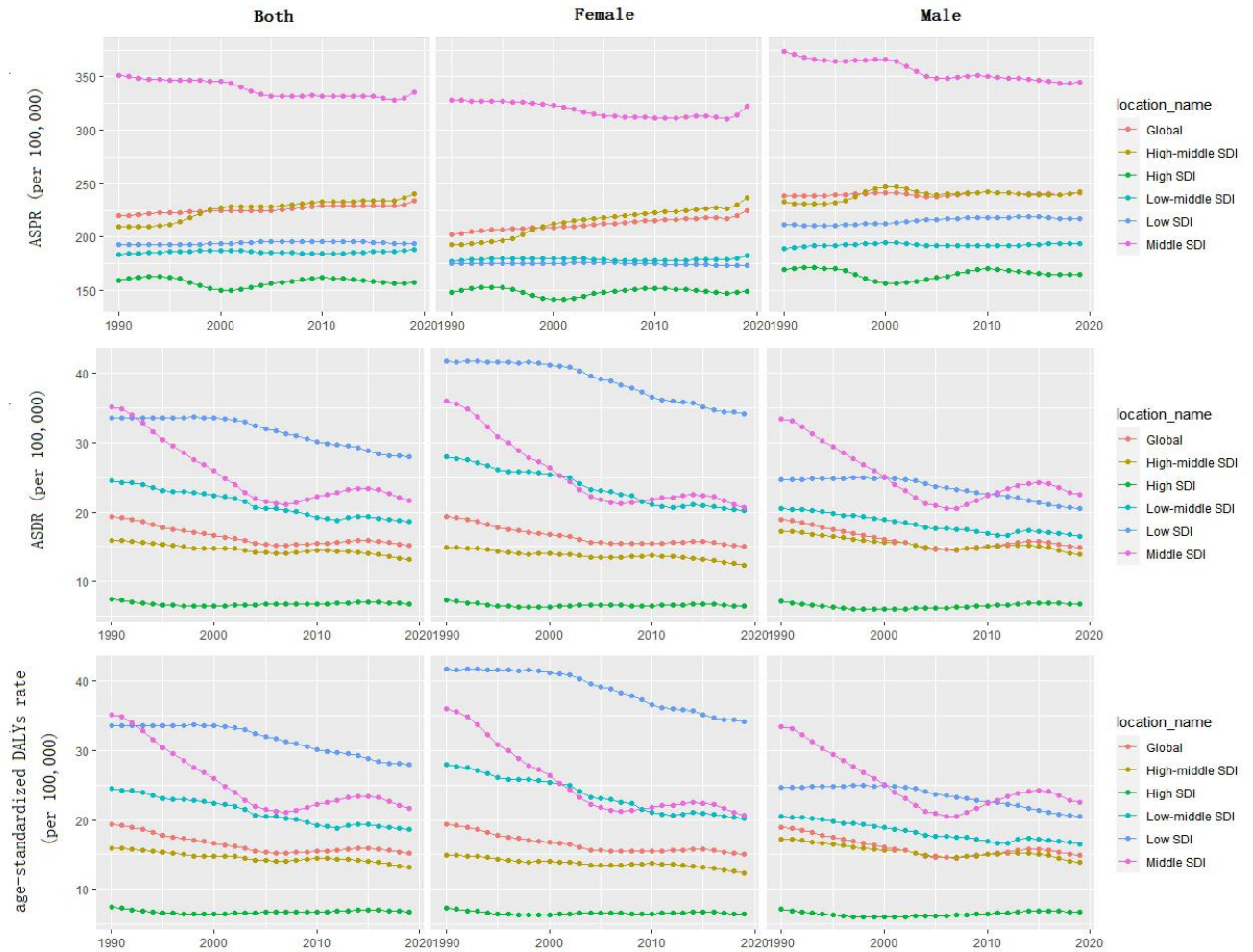


Supplementary Figure S1. The change trends of age-standardized hypertensive heart disease prevalence, death, and DALY rate among different SDI quintiles and gender from 1990 to 2019.

