National, Regional, and Global Cardiomyopathy Burden from 1990 – 2019

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Abstract

Objective: To gauge the incidence of both alcoholic cardiomyopathy (AC) and other cardiomyopathy (OC) in 204 nations and regions over the 1990 – 2019 period.

Methods: The Global Burden of Disease Study 2019 was leveraged to gather comprehensive information pertaining to both AC and OC. The calculated prevalence rates, mortality rates, and disability-adjusted life years (DALYs) related to these forms of cardiomyopathy were presented as counts and age-standardized rates (ASRs) per 100,000 persons with percentage change and 95% uncertainty intervals (UIs). The overall burden of cardiomyopathy was established by combining data pertaining to both AC and OC, with calculations and corresponding 95% confidence intervals (CIs) being determined based upon corresponding standard error values determined by dividing the width of 95% UI by 1.96×2.

Results: At the national level, ASR rates for cardiomyopathy varied by 144.6-fold among surveyed countries in 2019, while the rates ASR rates for AC and OC respectively varied by 408.0-fold and 380.6-fold. Age-standardized cardiomyopathy-associated mortality rates also varied by 58.4-fold among surveyed nations. The highest such AC-related death rates were observed in Latvia, with an age-standardized mortality rate of 16.3 (95%UI 11.0 to 21.1) per 100,000 persons, whereas some nations reported 0 AC-related deaths in 2019. National age-standardized OC-related mortality rates varied by 105-fold among surveyed nations. Despite overall reductions in cardiomyopathy ASRs from 1990 – 2019, the overall numbers of cases, deaths, years lost in life (YLLs), and years lost due to disability (YLDs) have all increased over this period for both AC and OC.

Conclusion: These data suggest that cardiomyopathy, including both AC and OC, remains a persistent threat to global public health as evidenced by increased numbers of cases, deaths, and DALYs over the past three decades, with clear geographic differences in overall cardiomyopathy burden. Additional study will be essential to more fully understand the risk factors associated with the development of this disease in an effort to guide its prevention, early diagnosis, and treatment.

Introduction

Cardiovascular disease (CVD) is the most prominent driver of global morbidity and mortality, resulting in high rates of disability or lost productivity that impose a marked burden on affected patients and society as a whole ⁽¹⁾. Cardiomyopathy is an uncommon and thus often-overlooked yet severe form of CVD that is characterized by clinical findings including abnormal cardiac structural characteristics, arrhythmia, and/or heart failure ⁽²⁾. Cardiomyopathy can result in the sudden death of affected individuals during childhood or adolescence and may require patients to undergo cardiac transplantation in some cases ⁽³⁾. Among the all types of cardiomyopathy, alcoholic cardiomyopathy (AC) is a special one. It is caused by heavy alcohol use over a prolonged period. Alcohol and its metabolites are cardiotoxic. Myocardial inhibition secondary to alcohol is initially reversible, but prolonged alcohol consumption can lead to irreversible dysfunction ⁽⁴⁾. However, there is neither a certain amount of alcohol known to be toxic to myocardial cells nor is there a special period of exposure time to cause it to happen ⁽⁵⁾. Furthermore, not all chronic alcohol abusers develop AC finally and prevalence of AC still cannot be accurately assessed due to incomplete data and its uncertainty ⁽⁶⁾.

A comprehensive overview of the epidemiological characteristics of cardiomyopathy in particular populations and countries would be invaluable as a tool for guiding the development of public health policy and informing decision-making aimed at preventing, diagnosing, and treating this debilitating disease. However, robust datasets pertaining to cardiomyopathy morbidity and mortality are primarily available for highly developed nations that had standardized the diagnosis and evaluation of affected patients ⁽⁷⁾. The Global Burden of Disease (GBD) study, which is an ongoing analysis of the incidence of over 350 diseases in around 195 nations and regions throughout the world, offers a unique opportunity to gain a more robust overview of the true global burden of cardiomyopathy. Since 2016, the GBD study has subdivided cardiomyopathy into the alcoholic cardiomyopathy (AC) and other cardiomyopathy (OC) subtypes ⁽⁸⁾. There is thus a clear need to more fully explore the national, regional, and global AC and OC burden and to explore trends in cardiomyopathy-related disease findings as a function of time.

Materials And Methods

Data sources

The present study was conducted using data derived from the GBD study coordinated by the Institute for Health Metrics and Evaluation (IHME). Each annual GBD study update entails the re-estimation of the entire data time series based on new advances in medical knowledge, modeling, estimation approaches, and data in an effort to ensure the continuous improvement of study quality. The GBD 2019 study was published in October 2020 and included epidemiological data pertaining to 369 diseases/injuries, 286 causes of death, and 87 risk factors in 204 nations and regions, with sub-national estimates additionally being reported for a subset of countries. For the present study, we obtained published estimates pertaining to the prevalence rates, mortality rates, and disability-adjusted life years (DALYs) associated with cardiomyopathy ⁽⁹⁾. As the GBD 2019 study consists of aggregated, de-identified data, the University of Washington Institutional Review Board approved a waiver of informed consent with respect to the use of these data for research purposes.

GBD estimation framework

AC and OC-related epidemiological data were established based on the 9th and 10th edition of the International Classification of Diseases (ICD-9 and ICD-10), with AC corresponding to diseases coded as 425.5 (ICD-9) or I42.6 (ICD-10), whereas OC corresponded to diseases coded as 425.0–425.3, 425.7–425.8, and 429.0 (ICD-9) or I42.1–I42.5, I42.7–I42.8, and I43–I43.9 (ICD-10).

Estimates of mortality rates were obtained from vital registration data sources for both OC and AC and from verbal autopsy data sources for AC using the ICD codes detailed above. The standard Cause of Death Ensemble model (CODEm), which incorporates a range of covariates and individual models (including linear mixed-effects regression and spatiotemporal Gaussian process regression models) to generate cause of death (COD) predictions, was used to estimate rates of AC- and OC-related mortality. Out-of-sample predictive validity tests were employed to evaluate utilized individual and ensemble models, with experts in appropriate disease fields having vetted these models in addition to their having been validated by the IHME and international collaborators. Estimated mortality rates were scaled based on other COD-related estimates to yield all-cause mortality estimates summing to 100% within individual year, age, sex, and location groups⁽¹⁰⁾. As mortality-related data availability was limited for some nations, it was converted from incidence data through mortality-to-incidence ratio modeling.

The Bayesian mixed-effects DisMod-MR 2.1 meta-regression tool, which was designed to analyze GBD data, was used to estimate the prevalence of OC and AC⁽¹¹⁾. Consistent prevalence estimates for all locations were generated by integrating the incidence, remission, and mortality rates for particular causes. Prevalence estimates did not incorporate non-literature data sources other than hospital or claim data. Outpatient data were excluded from these analyses as they were available at substantially lower levels than corresponding inpatient and claim data from matched locations. For high-income nations, inpatient hospital data found to be either 2-fold above or 0.5-fold below the median absolute deviation value for the corresponding age-sex group were additionally excluded⁽¹¹⁾.

