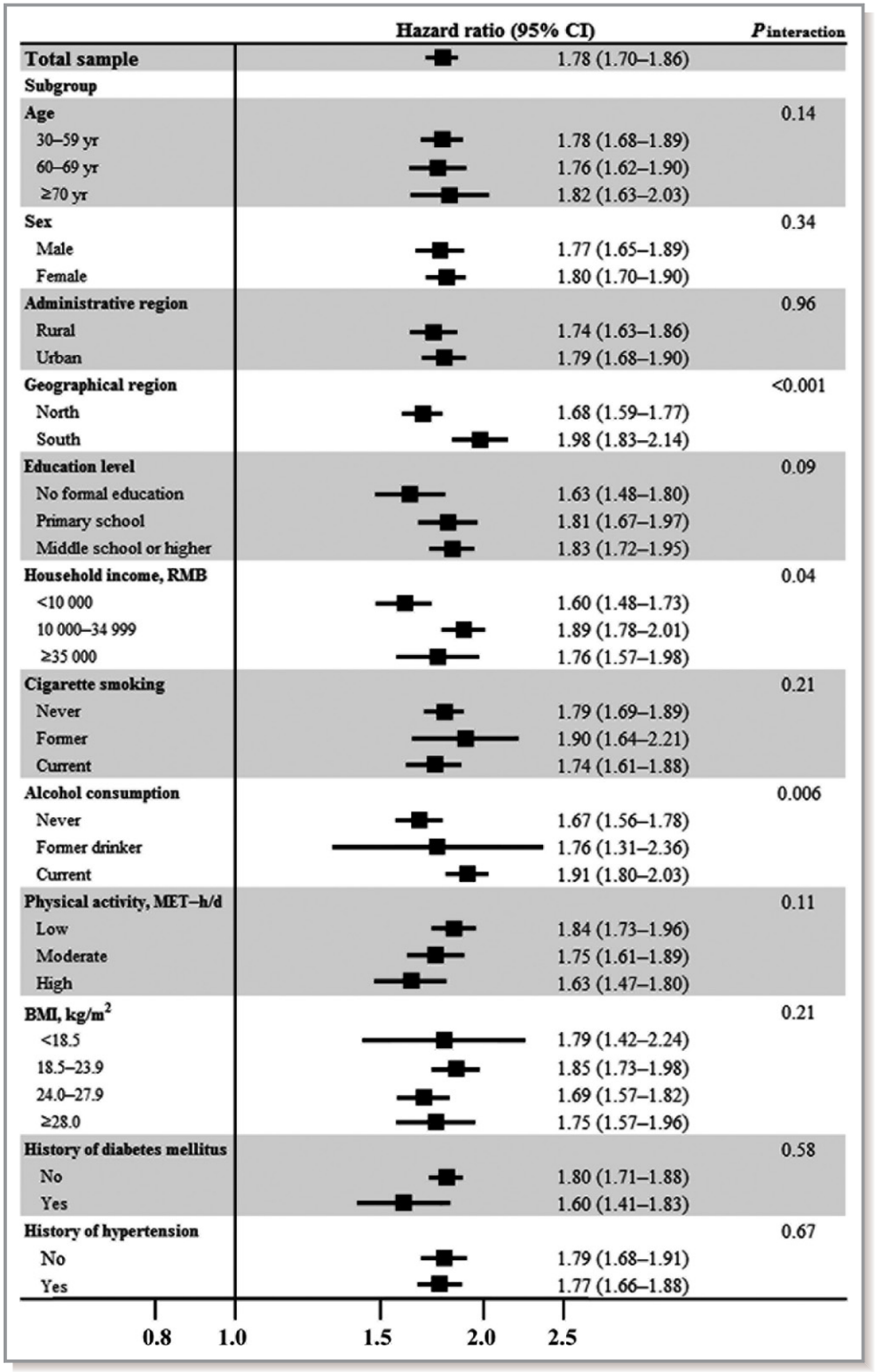


**Figure 2.** Worse vs better age-comparative self-rated health and risk of ischemic heart disease in the China Kadoorie Biobank study: stratified analysis. Hazard ratios (95% confidence intervals) were calculated after adjustment of age, marital status, household income, education level, occupation, menopausal status, sleep problems, alcohol consumption, cigarette smoking, physical activity, body mass index, family history of heart disease, baseline major depression, diabetes melllitus, hypertension, and other comorbidities, except for the stratified variable in the corresponding stratified analysis. BMI indicates body mass index; CI, confidence interval; MET, metabolic equivalent; RMB, Chinese yuan renminbi.

Because of the large sample size, we were able to explore associations in different subgroups, which was not possible in the previous 3 studies of the association between SRH and incident IHD.[13–15] We found that education and income, 2 commonly used indicators of SES, may modify the associations among global SRH, age-comparative SRH, and IHD risk: The associations were stronger among those with higher SES. This finding is consistent with those from studies of the influence of SRH on mortality.[23,24] People with higher SES may better understand their underlying health risks or objective health conditions[25] and may rate their health status more negatively when they are in a worse condition compared with their less educated or affluent counterparts.[23] We also found that the associations were stronger in south versus north China and in urban versus rural areas; these results may be attributable to discrepancies in overall SES in different regions, although we controlled for education levels, household income, and occupation in the models. The associations varied substantially across 10 study locations, but the exact reasons are unknown. We suspect that this may be due to different economic development levels across study sites. Culture, lifestyle, environment, and disease patterns were all different in different cities,[26,27] which may also potentially influence both SRH and heart disease.[28–33] However, positive associations existed across all subgroups, and SRH may be a reliable measurement for predicting IHD risk.

In addition to global SRH, we also examined the association between age-comparative SRH and risk of IHD. Some studies investigated the association of both measures of SRH with mortality,[6,10,12,34–37] but very few included both SRH measures in one model.[12,35,36] Consequently, it is difficult to directly identify which one is better for predicting cardiovascular mortality. Some studies argued that the association between age-comparative SRH and mortality was stronger and more consistent than that between global SRH and mortality[6,10,34] because age-comparative SRH had an explicit reference frame and compared health status for the same age, and thus was semantically clearer than global SRH.[10,34] Some thought, however, that global SRH was a preferable measure in longitudinal studies with a wide age range[12,37] because the age-comparative index tended to improve with age because of lower expectations for health among older adults, and thus reporting may be less reliable. Others contended that both measures were equally predictors of mortality and may not be comparable because different wording may capture different domains of health.[35,36] In a semantic study, investigators reported that global SRH was mainly connected to unspecific terms related with health such as *function, habits, youth*, and *diet*, whereas age-comparative SRH additionally led to social comparison, performance, and personal achievement.[38] In our study, we controlled age in all models, but associations between 2 measures and risk of IHD were statistically significant in overall analysis, and the associations remained strong in each age stratum for both measures in stratified analysis. In the models where both global SRH and age-comparative SRH were included, the magnitude of associations was reduced but both remained significant. Because the Harrel's C statistics were not different for the 2 predictive models including either global or age-comparative SRH, we believe both global SRH and age-comparative SRH are equally and independently useful for predicting risk of IHD.

Several reasons might explain the association among global SRH, age-comparative SRH, and risk of IHD. First, global SRH and age-comparative SRH are integrative measurements based on an individual's objective health status such as diagnosed diseases and treatment,[33,39] mental health (eg, depression, anxiety, and stress),[32,33,39] and physical dysfunction.[32,40] They fairly well reflect current overall health status of an individual and thus predict future disease events. Second, poor SRH was reported to be associated with chronic inflammation (reflected by high levels of interleukin 6 and C-reactive protein)[41–43] and abnormal autonomic nervous system function,[44] which are involved in the development of IHD. Third, unknown or underreported reasons such as individual disposition, nonfatal but lasting or frequently occurring ailments, and negative perceptions may result in unpleasant bodily sensations that could be perceived but not detected by traditional medical procedures.[45] This pathway was not commonly recognized and should be further investigated.