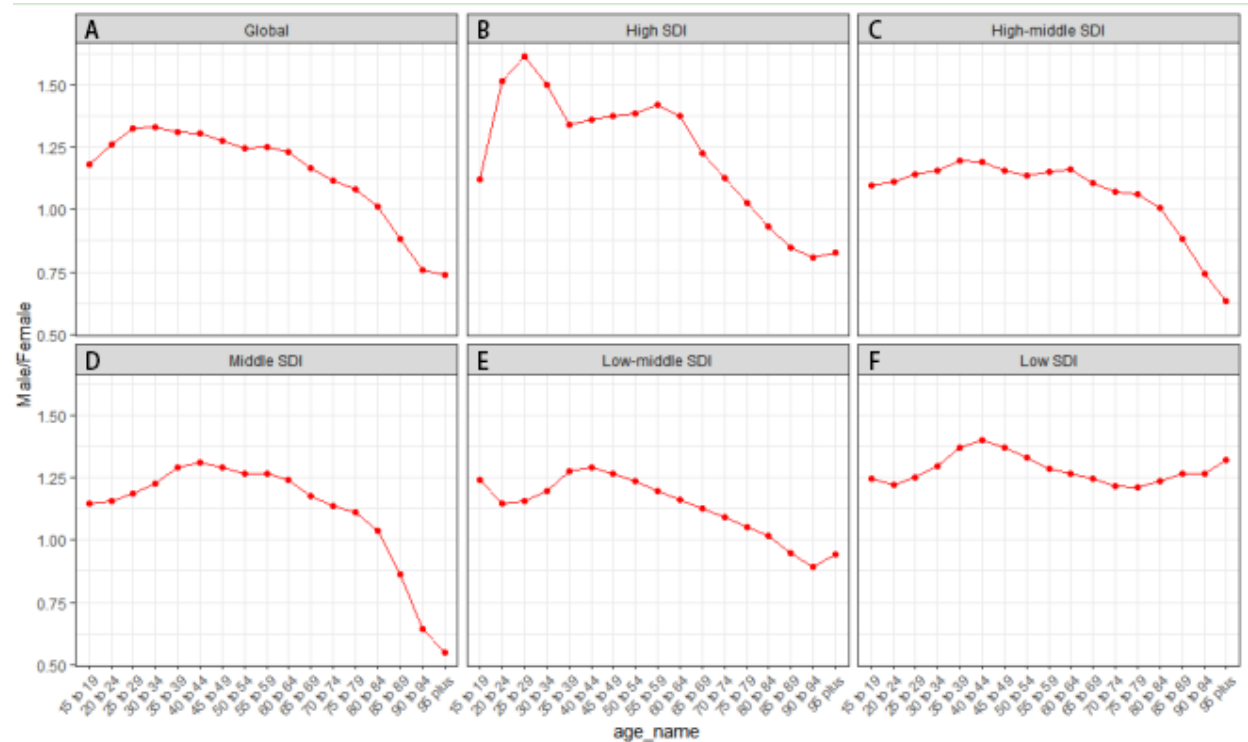
A – ASPR, age standardized prevalence rate. **B** – ASDR, age standardized death rate.

C – age-standardized DALY rate

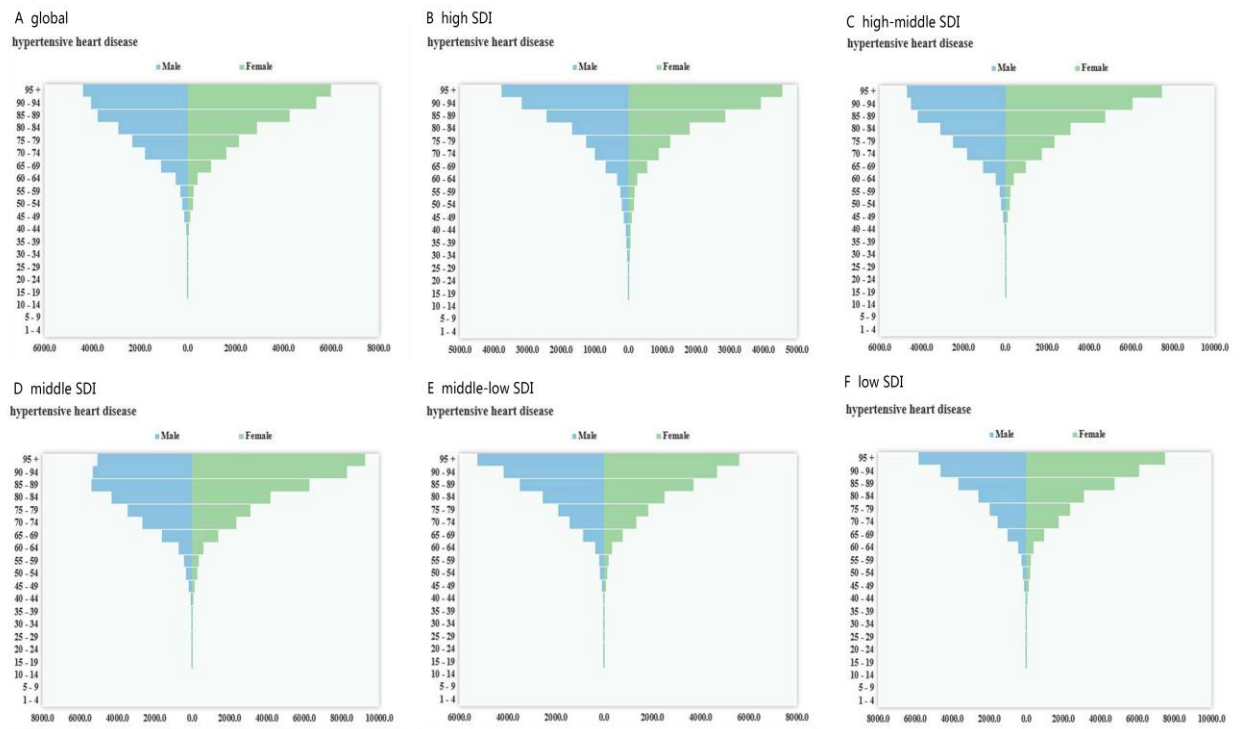
DALY – disability adjusted life-year.