DALYs were measured by summing both years lost in life (YLLs) and years lost due to disability (YLDs), providing a metric for health losses associated with a particular disease state. YLLs were quantified by multiplying estimated numbers of deaths by age with the corresponding standard life expectancy for individuals in that age group. YLDs were quantified by multiplying the number of cases of a given disease by the disability weight (ranging from 0-1, with 0 and 1 respectively corresponding to normal health and death), thus providing a metric proportional to the degree of health lost as a consequence of a given disease state⁽¹²⁾. Total DALYs within a given population offer substantial value as a means of measuring the overall disease burden experienced by that population.

Data from the GBD are subdivided into 21 global regions based on characteristics including geographical proximity and epidemiological similarity. The GBD study additionally reports the socio-demographic index (SDI) values for included regions at the state level, corresponding to a metric for average per-capita income, total fertility rates, and educational attainment⁽¹³⁻¹⁶⁾. SDI values range from 0 – 1, with larger values corresponding to higher levels of sociodemographic development such that nations are grouped into SDI-based development quintiles (high, high-middle, middle, low-middle, and low)⁽¹¹⁾.

Age-standardized rate (ASR) values were established based upon the world standard population developed for the GBD study. GBD disease burden estimates were reported with 95% uncertainty intervals (UIs) that take into account differences and uncertainties in parameter estimation, model selection, data collection, and other factors.

Data analysis

The overall burden of cardiomyopathy was assessed by combining AC- and OC-related data. As no published UI estimates corresponding to cardiomyopathy were available, 95% confidence intervals were calculated based on standardized error values determined based upon the width of the 95% UI divided by 1.96×2 .

Trends in ASRs correspond to shifts in disease-related patterns within particular populations, providing insight into potential underlying shifts in risk factor prevalence⁽¹⁷⁾. Trends in cardiomyopathy incidence, prevalence, and DALYs were evaluated based on percentage changes calculated based upon available estimates for the selected timepoints. An ASR was considered to be increased or decreased if the entirety of the 95% UI was above or below 0, respectively. If the 95% UI included 0, then the ASR was deemed stable. Estimated annual percentage changes served as a measure of ASR trends over particular time intervals, and were calculated as previously reported by Hankey et al⁽¹⁸⁾.

R (v 3.4.4, R core team) was used for all statistical analyses, with $P < 0.05$ as the threshold of significance.

Results

Cardiomyopathy prevalence in 2019

Globally, there were an estimated 0.7 million (95% UI: 0.5 - 0.9) AC cases and 3.7 million (95% UI: 2.9 - 4.7) OC cases in 2019. Respective age-standardized cardiomyopathy, AC, and OC prevalence rates (per 100,000 persons) in 2019 were 56.0 (95% CI: 43.8 - 71.2), 8.5 (95% UI: 6.6 - 11.0), and 47.5 (95% UI: 37.2 - 60.2), respectively (**Table 1-3**). When ASRs were compared among different SDI groups, the highest cardiomyopathy ASR was observed in the Low SDI group (126.1 per 100,000 persons; 95%CI: 87.4 - 173.4), with the highest OC ASR similarly being observed in the Low SDI group (123 per 100,000 persons; 95% UI: 85.9 - 170.3). In contrast, the highest AC ASR was observed in the High SDI group (23.7 per 100,000 persons; 95%UI: 18.9 - 30) in 2019 (**Table 1-3**).

In 2019, the highest cardiomyopathy ASRs were observed in Eastern Sub-Saharan Africa [267.0 (95%CI: 186.3 - 360.6) per 100,000 persons] with the highest AC and OC ASRs respectively being observed in Eastern Europe [49.5 (95%UI: 35.4to 67.0) per 100,000 persons] and Eastern Sub-Saharan Africa [264.8 (95%UI: 184.8 to 357.5) per 100,000 persons] (**Table 1-3**). At the national level, cardiomyopathy ASR rates varied by 144.6-fold in 2019, from a low of 2.1 (95%CI: 1.5 - 2.8) per 100,000 persons in Bangladesh to 303.6 (95%CI: 204.5 - 423.8) per 100,000 persons in Mozambique (**Supplementary Table S1, Figure1**).

Additionally, AC and OC ASRs varied by 408.0-fold and 380.6-fold among nations, respectively, respectively ranging from 0.2 (95%UI: 0.1 - 0.2) per 100,000 persons in Tajikistan to 81.6 (95%UI: 59.6 - 109.6) per 100,000 persons in Montenegro (**Supplementary Table S2, Supplementary Figure S1**), and from 0.8

(95%UI: 0.5 - 1.1) per 100,000 persons in Nepal to 304.5 (95%UI: 225.2 - 391.3) per 100,000 persons in Ethiopia (**Supplementary Table S3, Supplementary Figure S2**).

The proportion of cardiomyopathy cases attributed to OC and AC at the global and regional levels in 1990 and 2019 are summarized in **Figure 2**. Over half of cardiomyopathy cases at the global level were caused by OC, with these proportions having largely remained stable over time with the exception of in Eastern Europe, where a significant change in this proportion was observed when comparing these time points. The proportion of AC in Eastern Europe was outnumbered that of OC in both 1990 and 2019 (70.8%, 68% respectively). The gap between these two etiological forms of cardiomyopathy was also less in South Asia than in other surveyed regions.

Cardiomyopathy-Associated Mortality Rates in 2019

In total, the respective numbers of global deaths attributed to AC and OC were 0.07 million (95%UI: 0.06 - 0.08) and 0.24 million (95%UI: 0.19 - 0.26). The age-standardized mortality rate for cardiomyopathy in 2019 was 4 (95%CI: 3.3 - 4), with respective mortality rates of 0.9 (95%UI: 0.7 - 1) and 3.1 (95%UI: 2.6 - 3.4) for AC and OC. When comparing different SDI groups, the highest mortality rates were observed in the high-middle SDI group in all categories, followed by the high SDI group, with only slight differences among the three other groups (**Table 2**). Of the 21 surveyed regions the age-standardized mortality rates for cardiomyopathy were highest in Eastern Europe [23.5 (95%UI: 16.3 - 28.4) per 100,000 persons], while for AC and OC the highest respective age-standardized mortality rates were observed in Eastern Europe [15 (95%UI: 12.3 - 17.9) per 100,000 persons] and Central Europe [10.6 (95%UI: 7.5 - 12.2) per 100,000 persons] (**Table 2**). At the national level, age-standardized cardiomyopathy-related mortality rates varied by 58.4-fold among countries, from a low of 0.5 (95%CI: 0.3 - 0.8) per 100,000 persons in Bhutan and Pakistan to 29.2 (95%CI 15.1 to 44.0) per 100,000 persons in Montenegro (**supplementary TableS1, Figure1**). The highest age-standardized AC-related mortality rate was observed in Latvia at 16.3 (95%UI: 11.0 - 21.1) per 100,000 persons, whereas some nations reported 0 AC-related deaths in 2019 (**supplementary Table S2, Supplementary Figure S1**). Age-standardized OC-related mortality rates varied 105-fold among countries, from a low of 0.2 (95%UI: 0.2 - 0.4) per 100,000 persons in India to 21 (95%UI: 15.6 - 22.6) per 100,000 persons in Dominica (**Supplementary Table S3, Supplementary Figure S2**).