The strengths of our study include its prospective study design, large sample size, multiple stratified analyses, and investigation of 2 measures of SRH in 1 study and in 1 model. This study also has a few limitations. First, inaccurate reports of exposures due to poor understanding of the 2 questions might exist. In our study, participants were from 10 locations and had differences in age, SES levels, culture, and social environments that could influence understanding of the questions and selection of the answers. Second, objective health status may confound the associations between SRH and IHD risk but might not be adequately adjusted in analyses. In one study,[13] the association between SRH and myocardial infarction was attenuated to null when objective health conditions were added in the model. In our analyses, we excluded participants with baseline IHD, rheumatic heart disease, stroke, transient ischemic attack, and cancer and controlled for history of diabetes mellitus and hypertension in the models. We further excluded participants with major depression and comorbidities including diabetes mellitus, hypertension, and another 11 chronic diseases in the sensitivity analysis, and the associations remained unchanged. Third, there was a possibility of reverse causality

bias. Participants may report poor global SRH or worse age-comparative SRH at baseline because of undiagnosed cardiovascular disease; however, the positive associations between the 2 measures and IHD persisted even after we excluded those who died or developed IHD in the first 2 years after recruitment. Fourth, despite our efforts to control potential confounders, residual confounding might still be possible because of influence from factors such as air pollution, stress, or local culture. These might need to be controlled in future studies. Last, because all participants were Chinese, the results may not be generalized to other ethnicity groups; further investigations in other populations are warranted.

## Conclusions

Both global SRH and age-comparative SRH were sensitive predictors of IHD risk in China. Our findings suggest that the 2 SRH measures may provide additional value on top of traditional clinical measurements and well-established risk factors of IHD. They may be useful as screening tools in resource-limited settings. Given the limited number of high-quality studies on this specific topic, whether global SRH and age-comparative SRH can be applied in IHD risk assessment model or whether they can be used as screening tools in community and clinical care deserve further investigation.

## Appendix

### Members of the China Kadoorie Biobank Collaborative Group

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## Disclosures

None.

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# SUPPLEMENTAL MATERIAL

**Table S1.** Characteristics of the China Kadoorie Biobank Study by Age-comparative Self-rated Health Status at Baseline

| Variables | Total, N (%) | Age-comparative self-rated health, N (%) | | | |
|---|---|---|---|---|---|
| | | Better | Same | Worse | Don't know |
| **N** | 486541 (100) | 90738 (18.7) | 309022 (63.5) | 71791 (14.8) | 14990 (3.1) |
| **Age, years**[†] | 51.0 (10.5) | 50.8 (10.7) | 50.9 (10.5) | 51.4 (10.5) | 53.8 (11.0) |
| **Sex** | | | | | |
| **Male** | 199113 (40.9) | 41752 (46.0) | 127283 (41.2) | 24690 (34.4) | 5388 (35.9) |
| **Female** | 287428 (59.1) | 48986 (54.0) | 181739 (58.8) | 47101 (65.6) | 9602 (64.1) |
| **Marital status** | | | | | |
| **Married** | 44228 (90.9) | 82626 (91.0) | 282654 (91.4) | 63894 (89.0) | 13144 (87.7) |
| **Widowed** | 33081 (6.8) | 5853 (6.5) | 20015 (6.5) | 5793 (8.1) | 1420 (9.5) |
| **Separated/divorced** | 7579 (1.6) | 1765 (2.0) | 4178 (1.4) | 1372 (1.9) | 264 (1.7) |
| **Never married** | 3653 (0.7) | 494 (0.5) | 2265 (0.7) | 732 (1.0) | 162 (1.1) |
| **Education level** | | | | | |
| **No formal school** | 90829 (18.7) | 12931 (14.3) | 57403 (18.6) | 17331 (24.1) | 3164 (21.1) |
| **Primary** | 156407 (32.1) | 24060 (26.5) | 104137 (33.7) | 23403 (32.6) | 4807 (32.1) |
| **Middle or high school** | 211683 (43.5) | 45443 (50.1) | 131789 (42.6) | 28146 (39.2) | 6305 (42.0) |
| **College/university or more** | 27622 (5.7) | 8304 (9.1) | 15693 (5.1) | 2911 (4.1) | 714 (4.8) |
| **Household income,** | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **RMB** | | | | | |
| **<10,000** | 137893 (28.3) | 24621 (27.1) | 80679 (26.1) | 28885 (40.2) | 3708 (24.7) |
| **10,000-19,999** | 140432 (28.9) | 26004 (28.7) | 90375 (29.3) | 20027 (27.9) | 4026 (26.9) |
| **20,000-34,999** | 120197 (24.7) | 21718 (23.9) | 81437 (26.3) | 13752 (19.2) | 3290 (21.9) |
| **≥35,000** | 88019 (18.1) | 18395 (20.3) | 56531 (18.3) | 9127 (12.7) | 3966 (26.5) |
| **Occupation** | | | | | |
| **Farmers** | 208754 (42.9) | 33863 (37.3) | 137213 (44.4) | 33154 (46.2) | 4524 (30.2) |
| **Factory workers** | 71331 (14.7) | 14548 (16.0) | 46761 (15.1) | 8466 (11.8) | 1556 (10.4) |
| **Professionals and managers** | 64533 (13.3) | 16501 (18.2) | 38609 (12.5) | 7414 (10.3) | 2009 (13.4) |
| **Retired** | 72156 (14.8) | 16124 (17.8) | 43202 (14.0) | 9286 (12.9) | 3554 (23.6) |
| **Unemployed and others** | 69767 (14.3) | 9702 (10.7) | 43237 (14.0) | 13471 (18.8) | 3357 (22.4) |
| **Administrative Region** | | | | | |
| **Rural** | 276755 (56.9) | 41227 (45.4) | 188614 (61.0) | 42215 (58.8) | 4699 (31.3) |
| **Urban** | 209786 (43.1) | 49511 (54.6) | 120408 (39.0) | 29576 (41.2) | 10291 (68.7) |
| **Geographical region** | | | | | |
| **North** | 190992 (39.3) | 45072 (49.7) | 115313 (37.3) | 29285 (40.8) | 1322 (8.8) |
| **South** | 295549 (60.7) | 45666 (50.3) | 193709 (62.7) | 42506 (59.2) | 13668 (91.2) |
| **Sleep problems (Yes)** | 79756 （16.4） | 10244 (11.3) | 45539 (14.7) | 21159 (29.5) | 2814 (18.8) |
| **Cigarette smoking** | | | | | |
| **Never** | 301601 (62.0) | 52025 (57.3) | 192713 (62.4) | 46801 (65.2) | 10062 (67.1) |

| | | | | | |
|---|---|---|---|---|---|
| **Former** | 26807 (5.5) | 5428 (6.0) | 16253 (5.2) | 4385 (6.1) | 741 (5.0) |
| **Occasionally** | 27872 (5.7) | 5878 (6.5) | 17153 (5.6) | 3995 (5.6) | 846 (5.6) |
| **Current** | 130261 (26.8) | 27407 (30.2) | 82903 (26.8) | 16610 (23.1) | 3341 (22.3) |
| **Alcohol drinking** | | | | | |
| **Never** | 222161 (45.7) | 31476 (34.7) | 145507 (47.1) | 36254 (50.5) | 8924 (59.5) |
| **Ex-drinker** | 7751 (1.6) | 954 (1.1) | 4419 (1.4) | 2118 (3.0) | 260 (1.7) |
| **Occasionally** | 172550 (35.4) | 37489 (41.3) | 107436 (34.8) | 23796 (33.1) | 3829 (25.6) |
| **Weekly** | 84079 (17.3) | 80819 (22.9) | 51660 (16.7) | 9623 (13.4) | 1977 (13.2) |
| **Physical activity, MET-hr/wk‡** | 18.1 (10.8, 30.6) | 18.8 (11.2, 30.2) | 18.4 (11.0, 31.4) | 11.9 (9.6, 28.8) | 14.3 (8.4, 24.2) |
| **Menopausal status (women only)** | | | | | |
| **Premenopause** | 127325 (44.3) | 23446 (47.9) | 81960 (45.1) | 18548 (39.4) | 3371 (35.1) |
| **Perimenopause** | 14354 (5.0) | 2484 (5.1) | 9157 (5.0) | 2334 (4.9) | 379 (4.0) |
| **Postmenopause** | 145749 (50.7) | 23056 (47.0) | 90622 (49.9) | 26219 (55.7) | 5852 (60.9) |
| **BMI, kg/m$^2$** | | | | | |
| **<18.5** | 21428 (4.4) | 2244 (2.5) | 13167 (4.2) | 5117 (7.1) | 900 (6.0) |
| **18.5-23.9** | 255773 (52.6) | 44565 (49.1) | 165503 (53.6) | 37892 (52.8) | 7813 (52.1) |
| **24.0-27.9** | 159677 (32.8) | 33593 (37.0) | 100406 (32.5) | 20847 (29.0) | 4831 (32.2) |
| **≥28.0** | 49663 (10.2) | 10336 (11.4) | 29946 (9.7) | 7935 (11.1) | 1446 (9.7) |
| **Family history of heart disease (Yes)** | 15379 (3.2) | 3399 (3.8) | 8946 (2.9) | 2663 (3.7) | 371 (2.5) |