Supplementary Figure S2. The ratio of male to female prevalence among different age groups in 2019. **A** – Global. **B** – High SDI. **C** – High-middle SDI. **D** – Middle SDI. **E** – Middle-low SDI. **F** – Low SDI
SDI – socio-demographic index.

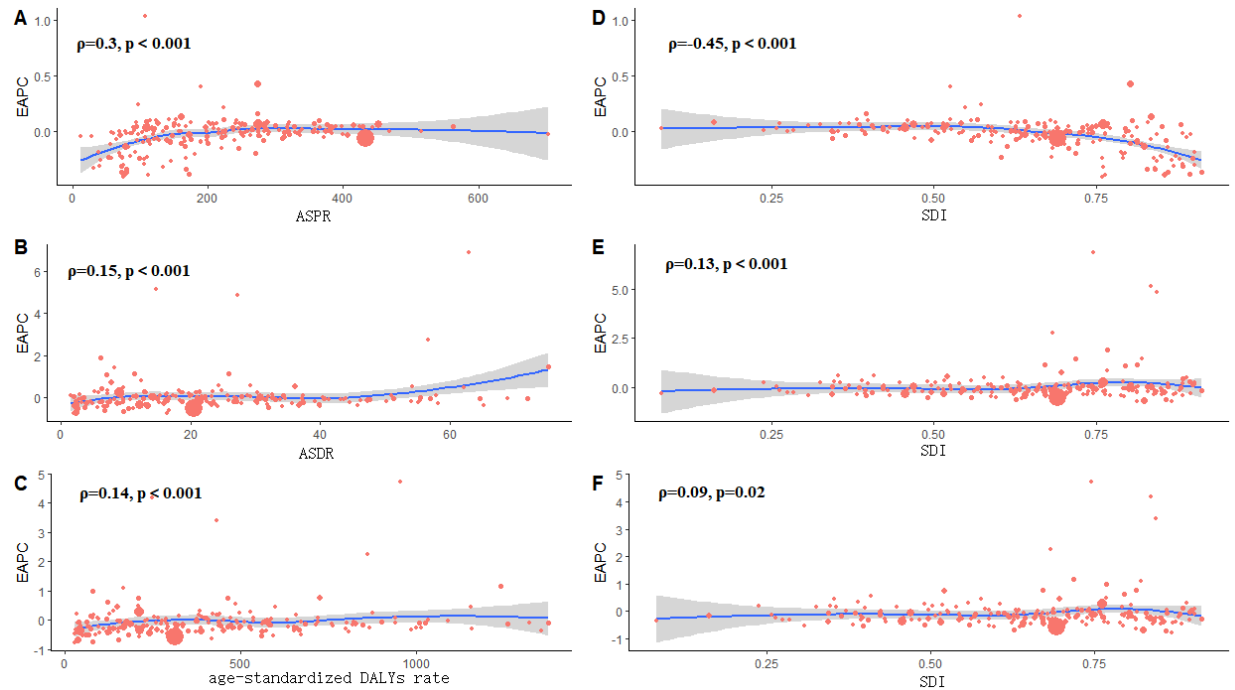


Supplementary Figure S3. Distribution of different ages in HDD prevalence in global (A), high SDI (B), high-middle SDI (C), middle SDI (D), middle-low SDI (E), low SDI (F) SDI – socio-demographic index.