Proportions of cardiomyopathy-related deaths attributed to AC and OC at the global and regional levels in 1990 and 2019 are summarized in **Supplementary Figure S3**. At the global level, over 50% of cardiomyopathy-related deaths were attributed to OC and these proportions were stable over time, but this trend was also totally adverse in Eastern Europe. The proportion of death caused by AC both exceeded that of OC in 1990 and 2019 (75.5%, 63.1% respectively). As above, the gap between these two etiologies was again found to be reduced in South Asia relative to other surveyed regions.

Cardiomyopathy-related DALY rates in 2019

At the global level in 2019, 2.4 million (95%UI: 2.0-2.8) DALYs were attributed to AC, while 5.7 million (95%UI: 4.9-6.3) DALYs attributed to OC. As shown in **Table 1**, the age-standardized DALY rate for cardiomyopathy per 100,000 persons in 2019 was 102 (95%CI: 86.7 - 113.8), with respective rates for AC and OC of 29.2 (95%UI 24.5 to 33.3) per 100,000 persons and 72.8 (95%UI: 62.2 - 80.5) per 100,000 persons (**Table 2, 3**). When comparing different SDI groups, the largest proportion of DALYs attributed to these two forms of cardiomyopathy were observed in the high-middle SDI group, with rates of 94.5 (95%UI: 78.2 - 111.0) per 100,000 persons for AC and 75 (95%UI: 68.9 - 85.4) per 100,000 persons for OC (**Table 2, 3**). At the regional level, the highest cardiomyopathy age-standardized DALY rates were observed in Eastern Europe [854.9 (95%CI 620.7 to 1019.8) per 100,000 persons] (**Table 1**). Similarly, the highest age-standardized DALY rates were observed in Eastern Europe [580.6 (95%UI: 476.6 - 689) per 100,000 persons] (**Table 2**), whereas for OC these rates were highest in Central Asia [271 (95%UI: 160.8 - 324.8) per 100,000 persons] (**Table 3**). At the national level, age-standardized DALY rates varied by 43.6-fold across countries, ranging from a low of 19.7 (95%CI: 14.0 - 36.4) per 100,000 persons in Thailand to a high of 858.2 (95%UI: 599.8 - 1107.1) per 100,000 persons in Latvia (**Supplementary TableS1, Figure 1**). For AC, these rates varied 909-fold among surveyed nations (**Supplementary TableS2, supplementary FigureS1**), while for OC they varied 127.25-fold (**Supplementary Table S3, Supplementary Figure S2**).

The proportions of cardiomyopathy-related DALYs caused by AC and OC at the global and regional levels in 1990 and 2016 are summarized in **Supplementary Figure S4**, revealing trends similar to those observed for prevalence and deaths.

Time-Dependent Trends in Cardiomyopathy Burden From 1990 to 2019

From 1990 – 2019, cardiomyopathy age-standardized prevalence rates declined by -0.5% (95%UI: -0.6 to -0.4), with those for AC and OC having respectively declined by -0.3% (95%UI: -0.4 to -0.3) and -0.2% (95%UI: -0.2 to -0.1). Despite these reductions, global cardiomyopathy case numbers have risen by 41.5% (95%UI: 31.4-60.8) over this same interval, with similar respective increases in AC and OC case numbers of 26.1% (95%UI: 13.5–44.0) and 44.4% (95% UI: 35.3–63.1), respectively.

As a function of SDI quintile, the greatest drop in cardiomyopathy age-standardized prevalence rates was observed in the high-middle SDI group, followed by the high SDI group. No decreases were observed in the middle, low-middle, or low SDI groups with respect to AC. Similar decreases were observed in all SDI quintiles other than the low SDI group when assessing OC age-standardized prevalence rates (**Table 1,2,3**).

In line with the above data, age-standardized AC and OC mortality rates both declined by -0.4% (95%UI: -0.4 to -0.3), despite 24.8% (95%UI: 11.2-41.5) and 30.2% (95%UI: 23.9-52.3) increases, respectively, in the numbers of AC- and OC-related deaths. Patterns of changing age-standardized death rates across SDI quintiles were distinct from those observed for age-standardized prevalence rates (**Table 2,3**). In addition, no clear patterns in age-standardized cardiomyopathy-related mortality rates were observed across the 21 surveyed regions of the world or as a function of SDI over the 1990-2019 period (**Figure 3, S5, S6**). For further details regarding time-dependent changes in AC and OC burden over the analyzed period, see **Tables 1-3** and **Tables S1-3**.

Discussion

Herein, we leveraged the GBD 2019 modeling framework to estimate the global burden of AC and OC, with data being stratified by year, SDI, and geographic region. While one recent report discussed the prevalence rates, mortality rates, YLDs, and YLLs associated with both AC and OC in 2017 and national, regional, and global levels, it did not analyze associated DALY-related data. The present study is the first to our knowledge to have systematically assessed the burden of AC and OC as of 2019 at the national, regional, and global levels. Through these analyses, we determined that there were approximately 0.7 million and 3.7 million worldwide AC and OC cases, respectively, in 2019. We further determined that there were 2.4 million and 5.7 million DALYs attributable to AC and OC, respectively, in 2019 at the global level. Together these results provide an epidemiological foundation that can guide public health efforts and policymakers as they seek to better understand, prevent, detect, and treat cardiomyopathy in a manner that better optimizes health system resource allocation.

We additionally evaluated differences in global AC and OC prevalence as a function of SDI and region. At all time points, AC prevalence were higher in regions with high SDI values irrespective of sex, while OC prevalence rates were higher in areas with low SDI values. The greatest decreases in overall cardiomyopathy prevalence were observed in high-middle SDI regions, while the largest increase in AD prevalence was observed in low-middle SDI regions, and no increasing trends were observed for OC. The primary components of SDI include gross fertility rates, per capita income levels, and years of education. As such, social factors can influence cardiomyopathy prevalence rates and associated changes. One possible explanation for this may be that healthcare surveillance systems in high SDI regions are more comprehensive, while there is significant room for improving healthcare systems in low, low-middle, and middle SDI regions in order to improve the prevention and diagnosis of both AC and OC, particularly among individuals with asymptomatic disease.

We found that cardiomyopathy burden in 2019 varied substantially among geographic regions, with the highest age-standardized rates of overall cardiomyopathy and OC being evident in Eastern Sub-Saharan Africa, likely owing to the more haphazard medical conditions in many African nations and a consequent lack of surveillance and detection systems. In addition, rates of communicable diseases and peripartum cardiomyopathy are particularly high in Africa ^(19,20). The highest age-standardized AC prevalence rates were observed in Eastern Europe, potentially due to high levels of alcohol intake and types of alcoholic beverage consumed in this region ⁽²¹⁾. Alcoholism and associated issues have been reported to impose a major burden on public health in Eastern Europe ⁽²²⁾. While many nations in this region have enacted policies aimed at curbing alcohol intake resulting in lower rates of alcohol-associated mortality, rates of associated morbidity nonetheless remain relatively high ⁽²³⁾.