| | | | | | |
|---|---|---|---|---|---|
| **Baseline major depression (Yes)** | 2972 (0.6) | 309 (0.3) | 1308 (0.4) | 1274 (1.8) | 81 (0.5) |
| **Baseline diabetes (Yes)** | 26118 (5.4) | 3380 (3.7) | 14855 (4.8) | 6878 (9.6) | 1005 (6.7) |
| **Baseline hypertension (Yes)** | 158473 (32.6) | 26673 (29.4) | 101085 (32.7) | 25526 (35.6) | 5189 (34.6) |
| **Other baseline comorbidities (Yes)** | 229350 (47.1) | 38134 (42.0) | 141452 (45.8) | 42224 (58.8) | 7540 (50.3) |

* Two-sided P values were derived from ANOVA for continuous variables and Chi-square test for categorical variables, all *P* values are <0.001.

† Data are shown as mean (standard deviation).

‡ Data are shown as median (P25, P75).

**Table S2.** Stratified Analysis: Risk of Ischemic Heart Disease According to Global Self-rated Health Status

| Subgroups | Cases/person-years | Model 1* HR (95% CI) | Model 2† HR (95% CI) | Model 3‡ HR (95% CI) | *P* for interaction |
|---|---|---|---|---|---|
| **Age** | | | | | 0.10 |
| **30-59 years old** | | | | | |
| **Excellent** | 2070/515951 | 1.00 | 1.00 | 1.00 | |
| **Good** | 2950/818435 | 1.05 (0.99, 1.11) | 1.04 (0.99, 1.11) | 1.03 (1.97, 1.09) | |
| **Fair** | 6164/1133304 | 1.40 (1.33, 1.48) | 1.39 (1.32, 1.46) | 1.33 (1.27, 1.40) | |
| **Poor** | 1712/234020 | 2.02 (1.90, 2.16) | 1.96 (1.84, 2.10) | 1.80 (1.68, 1.92) | |
| **60-69 years old** | | | | | |
| **Excellent** | 1091/82991 | 1.00 | 1.00 | 1.00 | |
| **Good** | 1650/148674 | 1.08 (1.00, 1.17) | 1.08 (0.99, 1.16) | 1.06 (0.98, 1.15) | |
| **Fair** | 3998/256820 | 1.44 (1.34, 1.54) | 1.41 (1.32, 1.51) | 1.37 (1.27, 1.47) | |
| **Poor** | 1112/57703 | 1.95 (1.79, 2.13) | 1.87 (1.72, 2.05) | 1.75 (1.60, 1.91) | |
| **70-79 years old** | | | | | |
| **Excellent** | 577/25403 | 1.00 | 1.00 | 1.00 | |
| **Good** | 805/45009 | 0.96 (0.86, 1.07) | 0.95 (0.85, 1.06) | 0.94 (0.84, 1.05) | |
| **Fair** | 1986/85692 | 1.24 (1.13, 1.37) | 1.22 (1.10, 1.34) | 1.19 (1.08, 1.31) | |
| **Poor** | 590/19539 | 1.82 (1.62, 2.06) | 1.74 (1.54, 1.96) | 1.66 (1.47, 1.88) | |
| **Sex** | | | | | 0.59 |
| **Men** | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Excellent** | 1760/287799 | 1.00 | 1.00 | 1.00 | |
| **Good** | 2459/426251 | 1.06 (1.00, 1.13) | 1.06 (1.00, 1.13) | 1.05 (0.99, 1.12) | |
| **Fair** | 4830/568999 | 1.39 (1.31, 1.47) | 1.37 (1.30, 1.45) | 1.32 (1.25, 1.40) | |
| **Poor** | 1133/103122 | 1.96 (1.81, 2.12) | 1.91 (1.76, 2.06) | 1.76 (1.62, 1.90) | |
| **Women** | | | | | |
| **Excellent** | 1978/336547 | 1.00 | 1.00 | 1.00 | |
| **Good** | 2946/585867 | 1.03 (0.97, 1.09) | 1.02 (0.96, 1.08) | 1.00 (0.95, 1.06) | |
| **Fair** | 7318/906817 | 1.38 (1.31, 1.45) | 1.36 (1.29, 1.43) | 1.31 (1.25, 1.38) | |
| **Poor** | 2281/208140 | 1.96 (1.84, 2.09) | 1.89 (1.77, 2.01) | 1.76 (1.65, 1.87) | |
| **Administrative region** | | | | | 0.43 |
| **Rural** | | | | | |
| **Excellent** | 1407/276017 | 1.00 | 1.00 | 1.00 | |
| **Good** | 3228/650831 | 1.03 (0.96, 1.09) | 1.02 (0.96, 1.09) | 1.01 (0.95, 1.08) | |
| **Fair** | 6331/847499 | 1.33 (1.25, 1.41) | 1.31 (1.23, 1.39) | 1.28 (1.21, 1.36) | |
| **Poor** | 2096/202076 | 1.90 (1.77, 2.03) | 1.83 (1.71, 1.96) | 1.73 (1.61, 1.86) | |
| **Urban** | | | | | |
| **Excellent** | 2331/348328 | 1.00 | 1.00 | 1.00 | |
| **Good** | 2177/361287 | 1.05 (0.99, 1.11) | 1.04 (0.98, 1.11) | 1.03 (0.97, 1.09) | |
| **Fair** | 5817/628317 | 1.43 (1.36, 1.51) | 1.41 (1.34, 1.48) | 1.35 (1.28, 1.42) | |
| **Poor** | 1318/109186 | 2.00 (1.87, 2.15) | 1.92 (1.79, 2.06) | 1.74 (1.63, 1.87) | |
| **Geographical** | | | | | <0.001 |

| | | | | | |
|---|---|---|---|---|---|
| **region** | | | | | |
| **North** | | | | | |
| **Excellent** | 2795/297781 | 1.00 | 1.00 | 1.00 | |
| **Good** | 3149/377323 | 1.04 (0.99, 1.10) | 1.04 (0.99, 1.10) | 1.03 (0.97, 1.08) | |
| **Fair** | 6169/541521 | 1.35 (1.29, 1.41) | 1.33 (1.27, 1.40) | 1.29 (1.23, 1.35) | |
| **Poor** | 1888/118204 | 1.86 (1.76, 1.98) | 1.80 (1.70s, 1.92) | 1.67 (1.57, 1.78) | |
| **South** | | | | | |
| **Excellent** | 943/326565 | 1.00 | 1.00 | 1.00 | |
| **Good** | 2256/634795 | 1.07 (0.99, 1.16) | 1.06 (0.99, 1.15) | 1.05 (0.98, 1.14) | |
| **Fair** | 5979/934295 | 1.47 (1.37, 1.58) | 1.45 (1.36, 1.56) | 1.41 (1.31, 1.51) | |
| **Poor** | 1526/193059 | 2.16 (1.99, 2.35) | 2.09 (1.93, 2.28) | 1.95 (1.79, 2.13) | |
| **Education** | | | | | 0.01 |
| **No formal education** | | | | | |
| **Excellent** | 642/94398 | 1.00 | 1.00 | 1.00 | |
| **Good** | 1379/212064 | 1.02 (0.93, 1.12) | 1.00 (0.91, 1.11) | 1.00 (0.90, 1.09) | |
| **Fair** | 2800/258668 | 1.34 (1.22, 1.46) | 1.30 (1.19, 1.42) | 1.27 (1.16, 1.39) | |
| **Poor** | 1010/76573 | 1.75 (1.58, 1.94) | 1.66 (1.50, 1.84) | 1.59 (1.44, 1.77) | |
| **Primary school** | | | | | |
| **Excellent** | 958/163372 | 1.00 | 1.00 | 1.00 | |
| **Good** | 1776/327991 | 1.03 (0.95, 1.12) | 1.03 (0.96, 1.12) | 1.02 (0.95, 1.11) | |
| **Fair** | 4169/495850 | 1.33 (1.24, 1.43) | 1.32 (1.23, 1.42) | 1.28 (1.19, 1.38) | |