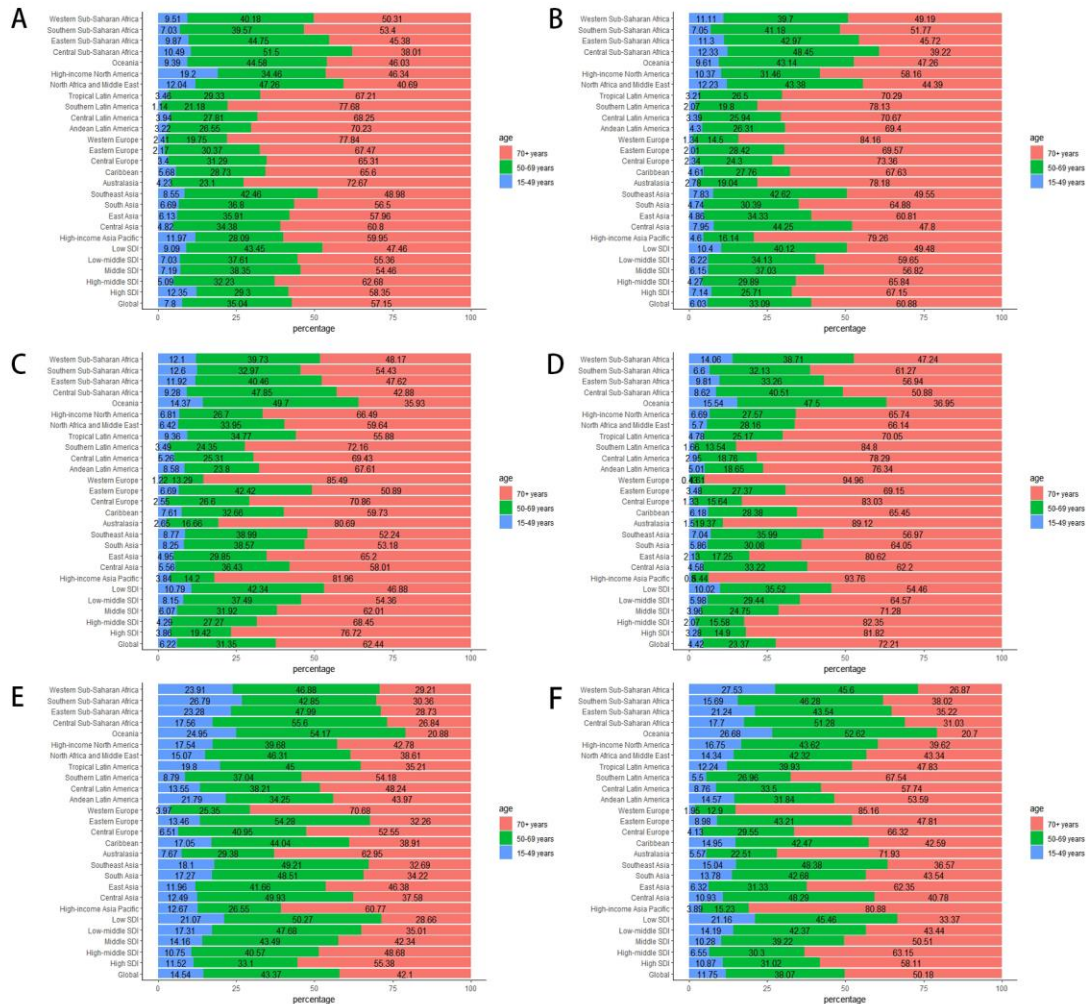
Supplementary Figure S4. The correlation between EAPC and hypertensive heart disease ASRs in 1990 and SDI in 2019. The circles represent countries that were available on SDI data. The size of circle is increased with the cases of hypertensive heart disease. The ρ indices Pearson's correlation coefficient and p values were derived from Pearson's correlation analysis. **A** – EAPC and ASPR. **B** – EAPC and ASDR. **C** – EAPC and age-standardized DALY rate. **D** – EAPC and SDI in prevalence. **E** – EAPC and SDI in death. **F** – EAPC and SDI in DALYs

EAPC – estimated annual percentage change, ASRs – age-standardized rates, SDI – socio-demographic index, ASPR – age standardized prevalence rate, ASDR – age standardized death rate, DALY – disability adjusted life-year.