The analyses conducted herein revealed that Eastern Europe exhibited the highest age-standardized prevalence of AC as well as the highest age-standardized cardiomyopathy-related mortality rate. This emphasizes the importance of alcohol intake as a major risk factor associated with global disease burden that results in substantial health-related losses ⁽²⁴⁾. Higher frequencies of alcohol use likely coincide with higher AC prevalence. Given the importance of alcohol intake as a driver of AC development, further studies of national trends pertaining to alcohol consumption and associated AC surveillance are warranted to guide the design of targeted prevention strategies.

Age-standardized DALYs were used to quantify the overall burden of cardiomyopathy, which decreased over the study period. However, owing to the overall growth and aging of the global population, a larger number of DALYs were lost due to cardiomyopathy over time during the analyzed period. Moreover, higher age-standardized DALYs were observed in SDI regions exhibiting higher prevalence and mortality rates. At the regional level, DALYs associated with cardiomyopathy declined in most areas over the study period. In contrast, however, these DALYs rose Eastern Europe and Central Asia over this duration. This may be attributable to alcohol intake in these regions, to the effective treatment of complications such as heart failure, or to changes in rates of successful heart transplantation, all of which vary unequally as a function of socioeconomic status ⁽²⁵⁾.

With respect to time-dependent trends in disease burden observed from 1990 – 2019, the overall global prevalence of AC and OC have significantly risen, as have overall mortality rates associated with these two forms of cardiomyopathy. Conversely, the age-standardized prevalence and mortality rates for these conditions have declined over this same interval. While the precise basis for these trends remains unclear, it may be in part due to the growth and aging of the global population ⁽²⁶⁾. We did not observe any clear patterns in age-standardized cardiomyopathy-related mortality rates across the 21 surveyed regions of the world over this 30-year period, suggesting that any such relationships that may exist are complex and non-linear. Consistent with this observation, the burden of AC and OC was not restricted to nations with particular levels of socioeconomic development, instead being highly prevalent in nations with a range of SDI values.

Limitations

While these GBD-based epidemiological estimates provide insight regarding the global burden of AC and OC that would otherwise be difficult or impossible to quantify, there are nonetheless certain limitations to this analysis. For one, data availability for certain countries was limited. While appropriate statistical efforts were employed to account for such data scarcity and associated uncertainty, the resultant data are primarily based upon trends in neighboring countries and/or covariates related to these diseases. Secondly, while the GBD study seeks to achieve maximal reliability and comparability with respect to the included data, there are inevitable instances of delayed/inaccurate reporting, variable data collection/source quality, misclassification, and coding deviations among countries. Lastly, the diagnostic criteria for specific conditions can change over time and be reflective of regional coding trends, with varied nomenclature and classifications for these diseases that can be vague or contradictory having been reported in the literature ⁽²⁷⁾.

Conclusions

In conclusion, the effective management of cardiomyopathy remains a pressing global public health challenge. The heterogeneous cardiomyopathy burden of cardiomyopathy observed across different regions of the world was primarily attributable to uneven socioeconomic development, suggesting that efforts to implement systematic surveillance systems should be implemented, particularly in middle- and low-income regions. Such monitoring would support efforts to better manage this disease, as well as associated risk factors and complications therefore. Public health policymakers and other officials should seek to develop regionally-appropriate efforts with the goal of counteracting and mitigating the future burden of cardiomyopathy.

Declarations

a. Ethics approval and consent to participate:

All included patients gave their oral and written informed consent and we confirmed that this experiment was performed in accordance with relevant guidelines and regulations. The study was approved by the Ethics Committee (full name: Ethics Committee of The Affiliated Hospital of Nanjing University Medical School) (reference number:2021-190-01) to the department of ultrasound diagnosis, The Affiliated Hospital of Nanjing University Medical School, Nanjing, China.

b. Consent for publication

Not applicable

c. Availability of data and materials:

All data generated or analyzed during this study are included in this published article. The datasets generated during and/or analyses during the current study are available in the global burden of disease.

d. Competing interests

The authors declare that they have no competing interests.

e. Funding

Not applicable

f. Acknowledgement

Not applicable

g. Author's Contribution

Siyuan Cheng and Zhanru Qi analyzed the data, drafted and revised the paper. Aijuan Fang and Ning Zhang prepared and analyzed the data. Guanjun Guo, Jing Yao and Hui Chen conceived and designed the study, interpreted the results, drafted and revised the paper. All authors provided critical comments on the manuscript. All authors read and approved the final manuscript.

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Tables

Table1 Age-standardized prevalence, death, DALYs rates of the cardiomyopathy, and their percentage changes with 95% CIs from 1990 to 2019, both sexes.