| | | | | | |
|---|---|---|---|---|---|
| **Poor** | 1205/110663 | 2.03 (1.86, 2.21) | 1.98 (1.81, 2.16) | 1.85 (1.69, 2.02) | |
| **Middle school or higher** | | | | | |
| **Excellent** | 2138/366575 | 1.00 | 1.00 | 1.00 | |
| **Good** | 2250/472063 | 1.05 (0.98, 1.11) | 1.04 (0.98, 1.10) | 1.03 (0.97, 1.09) | |
| **Fair** | 5179/721298 | 1.43 (1.36, 1.51) | 1.41 (1.34, 1.48) | 1.35 (1.28, 1.42) | |
| **Poor** | 1199/124027 | 2.02 (1.88, 2.17) | 1.94 (1.80, 2.09) | 1.76 (1.63, 1.90) | |
| **Income** | | | | | 0.03 |
| **<10,000** | | | | | |
| **Excellent** | 963/138097 | 1.00 | 1.00 | 1.00 | |
| **Good** | 1534/268338 | 0.95 (0.88, 1.04) | 0.95 (0.88, 1.04) | 0.95 (0.87, 1.03) | |
| **Fair** | 3569/442055 | 1.24 (1.15, 1.33) | 1.22 (1.14, 1.32) | 1.20 (1.11, 1.29) | |
| **Poor** | 1563/142699 | 1.79 (1.65, 1.94) | 1.73 (1.59, 1.88) | 1.63 (1.50, 1.77) | |
| **10,000-34,999** | | | | | |
| **Excellent** | 2019/339702 | 1.00 | 1.00 | 1.00 | |
| **Good** | 2833/543642 | 1.06 (1.00, 1.13) | 1.05 (0.99, 1.12) | 1.04 (0.98, 1.10) | |
| **Fair** | 6721/811926 | 1.41 (1.34, 1.49) | 1.39 (1.32, 1.47) | 1.34 (1.27, 1.41) | |
| **Poor** | 1555/138517 | 2.01 (1.88, 2.16) | 1.94 (1.81, 2.08) | 1.79 (1.67, 1.92) | |
| **≥35,000** | | | | | |
| **Excellent** | 756/146546 | 1.00 | 1.00 | 1.00 | |
| **Good** | 1038/200138 | 1.11 (1.01, 1.22) | 1.10 (1.00, 1.21) | 1.09 (0.99, 1.20) | |
| **Fair** | 1858/221835 | 1.52 (1.39, 1.66) | 1.49 (1.36, 1.63) | 1.44 (1.32, 1.57) | |

| | | | | | |
|---|---|---|---|---|---|
| **Poor** | 296/30047 | 2.01 (1.75, 2.30) | 1.92 (1.67, 2.21) | 1.78 (1.55, 2.05) | |
| **Cigarette smoking** | | | | | 0.65 |
| **Never** | | | | | |
| **Excellent** | 2102/364220 | 1.00 | 1.00 | 1.00 | |
| **Good** | 3092/618264 | 1.03 (0.97, 1.09) | 1.02 (0.97, 1.08) | 1.01 (0.95, 1.07) | |
| **Fair** | 7544/949098 | 1.39 (1.32, 1.46) | 1.37 (1.31, 1.44) | 1.33 (1.26, 1.39) | |
| **Poor** | 2126/203022 | 1.94 (1.82, 2.06) | 1.87 (1.76, 2.00) | 1.74 (1.64, 1.86) | |
| **Former** | | | | | |
| **Excellent** | 316/33514 | 1.00 | 1.00 | 1.00 | |
| **Good** | 460/53773 | 1.09 (0.94, 1.27) | 1.09 (0.94, 1.26) | 1.08 (0.93, 1.25) | |
| **Fair** | 991/76382 | 1.46 (1.28, 1.67) | 1.42 (1.25, 1.63) | 1.38 (1.21, 1.58) | |
| **Poor** | 312/18895 | 2.07 (1.76, 2.45) | 2.00 (1.69, 2.37) | 1.90 (1.60, 2.25) | |
| **Current** | | | | | |
| **Excellent** | 1320/226611 | 1.00 | 1.00 | 1.00 | |
| **Good** | 1853/340081 | 1.05 (0.98, 1.13) | 1.05 (0.98, 1.13) | 1.04 (0.96, 1.11) | |
| **Fair** | 3613/450336 | 1.34 (1.26, 1.43) | 1.33 (1.24, 1.42) | 1.28 (1.20, 1.36) | |
| **Poor** | 976/89345 | 1.95 (1.79, 2.13) | 1.90 (1.75, 2.08) | 1.75 (1.60, 1.91) | |
| **Alcohol drinking** | | | | | 0.14 |
| **Never** | | | | | |
| **Excellent** | 1467/249874 | 1.00 | 1.00 | 1.00 | |
| **Good** | 2433/458946 | 1.00 (0.94, 1.07) | 1.00 (0.93, 1.06) | 0.98 (0.92, 1.05) | |

| | | | | | |
|---|---|---|---|---|---|
| **Fair** | 6171/701208 | 1.36 (1.28, 1.44) | 1.35 (1.27, 1.43) | 1.30 (1.22, 1.38) | |
| **Poor** | 1814/156203 | 1.81 (1.69, 1.94) | 1.78 (1.65, 1.91) | 1.65 (1.53, 1.77) | |
| **Former** | | | | | |
| **Excellent** | 56/5892 | 1.00 | 1.00 | 1.00 | |
| **Good** | 119/11501 | 1.18 (0.85, 1.64) | 1.19 (0.86, 1.65) | 1.18 (0.85, 1.63) | |
| **Fair** | 317/24739 | 1.30 (0.97, 1.74) | 1.30 (0.97, 1.74) | 1.28 (0.95, 1.72) | |
| **Poor** | 148/9801 | 1.93 (1.40, 2.66) | 1.92 (1.39, 2.66) | 1.88 (1.36, 2.61) | |
| **Current** | | | | | |
| **Excellent** | 2215/368579 | 1.00 | 1.00 | 1.00 | |
| **Good** | 2853/541671 | 1.07 (1.01, 1.13) | 1.07 (1.01, 1.13) | 1.05 (1.00, 1.12) | |
| **Fair** | 5660/749869 | 1.39 (1.32, 1.46) | 1.38 (1.31, 1.45) | 1.33 (1.27, 1.40) | |
| **Poor** | 1452/145258 | 2.06 (1.93, 2.21) | 2.03 (1.89, 2.17) | 1.88 (1.75, 2.01) | |
| **Physical activity** | | | | | 0.19 |
| **Low** | | | | | |
| **Excellent** | 1695/160605 | 1.00 | 1.00 | 1.00 | |
| **Good** | 2303/267400 | 1.04 (0.98, 1.11) | 1.04 (0.97, 1.10) | 1.02 (0.96, 1.09) | |
| **Fair** | 6253/505584 | 1.40 (1.32, 1.48) | 1.38 (1.30, 1.46) | 1.33 (1.25, 1.40) | |
| **Poor** | 1959/117306 | 2.06 (1.92, 2.20) | 1.99 (1.86, 2.13) | 1.83 (1.71, 1.96) | |
| **Moderate** | | | | | |
| **Excellent** | 1279/230251 | 1.00 | 1.00 | 1.00 | |
| **Good** | 1664/336986 | 1.03 (0.95, 1.11) | 1.02 (0.94, 1.09) | 1.00 (0.93, 1.08) | |
| **Fair** | 3498/495711 | 1.35 (1.26, 1.44) | 1.32 (1.24, 1.41) | 1.27 (1.19, 1.36) | |