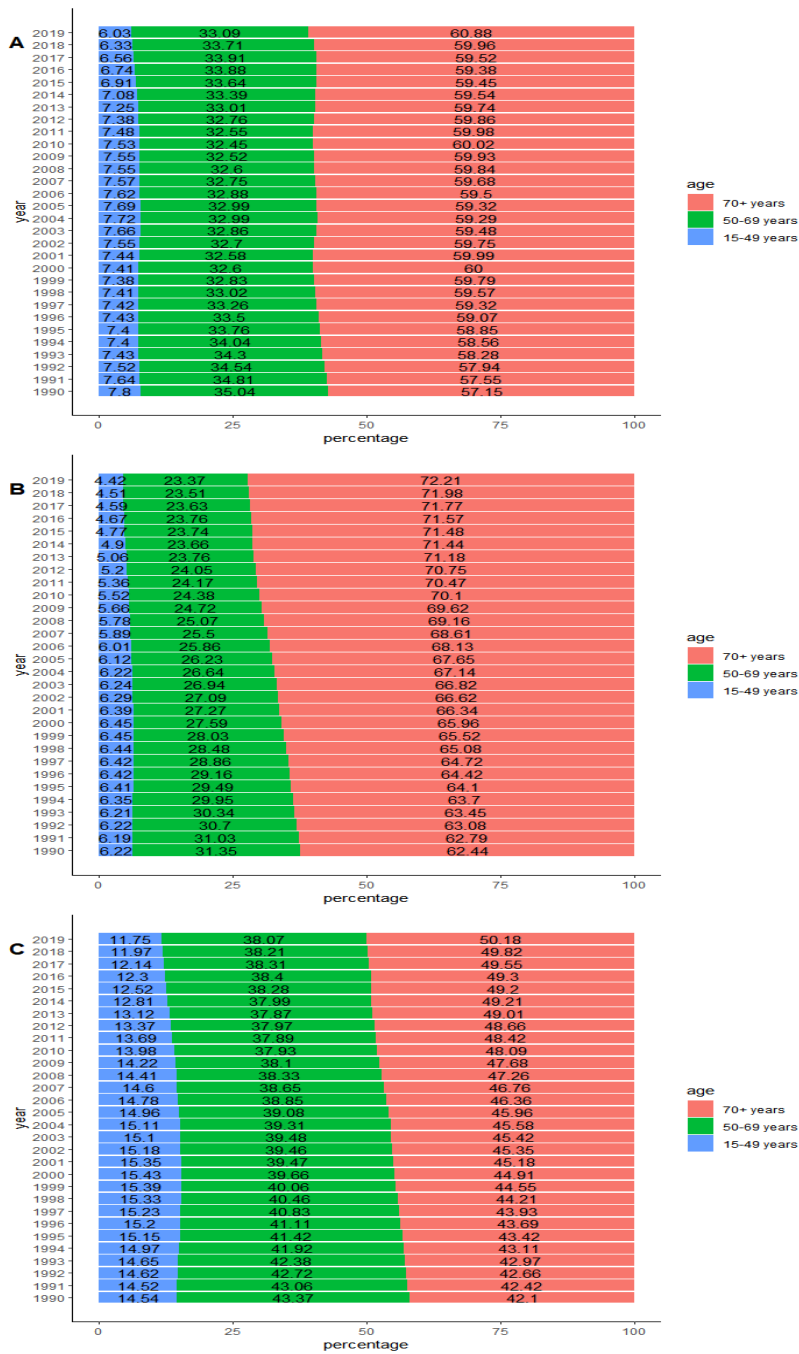


Supplementary Figure S5. The prevalence, death, and DALY rates of hypertensive heart disease in different age groups. **A** – Prevalence in 1990. **B** – Prevalence in 2019. **C** – Death rate in 1990. **D** – Death rate in 2019. **E** – DALY rate in 1990. **F** – DALY rate in 2019

DALY – disability adjusted life-year.



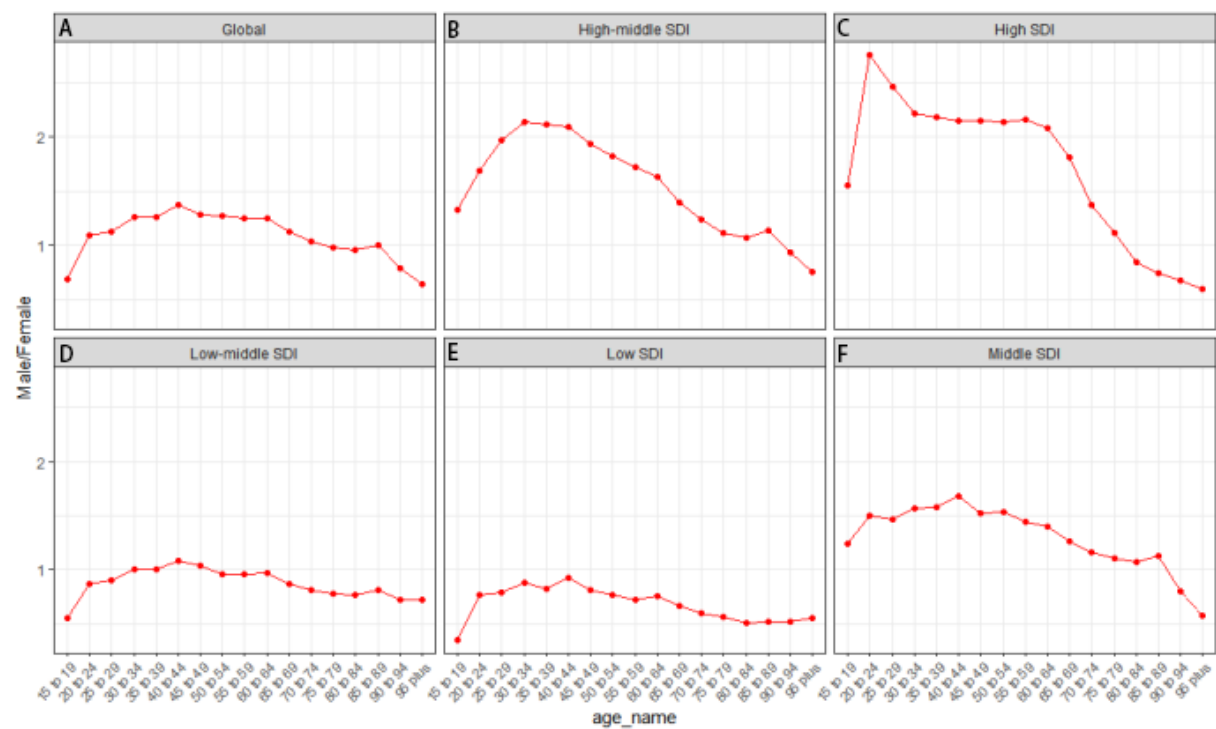
Supplementary Figure S6. The proportion of different ages in hypertensive heart disease prevalence (A) and death (B) and age-standardized DALY (C) by years
DALY – disability adjusted life-year.