	Prevalence			Deaths			DALYs		
Region	1990 age-standardized rate per 100,000 people	2019 age-standardized rate per 100,000 people	Percentage change in age-standardized rates, 1990– 2019 (%)	1990 age-standardized rate per 100,000 people	2019 age-standardized rate per 100,000 people	Percentage change in age-standardized rates, 1990– 2019 (%)	1990 age-standardized rate per 100,000 people	2019 age-standardized rate per 100,000 people	Percentage change in age-standardized rates, 1990– 2019 (%)
Global	69.8 (53.8 to 89.7)	56 (43.8 to 71.2)	-0.5 (-0.6 to -0.4)	6.4 (5.1 to 7.2)	4 (3.3 to 4.4)	-0.7 (-0.9 to -0.6)	142.9 (127 to 165)	102 (86.7 to 113.8)	-0.6 (-0.8 to -0.4)
SDI									
High SDI	131.5 (103.5 to 166.1)	111.4 (90.8 to 136)	-0.3 (-0.5 to -0.2)	7.1 (5.3 to 7.9)	4 (3.5 to 4.7)	-0.9 (-1.1 to -0.6)	172.1 (136.7 to 189.9)	100.1 (89.6 to 115.1)	-0.9 (-1 to -0.6)
High-middle SDI	67.4 (51 to 87.9)	57 (44 to 73.4)	-0.4 (-0.5 to -0.3)	11.3 (7.7 to 13.3)	7.4 (5.4 to 8.4)	-0.6 (-0.9 to -0.3)	239.5 (203.8 to 294.9)	203.8 (154.1 to 234.6)	-0.3 (-0.8 to 0.1)
Middle SDI	29.8 (22.7 to 38.1)	26.5 (20.5 to 33.9)	-0.1 (-0.2 to -0.1)	2.7 (2.2 to 3.3)	2.1 (1.7 to 2.5)	-0.5 (-0.8 to -0.1)	69.9 (58.9 to 95.3)	53.4 (45.1 to 66.1)	-0.5 (-0.9 to -0.1)
Low-middle SDI	28 (20.5 to 37)	25.6 (18.6 to 34.3)	0 (-0.1 to 0.1)	2.4 (1.9 to 2.9)	1.9 (1.6 to 2.2)	-0.5 (-0.8 to -0.1)	58.9 (46.7 to 75.1)	49.4 (41.3 to 58.6)	-0.4 (-0.7 to 0)
Low SDI	127.2 (86.3 to 174.4)	126.1 (87.4 to 173.4)	0 (-0.1 to 0.1)	4.4 (2.7 to 6.1)	3.3 (2.4 to 4.1)	-0.7 (-1 to -0.2)	132.7 (84.4 to 176.1)	101.2 (78 to 125.7)	-0.7 (-1 to -0.2)
Region									
High-income Asia Pacific	78.6 (59 to 103.1)	67 (53.3 to 83.2)	-0.3 (-0.5 to -0.1)	4.7 (2.6 to 5.3)	2 (1.4 to 2.2)	-1.2 (-1.3 to -0.9)	103.7 (80 to 112.8)	48.8 (41.2 to 55)	-1.1 (-1.3 to -0.9)
High-income North America	205.3 (160.3 to 265.8)	191.6 (154.2 to 237.7)	-0.2 (-0.4 to 0)	7.9 (6 to 8.7)	5.6 (4.9 to 6.5)	-0.7 (-0.9 to -0.3)	226.5 (175.9 to 250.9)	151.6 (136.5 to 174.6)	-0.7 (-0.9 to -0.4)
Western Europe	105 (82.1 to 131.7)	85.6 (67.2 to 106.7)	-0.4 (-0.5 to -0.3)	10.4 (6 to 11.9)	4.2 (3.6 to 5.1)	-1.2 (-1.4 to -0.7)	185.4 (130 to 208.5)	82.3 (72.1 to 100.3)	-1.1 (-1.3 to -0.7)
Australasia	152.8 (116.1 to 199.3)	108.7 (82.8 to 141.7)	-0.6 (-0.7 to -0.4)	7 (4.6 to 8.1)	3.3 (2.7 to 4.2)	-1 (-1.3 to -0.5)	177.7 (131.6 to 202.9)	86.2 (72.5 to 108.2)	-1 (-1.2 to -0.6)
Andean Latin America	15.2 (10.9 to 21)	18.6 (13.8 to 24.5)	0.5 (0.3 to 0.8)	1.9 (1.4 to 2.4)	1.4 (1.1 to 1.9)	-0.8 (-1.1 to -0.2)	58.6 (40.8 to 76.3)	40.6 (30.7 to 52)	-0.8 (-1.2 to -0.2)
Tropical Latin America	82.7 (58.9 to 113.3)	80.4 (57.6 to 108.6)	0 (-0.1 to 0.2)	15.3 (11.8 to 16.9)	9 (7.8 to 10.6)	-1.1 (-1.2 to -0.8)	379.1 (296.9 to 416.6)	223.2 (198 to 253.2)	-1 (-1.2 to -0.8)
Central Latin America	20 (14.8 to 26.6)	19.2 (14.5 to 25.2)	-0.1 (-0.1 to 0.1)	2.3 (2 to 2.5)	1.8 (1.5 to 2.2)	-0.7 (-1 to -0.5)	59.7 (52.6 to 67.2)	49.3 (39.1 to 59.8)	-0.7 (-1 to -0.4)
Southern Latin America	76.3 (53 to 105.5)	82.2 (59.1 to 113)	0.1 (-0.1 to 0.4)	12.6 (9.2 to 14.8)	8.6 (7.2 to 9.5)	-1.1 (-1.2 to -0.8)	279.4 (221.3 to 321.6)	176.6 (157.7 to 202.5)	-1.1 (-1.2 to -0.9)
Caribbean	36.4 (27.6 to 47.7)	38.7 (29.3 to 51)	0.2 (0 to 0.3)	4.7 (3.9 to 6.2)	5 (4 to 6.3)	0.4 (-0.1 to 1)	147.1 (113.6 to 203.1)	154.8 (116.6 to 206.8)	0.3 (-0.2 to 1)
Central Europe	105 (77.7 to 139.4)	105.7 (80.4 to 138.3)	0.1 (-0.1 to 0.3)	16.8 (12.4 to 18.9)	12.9 (9.2 to 15.1)	-0.4 (-0.7 to -0.1)	313.8 (255.3 to 347.4)	250.9 (182.3 to 293.5)	-0.3 (-0.6 to 0)
Eastern Europe	76.3 (56.8 to 100.1)	72.8 (53.5 to 96.8)	-0.1 (-0.2 to 0)	13.7 (10.8 to 20.8)	23.5 (16.3 to 28.4)	1.8 (-0.2 to 3.3)	462.6 (350.7 to 730)	845.9 (620.7 to 1019.8)	2.1 (-0.1 to 4.1)
Central Asia	34.1 (25.5 to 44.9)	30.7 (23 to 40.4)	-0.2 (-0.4 to -0.1)	4.8 (4 to 6.8)	10.2 (5.9 to 12.4)	1.6 (-0.2 to 2.8)	148.5 (124.5 to 223.6)	303.6 (180 to 370.5)	1.5 (-0.3 to 2.7)
North Africa and Middle East	26.5 (20.2 to 34.7)	27.1 (20.9 to 34.8)	0 (-0.1 to 0.1)	3.2 (2.3 to 4.9)	2.2 (1.8 to 3.2)	-0.9 (-1.2 to -0.4)	104.2 (71.3 to 163.2)	64.2 (50.9 to 90.7)	-0.9 (-1.3 to -0.4)
South Asia	1.8 (1.3 to 2.6)	1.9 (1.3 to 2.7)	0.1 (0 to 0.1)	0.5 (0.3 to 0.8)	0.4 (0.3 to 0.5)	-0.4 (-0.9 to 0.4)	11.7 (6.2 to 19.1)	9.6 (6.9 to 13.1)	-0.4 (-0.8 to 0.5)
Southeast Asia	39.8 (30.3 to 51.3)	42.8 (32.9 to 54.9)	0.2 (0.1 to 0.3)	3.8 (2.7 to 4.6)	3.5 (2.6 to 4.2)	-0.1 (-0.6 to 0.5)	86.1 (69 to 126)	79.2 (63.7 to 104)	-0.1 (-0.6 to 0.6)