| | | | | | |
|---|---|---|---|---|---|
| **Poor** | 875/103363 | 1.82 (1.66, 1.99) | 1.75 (1.60, 1.92) | 1.62 (1.48, 1.78) | |
| **High** | | | | | |
| **Excellent** | 764/233490 | 1.00 | 1.00 | 1.00 | |
| **Good** | 1438/407732 | 1.07 (0.97, 1.16) | 1.06 (0.97, 1.16) | 1.05 (0.96, 1.15) | |
| **Fair** | 2397/474521 | 1.40 (1.29, 1.52) | 1.38 (1.27, 1.50) | 1.35 (1.24, 1.47) | |
| **Poor** | 580/90593 | 1.86 (1.66, 2.08) | 1.81 (1.61, 2.02) | 1.73 (1.54, 1.94) | |
| **BMI** | | | | | 0.32 |
| **<18.5 kg/m$^2$** | | | | | |
| **Excellent** | 106/17870 | 1.00 | 1.00 | 1.00 | |
| **Good** | 212/33597 | 1.12 (0.88, 1.42) | 1.11 (0.88, 1.41) | 1.10 (0.87, 1.40) | |
| **Fair** | 657/71552 | 1.51 (1.22, 1.87) | 1.48 (1.19, 1.83) | 1.44 (1.17, 1.79) | |
| **Poor** | 292/22222 | 2.18 (1.73, 2.75) | 2.06 (1.63, 2.60) | 1.98 (1.57, 2.52) | |
| **18.5-23.9 kg/m$^2$** | | | | | |
| **Excellent** | 1580/322407 | 1.00 | 1.00 | 1.00 | |
| **Good** | 2455/535525 | 1.05 (0.98, 1.12) | 1.04 (0.98, 1.11) | 1.03 (0.97, 1.10) | |
| **Fair** | 5445/785795 | 1.38 (1.30, 1.46) | 1.36 (1.29, 1.45) | 1.32 (1.25, 1.40) | |
| **Poor** | 1501/163667 | 1.98 (1.84, 2.13) | 1.92 (1.79, 2.07) | 1.79 (1.66, 1.93) | |
| **24.0-27.9 kg/m$^2$** | | | | | |
| **Excellent** | 1490/220322 | 1.00 | 1.00 | 1.00 | |
| **Good** | 1929/342523 | 1.01 (0.94, 1.08) | 1.01 (0.94, 1.08) | 0.99 (0.93, 1.06) | |
| **Fair** | 4249/470164 | 1.37 (1.29, 1.46) | 1.35 (1.27, 1.44) | 1.30 (1.22, 1.38) | |
| **Poor** | 1069/91315 | 1.89 (1.74, 2.05) | 1.81 (1.67, 1.97) | 1.67 (1.54, 1.81) | |

| | | | | | |
|---|---|---|---|---|---|
| **≥28.0 kg/m$^2$** | | | | | |
| **Excellent** | 562/63747 | 1.00 | 1.00 | 1.00 | |
| **Good** | 809/100473 | 1.10 (0.99, 1.23) | 1.09 (0.98, 1.22) | 1.08 (0.97, 1.21) | |
| **Fair** | 1797/148305 | 1.40 (1.27, 1.55) | 1.38 (1.25, 1.52) | 1.33 (1.20, 1.46) | |
| **Poor** | 552/34058 | 1.96 (1.73, 2.21) | 1.89 (1.67, 2.14) | 1.74 (1.53, 1.97) | |
| **History of diabetes** | | | | | 0.78 |
| **No** | | | | | |
| **Excellent** | 3431/603383 | 1.00 | 1.00 | 1.00 | |
| **Good** | 4964/975069 | 1.04 (0.99, 1.09) | 1.03 (0.99, 1.08) | 1.02 (0.98, 1.07) | |
| **Fair** | 10741/1391903 | 1.37 (1.32, 1.43) | 1.36 (1.30, 1.41) | 1.33 (1.27, 1.38) | |
| **Poor** | 2807/281472 | 1.92 (1.82, 2.02) | 1.87 (1.77, 1.97) | 1.78 (1.69, 1.88) | |
| **Yes** | | | | | |
| **Excellent** | 307/20962 | 1.00 | 1.00 | 1.00 | |
| **Good** | 441/37050 | 1.03 (0.89, 1.20) | 1.03 (0.89, 1.19) | 1.03 (0.89, 1.19) | |
| **Fair** | 1407/83913 | 1.29 (1.14, 1.47) | 1.27 (1.12, 1.44) | 1.25 (1.10, 1.42) | |
| **Poor** | 607/29790 | 1.69 (1.47, 1.95) | 1.62 (1.40, 1.87) | 1.57 (1.36, 1.81) | |
| **History of hypertension** | | | | | 0.13 |
| **No** | | | | | |
| **Excellent** | 2057/451148 | 1.00 | 1.00 | 1.00 | |
| **Good** | 2747/694975 | 1.05 (0.99, 1.11) | 1.05 (0.99, 1.11) | 1.04 (0.98, 1.10) | |

| | | | | |
|---|---|---|---|---|
| **Fair** | 5625/987276 | 1.34 (1.27, 1.41) | 1.33 (1.26, 1.40) | 1.30 (1.24, 1.37) |
| **Poor** | 1499/199089 | 1.93 (1.80, 2.06) | 1.89 (1.76, 2.03) | 1.80 (1.68, 1.93) |
| **Yes** | | | | |
| **Excellent** | 1681/173198 | 1.00 | 1.00 | 1.00 |
| **Good** | 2658/317143 | 1.02 (0.96, 1.09) | 1.01 (0.95, 1.08) | 1.01 (0.95, 1.08) |
| **Fair** | 6523/488539 | 1.37 (1.30, 1.45) | 1.35 (1.28, 1.43) | 1.33 (1.26, 1.41) |
| **Poor** | 1915/112174 | 1.87 (1.75, 2.00) | 1.80 (1.68, 1.92) | 1.73 (1.62, 1.86) |

* Model 1: adjusted for age, marital status, education level, household income, occupation, and menopausal status;

† Model 2: model 1 plus sleep problems, cigarette smoking, alcohol drinking, physical activity, body mass index, and family history of heart disease;

‡ Model 3: model 2 plus baseline major depression, diabetes, hypertension and other comorbidities.

**Table S3.** Sensitivity Analysis: Risk of Ischemic Heart Disease According to Age- Self-rated Health Status

| **Age-comparative self-rated health** | **Cases/person-years** | **Model 1*** **HR (95% CI)** | **Model 2†** **HR (95% CI)** | **Model 3‡** **HR (95% CI)** |
|---|---|---|---|---|
| **Including "don't know"** | | | | |
| Better | 4038/649835 | 1.00 | 1.00 | 1.00 |
| Same | 14939/2172181 | 1.27 (1.22, 1.31) | 1.26 (1.21, 1.31) | 1.23 (1.19, 1.27) |
| Worse | 5048/501051 | 1.96 (1.87, 2.04) | 1.91 (1.83, 1.99) | 1.78 (1.70, 1.86) |
| don't know | 680/100476 | 1.53 (1.41,1.67) | 1.51 (1.39,1.64) | 1.46 (1.34,1.59) |

* Model 1: adjusted for age, marital status, education level, household income, occupation, and menopausal status;

† Model 2: model 1 plus sleep problems, cigarette smoking, alcohol drinking, physical activity, body mass index, and family history of heart disease;

‡ Model 3: model 2 plus baseline major depression, diabetes, hypertension and other comorbidities.