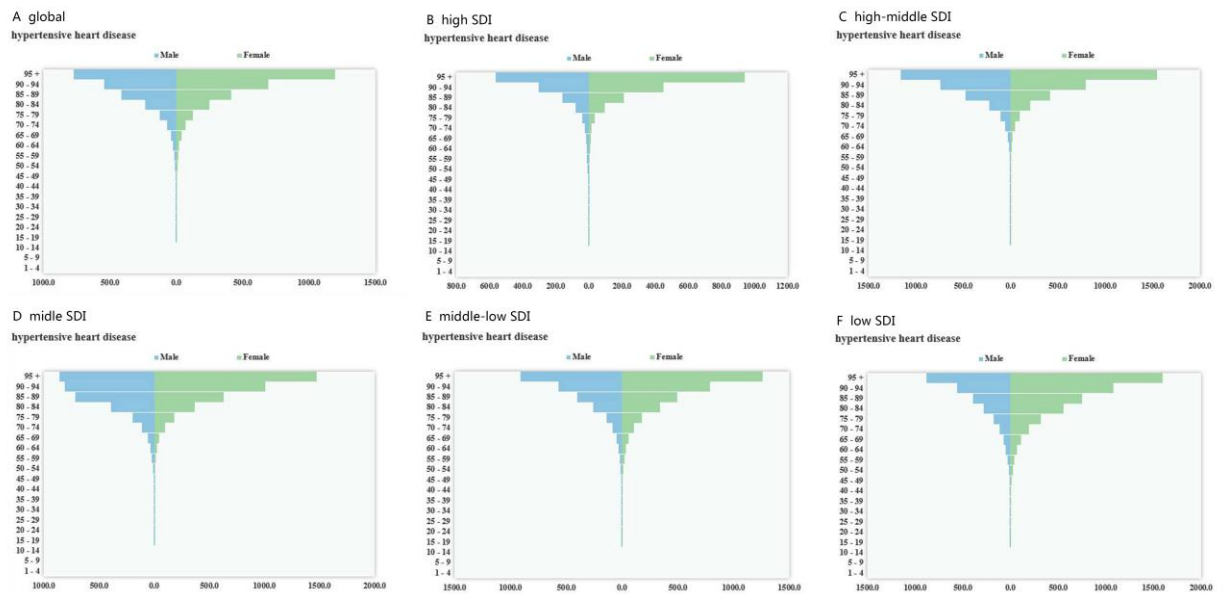
Supplementary Figure S7. The ratio of male to female death among different age groups in 2019.

A – Global. **B** – High SDI. **C** – High-middle SDI. **D** – Middle SDI. **E** – Middle-low SDI. **F** – Low SDI

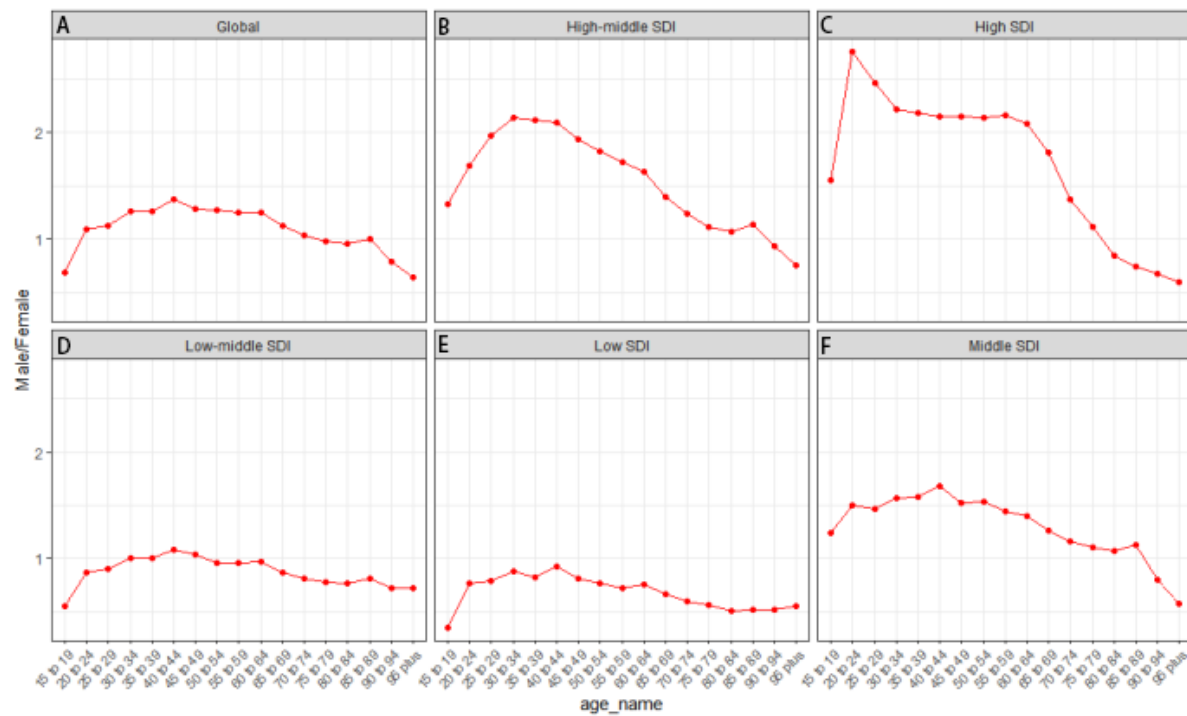
SDI – socio-demographic index.