East Asia	11.5 (8.7 to 14.8)	12.2 (9.2 to 15.7)	0.1 (0.1 to 0.2)	0.9 (0.6 to 1.8)	0.9 (0.6 to 1.1)	0.1 (-1.1 to 1.9)	31.6 (20.4 to 60.4)	24.6 (18.7 to 31)	0 (-1.1 to 1.6)
Oceania	21.5 (16 to 28.7)	22.1 (16.3 to 29.5)	0.1 (-0.1 to 0.2)	3.3 (2.2 to 4.9)	3.3 (2.2 to 4.8)	-0.3 (-0.7 to 0.2)	97.2 (60.3 to 152.7)	101.4 (60.9 to 158.9)	-0.3 (-0.7 to 0.3)
Western Sub-Saharan Africa	209 (145 to 284.5)	226.4 (151.6 to 315.5)	0.1 (0 to 0.2)	8.6 (4.9 to 11.8)	5.7 (4.2 to 7.1)	-0.9 (-1.2 to -0.4)	220.8 (132.9 to 296)	153.6 (115.4 to 190.3)	-0.9 (-1.2 to -0.4)
Eastern Sub-Saharan Africa	247.1 (169.3 to 336.6)	267 (186.3 to 360.6)	0.1 (0.1 to 0.2)	4.5 (3.1 to 5.8)	3.8 (2.6 to 4.7)	-0.5 (-1 to 0.1)	171.3 (117 to 219.6)	139.7 (98.4 to 181.4)	-0.5 (-1 to 0.2)
Central Sub-Saharan Africa	212.7 (138.4 to 302.9)	209.2 (135.5 to 297)	0 (-0.2 to 0.1)	9.8 (5.3 to 14.7)	8.6 (5 to 14)	-0.5 (-1 to 0.4)	273.1 (149.9 to 385.8)	233 (143.1 to 351.4)	-0.5 (-1 to 0.3)
Southern Sub-Saharan Africa	263.4 (179 to 363)	240.5 (160.3 to 335.4)	-0.2 (-0.2 to -0.1)	12.5 (9.7 to 15)	11.3 (9.3 to 14.2)	-0.3 (-0.6 to 0)	295.5 (237.5 to 346.9)	253.7 (210.2 to 311.9)	-0.4 (-0.6 to -0.1)

Table 2. Age-standardized prevalence, death, DALYs rates of the alcoholic cardiomyopathy, and their percentage changes with 95% UIs from 1990 to 2019, both sexes.

	Prevalence			Deaths			DALYs		
Region	1990 age-standardized rate per 100,000 people	2019 age-standardized rate per 100,000 people	Percentage change in age-standardized rates, 1990–2019 (%)	1990 age-standardized rate per 100,000 people	2019 age-standardized rate per 100,000 people	Percentage change in age-standardized rates, 1990–2019 (%)	1990 age-standardized rate per 100,000 people	2019 age-standardized rate per 100,000 people	Percentage change in age-standardized rates, 1990–2019 (%)
Global	12.6 (9.6 to 16.5)	8.5 (6.6 to 11)	-0.3 (-0.4 to -0.3)	1.3 (1.2 to 1.7)	0.9 (0.7 to 1)	-0.4 (-0.5 to -0.3)	40.2 (36.6 to 52.1)	29.2 (24.5 to 33.3)	-0.3 (-0.5 to -0.2)
SDI									
High SDI	29.1 (22.4 to 38.1)	23.7 (18.9 to 30)	-0.2 (-0.3 to -0.1)	1.6 (1.2 to 2)	0.8 (0.7 to 1)	-0.5 (-0.6 to -0.4)	47.6 (37.2 to 56.3)	25.2 (20.7 to 29.7)	-0.5 (-0.6 to -0.4)
High-middle SDI	17.9 (13.2 to 24.1)	12.1 (9 to 16.2)	-0.3 (-0.3 to -0.3)	3 (2.6 to 4.2)	2.6 (2.1 to 3)	-0.2 (-0.4 to 0)	98.6 (82 to 139.4)	94.5 (78.2 to 111)	0 (-0.4 to 0.2)
Middle SDI	1.8 (1.3 to 2.4)	1.8 (1.3 to 2.3)	0 (0 to 0)	0.2 (0.2 to 0.3)	0.2 (0.1 to 0.2)	-0.3 (-0.5 to -0.1)	6.7 (5.3 to 8.9)	5 (3.8 to 6.2)	-0.3 (-0.5 to 0)
Low-middle SDI	1.5 (1 to 2)	1.6 (1.1 to 2.1)	0.1 (0 to 0.1)	0.3 (0.2 to 0.5)	0.2 (0.2 to 0.3)	-0.3 (-0.5 to 0)	9 (6.1 to 12.9)	6.8 (5.3 to 8.1)	-0.2 (-0.4 to 0)
Low SDI	2.1 (1.4 to 3.1)	2.1 (1.4 to 3)	0 (0 to 0)	0.3 (0.2 to 0.5)	0.2 (0.1 to 0.2)	-0.5 (-0.6 to -0.2)	8.9 (5.7 to 13.8)	4.8 (3.5 to 6.8)	-0.5 (-0.6 to -0.3)
Region									
High-income Asia Pacific	6.7 (4.9 to 9.4)	5.6 (4.3 to 7.3)	-0.2 (-0.3 to -0.1)	0.2 (0.2 to 0.3)	0.1 (0.1 to 0.1)	-0.6 (-0.7 to -0.5)	8.5 (6.9 to 10.1)	3.6 (2.7 to 4.5)	-0.6 (-0.7 to -0.5)
High-income North America	47.1 (35.5 to 64.2)	40.4 (31.7 to 51.8)	-0.1 (-0.2 to 0)	2 (1.4 to 2.4)	1.1 (0.9 to 1.3)	-0.5 (-0.6 to -0.3)	63.9 (48.3 to 74.9)	34.5 (29.5 to 42.2)	-0.5 (-0.6 to -0.3)
Western Europe	22.2 (17.1 to 28.5)	17.7 (13.7 to 22.5)	-0.2 (-0.3 to -0.1)	1.7 (1.3 to 2.1)	0.7 (0.6 to 0.9)	-0.6 (-0.7 to -0.4)	46.7 (36.5 to 56.7)	21.4 (17.4 to 25.5)	-0.5 (-0.7 to -0.4)
Australasia	49.5 (36.7 to 65.6)	37 (27.5 to 49.6)	-0.3 (-0.3 to -0.2)	1.8 (1.4 to 2.3)	1.1 (0.8 to 1.4)	-0.4 (-0.6 to -0.2)	58.6 (46.9 to 71.2)	34.4 (26.8 to 42)	-0.4 (-0.6 to -0.3)
Andean Latin America	0.6 (0.4 to 0.9)	0.8 (0.5 to 1)	0.3 (0.2 to 0.5)	0.1 (0.1 to 0.2)	0 (0 to 0.1)	-0.6 (-0.7 to -0.3)	2.9 (1.8 to 4.1)	1.3 (1 to 1.8)	-0.5 (-0.7 to -0.2)
Tropical Latin America	4.3 (2.8 to 6.2)	4.5 (3.1 to 6.5)	0.1 (0 to 0.1)	1.6 (1.2 to 2)	0.5 (0.4 to 0.6)	-0.7 (-0.8 to -0.6)	54.8 (42.4 to 69)	17.5 (13.6 to 21.6)	-0.7 (-0.7 to -0.6)
Central Latin America	1.3 (0.9 to 1.9)	1.3 (0.9 to 1.9)	0 (-0.1 to 0)	0.3 (0.2 to 0.4)	0.1 (0.1 to 0.2)	-0.6 (-0.7 to -0.5)	8.9 (6.6 to 10.5)	3.8 (2.9 to 4.8)	-0.6 (-0.7 to -0.5)
Southern Latin America	4.4 (2.9 to 6.4)	4.7 (3.1 to 6.7)	0.1 (-0.1 to 0.2)	1.2 (0.9 to 1.5)	0.2 (0.2 to 0.3)	-0.8 (-0.9 to -0.7)	35.4 (26.9 to 45.4)	7.4 (5.7 to 9.5)	-0.8 (-0.8 to -0.7)
Caribbean	10.4 (7.5 to 14)	11.7 (8.4 to 15.9)	0.1 (0 to 0.2)	1 (0.8 to 1.4)	1.5 (1.2 to 1.9)	0.5 (0.1 to 0.9)	33.8 (25.6 to 46.6)	45.5 (36.4 to 55.7)	0.3 (0 to 0.6)
Central Europe	20.2 (14.9 to 27.1)	22.5 (17.2 to 29.4)	0.1 (0 to 0.2)	2.7 (2.2 to 3.3)	2.4 (1.7 to 2.9)	-0.1 (-0.3 to 0)	73.7 (62.1 to 87.5)	72.6 (51.1 to 87.2)	0 (-0.3 to 0.2)
Eastern Europe	51.9 (37.7 to 69.3)	49.5 (35.4 to 67)	0 (-0.1 to 0)	10 (7.8 to 14.4)	15 (12.3 to 17.9)	0.5 (0 to 1)	356.1 (272 to 518.5)	580.6 (476.6 to 689)	0.6 (0.1 to 1.3)
Central Asia	3.9 (2.8 to 5.2)	3.3 (2.4 to 4.5)	-0.2 (-0.2 to -0.1)	0.8 (0.6 to 0.9)	0.9 (0.6 to 1.3)	0.3 (-0.2 to 0.8)	24.1 (20.9 to 31.1)	32.6 (19.2 to 45.7)	0.4 (-0.2 to 0.8)
North Africa and Middle East	1.8 (1.3 to 2.4)	1.8 (1.3 to 2.4)	0 (-0.1 to 0)	0.3 (0.1 to 0.5)	0.1 (0.1 to 0.2)	-0.6 (-0.8 to -0.3)	7 (3.8 to 11)	3.4 (2.3 to 4.3)	-0.5 (-0.7 to -0.2)
South Asia	0.7 (0.5 to 1)	0.7 (0.5 to 1)	0 (0 to 0)	0.2 (0.1 to 0.4)	0.1 (0.1 to 0.2)	-0.4 (-0.5 to 0.1)	5.8 (2.7 to 9.7)	3.9 (2.8 to 5.5)	-0.3 (-0.5 to 0.1)
Southeast Asia	1.7 (1.3 to 2.2)	1.9 (1.5 to 2.4)	0.1 (0.1 to 0.2)	0.2 (0.1 to 0.2)	0.1 (0.1 to 0.2)	-0.1 (-0.4 to 0.4)	4.8 (3.2 to 7.5)	4.8 (3.1 to 7.5)	0 (-0.3 to 0.4)