**Table S4.** Stratified Analysis: Risk of Ischemic Heart Disease According to Age-comparative Self-rated Health Status

| Subgroups | Cases/person-years | Model 1* HR (95% CI) | Model 2† HR (95% CI) | Model 3‡ HR (95% CI) | *P* for interaction |
|---|---|---|---|---|---|
| **Age** | | | | | 0.14 |
| **30-59 years old** | | | | | |
| **Better** | 2015/511321 | 1.00 | 1.00 | 1.00 | |
| **Same** | 7828/1726348 | 1.26 (1.20, 1.32) | 1.26 (1.20, 1.32) | 1.23 (1.17, 1.29) | |
| **Worse** | 2761/394268 | 1.97 (1.86, 2.09) | 1.93 (1.82, 2.05) | 1.78 (1.68, 1.89) | |
| **60-69 years old** | | | | | |
| **Better** | 1311/103743 | 1.00 | 1.00 | 1.00 | |
| **Same** | 4769/339072 | 1.30 (1.22, 1.39) | 1.29 (1.21, 1.37) | 1.26 (1.18, 1.34) | |
| **Worse** | 1548/82252 | 1.94 (1.80, 2.09) | 1.88 (1.74, 2.03) | 1.76 (1.62, 1.90) | |
| **70-79 years old** | | | | | |
| **Better** | 712/34771 | 1.00 | 1.00 | 1.00 | |
| **Same** | 2342/106761 | 1.24 (1.13, 1.35) | 1.22 (1.12, 1.33) | 1.20 (1.10, 1.31) | |
| **Worse** | 739/24531 | 1.97 (1.77, 2.19) | 1.89 (1.69, 2.11) | 1.82 (1.63, 2.03) | |
| **Sex** | | | | | 0.34 |
| **Men** | | | | | |
| **Better** | 1955/296829 | 1.00 | 1.00 | 1.00 | |
| **Same** | 6243/885507 | 1.22 (1.16, 1.29) | 1.22 (1.16, 1.29) | 1.19 (1.13, 1.25) | |
| **Worse** | 1720/168252 | 1.93 (1.80, 2.06) | 1.90 (1.78, 2.03) | 1.77 (1.65, 1.89) | |

| | | | | | |
|---|---|---|---|---|---|
| **Women** | | | | | |
| **Better** | 2083/353006 | 1.00 | 1.00 | 1.00 | |
| **Same** | 8696/1286673 | 1.31 (1.24, 1.37) | 1.29 (1.23, 1.36) | 1.26 (1.20, 1.33) | |
| **Worse** | 3328/332799 | 1.99 (1.88, 2.10) | 1.92 (1.82, 2.04) | 1.80 (1.70, 1.90) | |
| **Administrative region** | | | | | 0.96 |
| **Rural** | | | | | |
| **Better** | 1484/301125 | 1.00 | 1.00 | 1.00 | |
| **Same** | 8453/1344074 | 1.25 (1.18, 1.32) | 1.24 (1.17, 1.31) | 1.22 (1.15, 1.29) | |
| **Worse** | 2855/297499 | 1.88 (1.76, 2.01) | 1.83 (1.71, 1.95) | 1.74 (1.63, 1.86) | |
| **Urban** | | | | | |
| **Better** | 2554/348710 | 1.00 | 1.00 | 1.00 | |
| **Same** | 6486/828107 | 1.28 (1.22, 1.34) | 1.27 (1.21, 1.33) | 1.23 (1.18, 1.29) | |
| **Worse** | 2193/203552 | 2.02 (1.90, 2.14) | 1.95 (1.84, 2.07) | 1.79 (1.68, 1.90) | |
| **Geographical region** | | | | | <0.001 |
| **North** | | | | | |
| **Better** | 3047/321838 | 1.00 | 1.00 | 1.00 | |
| **Same** | 7895/799026 | 1.26 (1.21, 1.32) | 1.26 (1.21, 1.31) | 1.23 (1.18, 1.28) | |
| **Worse** | 2917/204427 | 1.85 (1.76, 1.95) | 1.81 (1.71, 1.90) | 1.68 (1.59, 1.77) | |
| **South** | | | | | |
| **Better** | 991/327997 | 1.00 | 1.00 | 1.00 | |

| | | | | | |
|---|---|---|---|---|---|
| **Same** | 7044/1373155 | 1.29 (1.21, 1.39) | 1.29 (1.20, 1.38) | 1.26 (1.18, 1.35) | |
| **Worse** | 2131/296624 | 2.15 (1.99, 2.32) | 2.10 (1.94, 2.27) | 1.98 (1.83, 2.14) | |
| **Education** | | | | | 0.09 |
| **No formal school** | | | | | |
| **Better** | 663/93968 | 1.00 | 1.00 | 1.00 | |
| **Same** | 3515/406313 | 1.25 (1.15, 1.36) | 1.23 (1.13, 1.34) | 1.21 (1.11, 1.32) | |
| **Worse** | 1469/120336 | 1.78 (1.62, 1.95) | 1.70 (1.55, 1.87) | 1.63 (1.48, 1.80) | |
| **Primary** | | | | | |
| **Better** | 1030/172323 | 1.00 | 1.00 | 1.00 | |
| **Same** | 5260/730695 | 1.24 (1.15, 1.33) | 1.23 (1.15, 1.32) | 1.20 (1.12, 1.29) | |
| **Worse** | 1611/161926 | 1.98 (1.83, 2.15) | 1.94 (1.79, 2.1, ) | 1.81 (1.67, 1.97) | |
| **Middle school or higher** | | | | | |
| **Better** | 2345/383544 | 1.00 | 1.00 | 1.00 | |
| **Same** | 6164/1035173 | 1.28 (1.22, 1.35) | 1.28 (1.22, 1.34) | 1.24 (1.18, 1.30) | |
| **Worse** | 1968/218789 | 2.04 (1.92, 2.17) | 1.99 (1.87, 2.12) | 1.83 (1.72, 1.95) | |
| **Income** | | | | | 0.04 |
| **<10,000** | | | | | |
| **Better** | 1160/179879 | 1.00 | 1.00 | 1.00 | |
| **Same** | 4233/581341 | 1.17 (1.09, 1.25) | 1.16 (1.09, 1.24) | 1.14 (1.07, 1.22) | |
| **Worse** | 2071/203782 | 1.74 (1.62, 1.88) | 1.69 (1.57, 1.82) | 1.60 (1.48, 1.73) | |
| **10,000-34,999** | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Better** | 2013/342640 | 1.00 | 1.00 | 1.00 | |
| **Same** | 8244/1205969 | 1.31 (1.25, 1.38) | 1.30 (1.24, 1.37) | 1.27 (1.21, 1.33) | |
| **Worse** | 2458/235471 | 2.09 (1.97, 2.21) | 2.03 (1.91, 2.16) | 1.89 (1.78, 2.01) | |
| **≥35,000** | | | | | |
| **Better** | 775/127316 | 1.00 | 1.00 | 1.00 | |
| **Same** | 2462/384871 | 1.29 (1.18, 1.41) | 1.29 (1.18, 1.40) | 1.26 (1.15, 1.37) | |
| **Worse** | 519/61798 | 1.94 (1.73, 2.18) | 1.89 (1.68, 2.12) | 1.76 (1.57, 1.98) | |
| **Cigarette smoking** | | | | | 0.21 |
| **Never** | | | | | |
| **Better** | 2194/374639 | 1.00 | 1.00 | 1.00 | |
| **Same** | 9066/1361516 | 1.31 (1.25, 1.37) | 1.30 (1.24, 1.36) | 1.27 (1.21, 1.33) | |
| **Worse** | 3170/330686 | 1.97 (1.86, 2.08) | 1.91 (1.81, 2.02) | 1.79 (1.69, 1.89) | |
| **Former** | | | | | |
| **Better** | 383/38017 | 1.00 | 1.00 | 1.00 | |
| **Same** | 1208/111150 | 1.31 (1.16, 1.47) | 1.30 (1.15, 1.46) | 1.27 (1.12, 1.43) | |
| **Worse** | 439/28689 | 2.06 (1.78, 2.37) | 2.01 (1.73, 2.33) | 1.90 (1.64, 2.21) | |
| **Current** | | | | | |
| **Better** | 1461/237179 | 1.00 | 1.00 | 1.00 | |
| **Same** | 4665/699514 | 1.18 (1.11, 1.26) | 1.18 (1.11, 1.26) | 1.15 (1.08, 1.22) | |
| **Worse** | 1439/141675 | 1.91 (1.77, 2.06) | 1.88 (1.74, 2.03) | 1.74 (1.61, 1.88) | |
| **Alcohol drinking** | | | | | 0.006 |