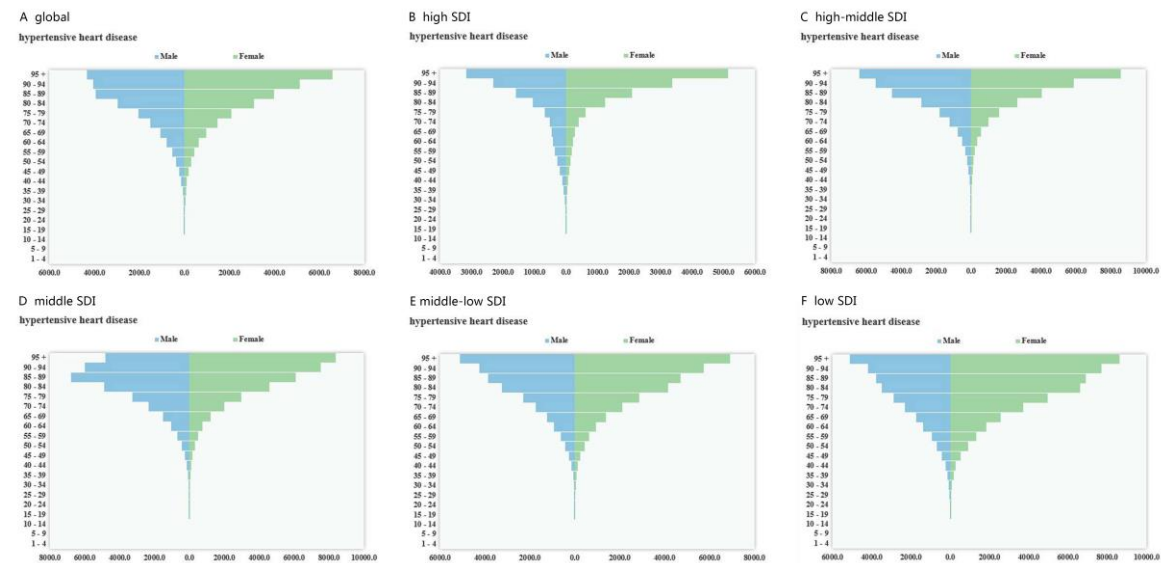
Supplementary Figure S8. Distribution of different ages in HDD death in global (A), high SDI (B), high-middle SDI (C), middle SDI (D), middle-low SDI (E), low SDI (F)
SDI – socio-demographic index.



Supplementary Figure S9. The ratio of male to female age standardized DALY rate among different age groups in 2019. **A** – Global. **B** – High SDI. **C** – High-middle SDI. **D** – Middle SDI. **E** – Middle-low SDI. **F** – Low SDI
SDI – socio-demographic index.



Supplementary Figure S10. Distribution of different ages in HDD DALYs in global (A), high SDI (B), high-middle SDI (C), middle SDI (D), middle-low SDI (E), low SDI (F) SDI – socio-demographic index.



Supplementary Figure S11. Risk factors from deaths due to HHD and percentage change in age-standardized death rates during 1990–2019 globally

A. Both

Leading risks 1990	Age-standardized Death rate in 1990	Leading risks 2019	Age-standardized Death rate in 2019	Percentage change in age-standardised Death rate, 1990-19
Metabolic risks	19.31	Metabolic risks	15.16	-0.21
High systolic blood pressure	19.31	High systolic blood pressure	15.16	-0.21
Behavioral risks	4.68	High body-mass index	5.29	0.22
High body-mass index	4.34	Behavioral risks	3.26	-0.30
Dietary risks	3.50	Environmental/occupational risks	2.20	-0.23
Diet high in sodium	3.50	Dietary risks	2.19	-0.37
Environmental/occupational risks	2.84	Diet high in sodium	2.19	-0.37
Other environmental risks	1.61	Alcohol use	1.31	-0.13
Lead exposure	1.61	Other environmental risks	1.27	-0.21
Alcohol use	1.52	Lead exposure	1.27	-0.21
Low temperature	1.37	Non-optimal temperature	1.01	-0.24
Non-optimal temperature	1.34	Low temperature	0.99	-0.28
High temperature	-0.04	High temperature	0.02	-1.62

Primary risk factors
Secondary risk factors
Level 3 risk factors

B. Male

Leading risks 1990	Age-standardized Death rate in 1990	Leading risks 2019	Age-standardized Death rate in 2019	Percentage change in age-standardised Death rate, 1990-19
Metabolic risks	18.95	Metabolic risks	14.95	-0.21
High systolic blood pressure	18.95	High systolic blood pressure	14.95	-0.21
Behavioral risks	5.98	High body-mass index	4.76	0.34
Dietary risks	4.14	Behavioral risks	4.36	-0.27
Diet high in sodium	4.14	Dietary risks	2.66	-0.36
High body-mass index	3.56	Diet high in sodium	2.66	-0.36
Environmental/occupational risks	3.19	Environmental/occupational risks	2.47	-0.23
Alcohol use	2.47	Alcohol use	2.15	-0.13
Other environmental risks	2.00	Other environmental risks	1.55	-0.23
Lead exposure	2.00	Lead exposure	1.55	-0.23
Low temperature	1.36	Non-optimal temperature	1.02	-0.23
Non-optimal temperature	1.32	Low temperature	1.00	-0.26
High temperature	-0.04	High temperature	0.02	-1.56