East Asia	1.7 (1.3 to 2.3)	1.9 (1.4 to 2.5)	0.1 (0 to 0.1)	0.1 (0.1 to 0.2)	0.1 (0.1 to 0.2)	0.2 (-0.5 to 1.4)	3.6 (2.1 to 7.1)	4.7 (3.2 to 6.1)	0.3 (-0.4 to 1.4)
Oceania	1.3 (0.9 to 1.8)	1.4 (1 to 1.9)	0 (0 to 0.1)	0.3 (0.2 to 0.5)	0.2 (0.1 to 0.3)	-0.4 (-0.6 to -0.1)	8 (4.2 to 14.1)	5.1 (2.7 to 8.7)	-0.4 (-0.5 to -0.1)
Western Sub-Saharan Africa	5 (3.2 to 7.4)	5 (3.1 to 7.6)	0 (-0.1 to 0)	0.6 (0.3 to 0.8)	0.2 (0.1 to 0.3)	-0.6 (-0.7 to -0.4)	18.3 (11.4 to 27.1)	7 (4.8 to 9.6)	-0.6 (-0.7 to -0.4)
Eastern Sub-Saharan Africa	2.1 (1.4 to 3)	2.2 (1.5 to 3.1)	0.1 (0 to 0.1)	0.1 (0 to 0.1)	0 (0 to 0.1)	-0.4 (-0.6 to 0)	2.2 (1.3 to 4.1)	1.4 (0.7 to 2.4)	-0.3 (-0.6 to 0.1)
Central Sub-Saharan Africa	1.6 (1.1 to 2.4)	1.6 (1 to 2.4)	0 (-0.1 to 0.1)	0.1 (0.1 to 0.2)	0.1 (0 to 0.2)	-0.3 (-0.6 to 0.1)	3.8 (2.1 to 6.5)	2.6 (1.4 to 4.8)	-0.3 (-0.6 to 0.1)
Southern Sub-Saharan Africa	0.5 (0.4 to 0.7)	0.5 (0.4 to 0.7)	-0.1 (-0.1 to 0)	0 (0 to 0.1)	0 (0 to 0)	-0.2 (-0.4 to -0.1)	1.3 (1 to 1.7)	1 (0.7 to 1.3)	-0.2 (-0.4 to -0.1)

Table 3. Age-standardized prevalence, death, DALYs rates of other cardiomyopathy, and their percentage changes with 95% UIs from 1990 to 2019, both sexes