| | | | | | |
|---|---|---|---|---|---|
| **Never** | | | | | |
| **Better** | 1430/226918 | 1.00 | 1.00 | 1.00 | |
| **Same** | 7371/1026479 | 1.25 (1.18, 1.33) | 1.25 (1.18, 1.33) | 1.22 (1.15, 1.29) | |
| **Worse** | 2670/253196 | 1.81 (1.70, 1.94) | 1.79 (1.68, 1.91) | 1.67 (1.56, 1.78) | |
| **Former** | | | | | |
| **Better** | 68/6707 | 1.00 | 1.00 | 1.00 | |
| **Same** | 359/29972 | 1.17 (0.89, 1.54) | 1.19 (0.90, 1.56) | 1.17 (0.89, 1.54) | |
| **Worse** | 187/13611 | 1.76 (1.32, 2.35) | 1.77 (1.32, 2.37) | 1.76 (1.31, 2.36) | |
| **Current** | | | | | |
| **Better** | 2540/416209 | 1.00 | 1.00 | 1.00 | |
| **Same** | 7209/1115730 | 1.26 (1.21, 1.32) | 1.27 (1.21, 1.33) | 1.23 (1.18, 1.29) | |
| **Worse** | 2191/234245 | 2.06 (1.94, 2.18) | 2.04 (1.93, 2.17) | 1.91 (1.80, 2.03) | |
| **Physical activity** | | | | | 0.11 |
| **Low** | | | | | |
| **Better** | 1914/182631 | 1.00 | 1.00 | 1.00 | |
| **Same** | 7196/656658 | 1.28 (1.21, 1.34) | 1.27 (1.2, 1.34) | 1.23 (1.17, 1.30) | |
| **Worse** | 2703/170373 | 2.05 (1.93, 2.18) | 2.00 (1.88, 2.12) | 1.84 (1.73, 1.96) | |
| **Moderate** | | | | | |
| **Better** | 1350/240532 | 1.00 | 1.00 | 1.00 | |
| **Same** | 4388/722107 | 1.27 (1.19, 1.35) | 1.26 (1.18, 1.34) | 1.24 (1.16, 1.32) | |
| **Worse** | 1380/168379 | 1.91 (1.77, 2.06) | 1.87 (1.73, 2.02) | 1.75 (1.61, 1.89) | |
| **High** | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Better** | 774/226671 | 1.00 | 1.00 | 1.00 | |
| **Same** | 3355/793416 | 1.21 (1.12, 1.31) | 1.21 (1.11, 1.31) | 1.19 (1.10, 1.29) | |
| **Worse** | 965/162299 | 1.72 (1.56, 1.90) | 1.69 (1.53, 1.87) | 1.63 (1.47, 1.80) | |
| **BMI** | | | | | 0.21 |
| **<18.5 kg/m$^2$** | | | | | |
| **Better** | 107/15798 | 1.00 | 1.00 | 1.00 | |
| **Same** | 741/89954 | 1.38 (1.12, 1.71) | 1.35 (1.09, 1.67) | 1.34 (1.08, 1.65) | |
| **Worse** | 387/33516 | 1.97 (1.58, 2.46) | 1.85 (1.47, 2.31) | 1.79 (1.42, 2.24) | |
| **18.5-23.9 kg/m$^2$** | | | | | |
| **Better** | 1617/319765 | 1.00 | 1.00 | 1.00 | |
| **Same** | 6784/1168757 | 1.27 (1.20, 1.34) | 1.26 (1.19, 1.34) | 1.24 (1.17, 1.31) | |
| **Worse** | 2262/266220 | 2.03 (1.90, 2.16) | 1.98 (1.85, 2.11) | 1.85 (1.73, 1.98) | |
| **24.0-27.9 kg/m$^2$** | | | | | |
| **Better** | 1671/240369 | 1.00 | 1.00 | 1.00 | |
| **Same** | 5256/705365 | 1.24 (1.17, 1.31) | 1.23 (1.16, 1.30) | 1.20 (1.13, 1.27) | |
| **Worse** | 1575/146361 | 1.90 (1.77, 2.05) | 1.82 (1.70, 1.96) | 1.69 (1.57, 1.82) | |
| **≥28.0 kg/m$^2$** | | | | | |
| **Better** | 643/73903 | 1.00 | 1.00 | 1.00 | |
| **Same** | 2158/208105 | 1.33 (1.22, 1.46) | 1.32 (1.21, 1.45) | 1.29 (1.17, 1.41) | |
| **Worse** | 824/54954 | 1.96 (1.76, 2.18) | 1.90 (1.71, 2.12) | 1.75 (1.57, 1.96) | |
| **History of diabetes** | | | | | 0.58 |

| | | | | | |
|---|---|---|---|---|---|
| **No** | | | | | |
| **Better** | 3688/627060 | 1.00 | 1.00 | 1.00 | |
| **Same** | 13489/2073825 | 1.26 (1.21, 1.31) | 1.26 (1.21, 1.30) | 1.24 (1.19, 1.28) | |
| **Worse** | 4177/456726 | 1.90 (1.82, 1.99) | 1.87 (1.79, 1.96) | 1.80 (1.71, 1.88) | |
| **Yes** | | | | | |
| **Better** | 350/22775 | 1.00 | 1.00 | 1.00 | |
| **Same** | 1450/98355 | 1.18 (1.04, 1.33) | 1.16 (1.03, 1.31) | 1.15 (1.02, 1.30) | |
| **Worse** | 871/44325 | 1.72 (1.51, 1.95) | 1.65 (1.45, 1.88) | 1.60 (1.41, 1.83) | |
| **History of hypertension** | | | | | 0.67 |
| **No** | | | | | |
| **Better** | 2110/461306 | 1.00 | 1.00 | 1.00 | |
| **Same** | 7229/1476027 | 1.26 (1.2, 1.33) | 1.26 (1.2, 1.33) | 1.25 (1.18, 1.31) | |
| **Worse** | 2262/328713 | 1.9 (1.79, 2.02) | 1.87 (1.76, 1.99) | 1.79 (1.68, 1.91) | |
| **Yes** | | | | | |
| **Better** | 1928/188528 | 1.00 | 1.00 | 1.00 | |
| **Same** | 7710/696154 | 1.23 (1.17, 1.30) | 1.22 (1.16, 1.29) | 1.21 (1.15, 1.28) | |
| **Worse** | 2786/172338 | 1.89 (1.78, 2.01) | 1.83 (1.72, 1.94) | 1.77 (1.66, 1.88) | |

[*]Model 1: adjusted for age, marital status, education level, household income, occupation, and menopausal status;

[†]Model 2: model 1 plus sleep problems, cigarette smoking, alcohol drinking, physical activity, body mass index, and family history of heart disease;

[‡]Model 3: model 2 plus baseline major depression, diabetes, hypertension and other comorbidities.

**Table S5.** Risk of Ischemic Heart Disease According to Two Measures of Self-rated Health Status

| Exposures | A* | B† | C‡ |
|---|---|---|---|
| | HR (95% CI) | HR (95% CI) | HR (95% CI) |
| **Global self-rated health (Reference=Excellent)** | | | |
| **Good** | 1.02 (0.98, 1.07) | | 0.98 (0.94, 1.03) |
| **Fair** | 1.32 (1.27, 1.37) | | 1.19 (1.14, 1.25) |
| **Poor** | 1.76 (1.68, 1.85) | | 1.37 (1.29, 1.45) |
| **Age-comparative self-rated health (Reference=Better)§** | | | |
| **Same** | | 1.23 (1.19, 1.27) | 1.14 (1.10, 1.19) |
| **Worse** | | 1.78 (1.70, 1.86) | 1.46 (1.37, 1.53) |
| **Don't know** | | 1.46 (1.34, 1.59) | 1.27 (1.17, 1.39) |

* only global self-rated health was included in model 3 (adjusted for age, marital status, education level, household income, occupation, and menopausal status, sleep problems, cigarette smoking, alcohol drinking, physical activity, body mass index, family history of heart disease, baseline major depression, diabetes, hypertension, and other comorbidities).