Primary risk factors
Secondary risk factors
Level 3 risk factors

C. Female

Leading risks 1990	Age-standardized Death rate in 1990	Leading risks 2019	Age-standardized Death rate in 2019	Percentage change in age-standardised Death rate, 1990-19
Metabolic risks	19.35	Metabolic risks	15.05	-0.22
High systolic blood pressure	19.35	High systolic blood pressure	15.05	-0.22
High body-mass index	4.82	High body-mass index	5.58	0.16
Behavioral risks	3.68	Behavioral risks	2.37	-0.36
Dietary risks	2.99	Environmental/occupational risks	1.98	-0.23
Diet high in sodium	2.99	Dietary risks	1.79	-0.40
Environmental/occupational risks	2.57	Diet high in sodium	1.79	-0.40
Low temperature	1.36	Other environmental risks	1.07	-0.20
Non-optimal temperature	1.33	Lead exposure	1.07	-0.20
Other environmental risks	1.32	Non-optimal temperature	0.98	-0.26
Lead exposure	1.32	Low temperature	0.96	-0.30
Alcohol use	0.80	Alcohol use	0.66	-0.18
High temperature	-0.04	High temperature	0.02	-1.66

Primary risk factors
Secondary risk factors
Level 3 risk factors

Supplementary Figure S12. Risk factors from DALYs due to HHD and percentage change in age-standardized DALYs rates during 1990–2019 globally

A. Both

Leading risks 1990	Age-standardized DALY's rate in 1990		Leading risks 2019	Age-standardized DALY's rate in 2019	Percentage change in age-standardised DALY's rate, 1990-19
Metabolic risks	364.55		Metabolic risks	268.19	-0.26
High systolic blood pressure	364.55		High systolic blood pressure	268.19	-0.33
Behavioral risks	97.44		High body-mass index	106.80	-0.35
High body-mass index	90.20		Behavioral risks	63.15	-0.26
Dietary risks	73.96		Dietary risks	43.07	-0.34
Diet high in sodium	73.96		Diet high in sodium	43.07	-0.34
Environmental/occupational risks	54.23		Environmental/occupational risks	36.24	-0.26
Other environmental risks	33.36		Alcohol use	25.34	-0.42
Lead exposure	33.36		Other environmental risks	22.04	0.18
Alcohol use	31.18		Lead exposure	22.04	-0.42
Low temperature	23.63		Non-optimal temperature	15.46	-0.32
Non-optimal temperature	22.88		Low temperature	15.04	-0.36
High temperature	-0.77		High temperature	0.44	-1.57

Primary risk factors
Secondary risk factors
Level 3 risk factors

B. Male

Leading risks 1990	Age-standardized DALY's rate in 1990		Leading risks 2019	Age-standardized DALY's rate in 2019	Percentage change in age-standardised DALY's rate, 1990-19
Metabolic risks	368.86		Metabolic risks	277.86	-0.25
High systolic blood pressure	368.86		High systolic blood pressure	277.86	-0.33
Behavioral risks	126.00		High body-mass index	103.57	-0.31
Dietary risks	88.74		Behavioral risks	86.58	-0.25
Diet high in sodium	88.74		Dietary risks	54.04	-0.35
High body-mass index	78.67		Diet high in sodium	54.04	-0.35
Environmental/occupational risks	62.39		Alcohol use	42.29	-0.39
Alcohol use	51.47		Environmental/occupational risks	41.97	-0.25
Other environmental risks	41.51		Other environmental risks	27.01	0.32
Lead exposure	41.51		Lead exposure	27.01	-0.39
Low temperature	24.24		Non-optimal temperature	16.57	-0.29
Non-optimal temperature	23.48		Low temperature	16.17	-0.33
High temperature	-0.79		High temperature	0.43	-1.54

Primary risk factors
Secondary risk factors
Level 3 risk factors

C. Female

Leading risks 1990	Age-standardized DALY's rate in 1990		Leading risks 2019	Age-standardized DALY's rate in 2019	Percentage change in age-standardised DALY's rate, 1990-19
Metabolic risks	358.42		Metabolic risks	256.81	-0.28
High systolic blood pressure	358.42		High systolic blood pressure	256.81	-0.34
High body-mass index	98.68		High body-mass index	108.20	-0.42
Behavioral risks	73.21		Behavioral risks	42.47	-0.28
Dietary risks	61.21		Dietary risks	33.17	-0.33
Diet high in sodium	61.21		Diet high in sodium	33.17	-0.33
Environmental/occupational risks	47.15		Environmental/occupational risks	31.19	-0.28
Other environmental risks	26.53		Other environmental risks	17.86	0.10
Lead exposure	26.53		Lead exposure	17.86	-0.46
Low temperature	22.87		Non-optimal temperature	14.28	-0.35
Non-optimal temperature	22.14		Low temperature	13.85	-0.39
Alcohol use	14.04		Alcohol use	10.58	-0.46
High temperature	-0.75		High temperature	0.44	-1.59

Primary risk factors
Secondary risk factors
Level 3 risk factors