† only age-comparative self-rated health was included in model 3.

‡ both global self-rated health and age-comparative self-rated health were included in model 3.

§ Participants who reported “don’t know” to the age-comparative self-rated health question were not excluded in this analysis.

**Table S6.** The Distribution of Global Self-rated Health Status by Age-comparative Self-rated Health Status

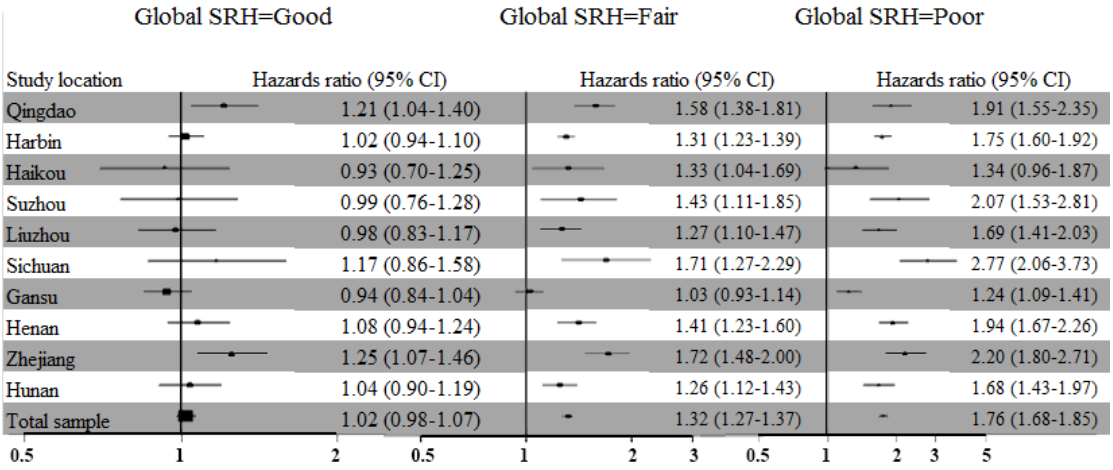
| Global self-rated health | Age-comparative self-rated health, N (%) | | | | Total, N (%) |
|---|---|---|---|---|---|
| | Better | Same | Worse | Don't Know | |
| **Excellent** | 46 875 (51.7) | 39414 (12.8) | 717 (1.0) | 1334 (8.9) | 88340 (18.2) |
| **Good** | 30 651 (33.8) | 105 831 (34.2) | 2 862 (4.0) | 1678 (11.2) | 141022 (29.0) |
| **Fair** | 12 320 (13.6) | 157 926 (51.1) | 31 521 (43.9) | 10391 (69.3) | 212158 (43.6) |
| **Poor** | 892 (1.0) | 5851 (1.9) | 36 691 (51.1) | 1587 (10.6) | 45021 (9.3) |
| **Total, N (%)** | 90 738 (18.6) | 309 022 (63.5) | 71791 (14.8) | 14990 (3.1) | 486541 |

**Table S7.** Sensitivity Analysis: Risk of Ischemic Heart Disease According to Two Measures of Self-rated Health Status

| Excluding participants with baseline conditions | Major depression (n=2,972) | Baseline comorbidities (n=238,007) | Died or developed IHD in the first 2 years (n=9,147) |
|---|---|---|---|
| | HR (95% CI) | HR (95% CI) | HR (95% CI) |
| **Global self-rated health** | | | |
| **Excellent** | 1.00 | 1.00 | 1.00 |
| **Good** | 1.02 (0.98, 1.07) | 1.05 (0.98, 1.13) | 1.06 (1.01, 1.11) |
| **Fair** | 1.32 (1.27, 1.37) | 1.32 (1.24, 1.41) | 1.32 (1.26, 1.37) |
| **Poor** | 1.78 (1.69, 1.87) | 1.88 (1.72, 2.06) | 1.76 (1.66, 1.86) |
| **Age-comparative self-rated health** | | | |
| **Better** | 1.00 | 1.00 | 1.00 |
| **Same** | 1.23 (1.19, 1.27) | 1.26 (1.18, 1.33) | 1.22 (1.17, 1.27) |
| **Worse** | 1.79 (1.71, 1.87) | 1.89 (1.74, 2.04) | 1.75 (1.67, 1.84) |

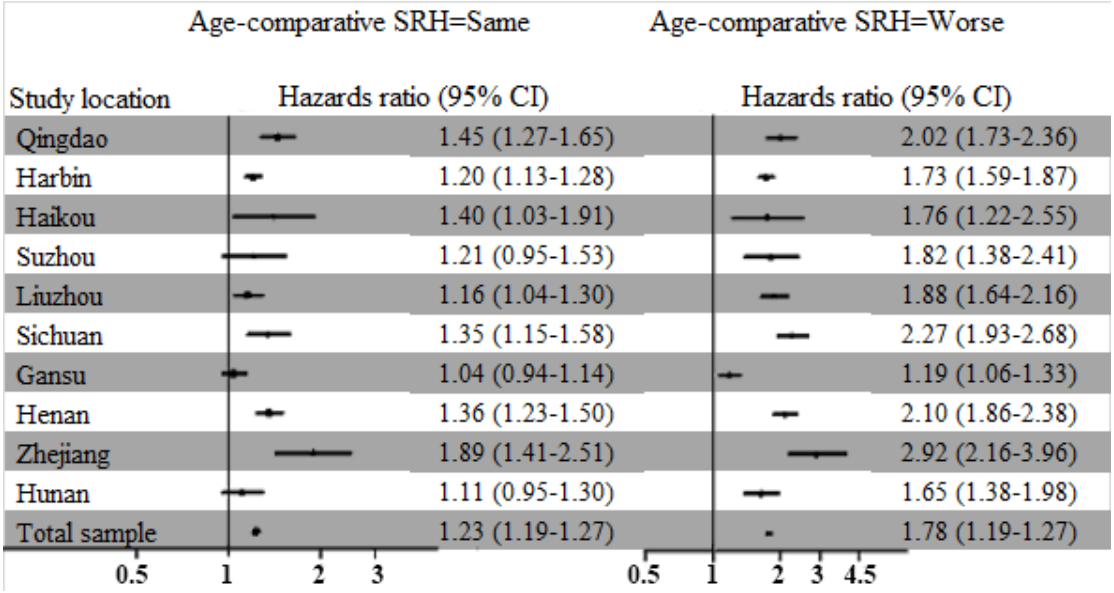
Hazards ratios (95% confidence interval) were calculated after adjustment for age, marital status, education level, household income, occupation, and menopausal status, sleep problems, cigarette smoking, alcohol drinking, physical activity, body mass index, family history of heart disease, baseline major depression, diabetes, hypertension, and other comorbidities.

**Figure S1.** Risk of Ischemic Heart Disease According to global Self-rated Health Status by study locations




Hazards ratios (95% CI) were calculated after adjustment for age, marital status, education level, household income, occupation, and menopausal status, sleep problems, cigarette smoking, alcohol drinking, physical activity, body mass index, family history of heart disease, and baseline major depression, diabetes, hypertension and other comorbidities.

**Figure S2.** Risk of Ischemic Heart Disease According to Age-comparative Self-rated Health Status by study locations




Hazards ratios (95% CI) were calculated after adjustment for age, marital status, education level, household income, occupation, and menopausal status, sleep problems, cigarette smoking, alcohol drinking, physical activity, body mass index, family history of heart disease, and baseline major depression, diabetes, hypertension and other comorbidities.