	Prevalence			Deaths			DALYs		
Region	1990 age-standardized rate per 100,000 people	2019 age-standardized rate per 100,000 people	Percentage change in age-standardized rates, 1990–2019 (%)	1990 age-standardized rate per 100,000 people	2019 age-standardized rate per 100,000 people	Percentage change in age-standardized rates, 1990–2019 (%)	1990 age-standardized rate per 100,000 people	2019 age-standardized rate per 100,000 people	Percentage change in age-standardized rates, 1990–2019 (%)
Global	57.2 (44.2 to 73.2)	47.5 (37.2 to 60.2)	-0.2 (-0.2 to -0.1)	5.1 (3.8 to 5.5)	3.1 (2.6 to 3.4)	-0.4 (-0.4 to -0.3)	102.6 (90.4 to 112.9)	72.8 (62.2 to 80.5)	-0.3 (-0.4 to -0.2)
SDI									
High SDI	102.4 (81.1 to 128)	87.7 (72 to 106)	-0.1 (-0.2 to -0.1)	5.5 (4.1 to 5.9)	3.2 (2.8 to 3.7)	-0.4 (-0.5 to -0.3)	124.5 (99.5 to 133.6)	75 (68.9 to 85.4)	-0.4 (-0.4 to -0.3)
High-middle SDI	49.5 (37.9 to 63.8)	44.9 (35 to 57.1)	-0.1 (-0.1 to 0)	8.2 (5.1 to 9.1)	4.8 (3.3 to 5.4)	-0.4 (-0.5 to -0.3)	140.9 (121.8 to 155.5)	109.3 (76 to 123.6)	-0.2 (-0.4 to -0.1)
Middle SDI	28 (21.3 to 35.7)	24.7 (19.2 to 31.6)	-0.1 (-0.2 to -0.1)	2.5 (2.1 to 3)	2 (1.6 to 2.3)	-0.2 (-0.3 to -0.1)	63.2 (53.7 to 86.4)	48.4 (41.3 to 60)	-0.2 (-0.4 to -0.1)
Low-middle SDI	26.5 (19.5 to 35)	24.1 (17.5 to 32.1)	-0.1 (-0.1 to 0)	2.1 (1.7 to 2.5)	1.7 (1.4 to 2)	-0.2 (-0.3 to -0.1)	49.9 (40.6 to 62.2)	42.6 (36.1 to 50.5)	-0.1 (-0.3 to 0)
Low SDI	125.1 (84.9 to 171.3)	124 (85.9 to 170.3)	0 (0 to 0)	4.1 (2.6 to 5.6)	3.1 (2.3 to 3.9)	-0.2 (-0.4 to 0)	123.8 (78.7 to 162.3)	96.5 (74.5 to 118.9)	-0.2 (-0.4 to 0.1)
Region									
High-income Asia Pacific	71.9 (54.2 to 93.7)	61.4 (49 to 75.9)	-0.1 (-0.2 to 0)	4.4 (2.4 to 5)	1.9 (1.3 to 2.1)	-0.6 (-0.6 to -0.4)	95.2 (73.1 to 102.8)	45.1 (38.4 to 50.5)	-0.5 (-0.6 to -0.4)
High-income North America	158.1 (124.8 to 201.6)	151.2 (122.5 to 185.9)	0 (-0.1 to 0.1)	5.9 (4.6 to 6.3)	4.6 (4.1 to 5.1)	-0.2 (-0.3 to -0.1)	162.6 (127.6 to 176)	117.1 (107 to 132.4)	-0.3 (-0.3 to -0.1)
Western Europe	82.8 (65 to 103.2)	67.9 (53.5 to 84.2)	-0.2 (-0.2 to -0.1)	8.7 (4.8 to 9.8)	3.4 (3 to 4.2)	-0.6 (-0.7 to -0.2)	138.7 (93.5 to 151.8)	60.8 (54.7 to 74.8)	-0.6 (-0.6 to -0.3)
Australasia	103.3 (79.4 to 133.7)	71.7 (55.3 to 92.1)	-0.3 (-0.4 to -0.2)	5.2 (3.2 to 5.8)	2.2 (1.9 to 2.8)	-0.6 (-0.6 to -0.3)	119.2 (84.7 to 131.7)	51.8 (45.7 to 66.2)	-0.6 (-0.6 to -0.3)
Andean Latin America	14.6 (10.5 to 20.1)	17.8 (13.3 to 23.4)	0.2 (0.1 to 0.4)	1.8 (1.3 to 2.2)	1.4 (1.1 to 1.8)	-0.2 (-0.4 to 0.1)	55.7 (38.9 to 72.2)	39.3 (29.7 to 50.2)	-0.3 (-0.5 to 0)
Tropical Latin America	78.5 (56.2 to 107.1)	75.9 (54.6 to 102.1)	0 (-0.1 to 0)	13.8 (10.6 to 14.9)	8.5 (7.5 to 9.9)	-0.4 (-0.4 to -0.2)	324.3 (254.6 to 347.6)	205.7 (184.4 to 231.7)	-0.4 (-0.4 to -0.2)
Central Latin America	18.6 (13.9 to 24.6)	17.9 (13.6 to 23.4)	0 (-0.1 to 0)	1.9 (1.7 to 2.1)	1.7 (1.4 to 2.1)	-0.1 (-0.3 to 0)	50.8 (45.9 to 56.7)	45.6 (36.2 to 55)	-0.1 (-0.3 to 0.1)
Southern Latin America	71.9 (50.2 to 99.1)	77.5 (56 to 106.3)	0.1 (0 to 0.2)	11.4 (8.3 to 13.3)	8.3 (7 to 9.2)	-0.3 (-0.4 to -0.1)	244 (194.3 to 276.2)	169.2 (152 to 193.1)	-0.3 (-0.4 to -0.1)
Caribbean	26 (20.1 to 33.6)	27 (21 to 35.1)	0 (0 to 0.1)	3.7 (3 to 4.7)	3.5 (2.8 to 4.5)	0 (-0.2 to 0.1)	113.3 (88 to 156.5)	109.3 (80.2 to 151.1)	0 (-0.2 to 0.2)
Central Europe	84.8 (62.8 to 112.4)	83.2 (63.2 to 108.9)	0 (-0.1 to 0.1)	14.1 (10.1 to 15.6)	10.6 (7.5 to 12.2)	-0.2 (-0.3 to -0.2)	240.1 (193.2 to 259.9)	178.3 (131.2 to 206.4)	-0.3 (-0.4 to -0.2)
Eastern Europe	24.4 (19.1 to 30.8)	23.3 (18 to 29.8)	0 (-0.1 to 0)	3.8 (2.9 to 6.4)	8.5 (4 to 10.5)	1.3 (-0.2 to 2.3)	106.4 (78.7 to 211.6)	265.3 (144.2 to 330.8)	1.5 (-0.2 to 2.8)
Central Asia	30.2 (22.7 to 39.7)	27.5 (20.6 to 36)	-0.1 (-0.2 to 0)	4 (3.3 to 5.9)	9.3 (5.3 to 11)	1.3 (0.1 to 2)	124.4 (103.7 to 192.5)	271 (160.8 to 324.8)	1.2 (0 to 1)
North Africa and Middle East	24.8 (18.9 to 32.2)	25.3 (19.6 to 32.4)	0 (0 to 0.1)	3 (2.2 to 4.4)	2.1 (1.7 to 3)	-0.3 (-0.5 to -0.1)	97.2 (67.4 to 152.2)	60.9 (48.7 to 86.4)	-0.4 (-0.5 to -0.1)
South Asia	1.1 (0.8 to 1.6)	1.2 (0.8 to 1.6)	0 (0 to 0.1)	0.3 (0.2 to 0.5)	0.3 (0.2 to 0.3)	-0.1 (-0.3 to 0.3)	5.8 (3.5 to 9.4)	5.7 (4.1 to 7.6)	0 (-0.3 to 0.4)
Southeast Asia	38.1 (29 to 49)	40.9 (31.4 to 52.5)	0.1 (0 to 0.1)	3.6 (2.6 to 4.4)	3.4 (2.5 to 4)	-0.1 (-0.2 to 0.1)	81.3 (65.8 to 118.5)	74.5 (60.6 to 96.6)	-0.1 (-0.3 to 0.1)

East Asia	9.8 (7.4 to 12.5)	10.3 (7.8 to 13.2)	0.1 (0 to 0.1)	0.8 (0.5 to 1.5)	0.7 (0.5 to 0.9)	-0.1 (-0.5 to 0.5)	28 (18.3 to 53.2)	20 (15.5 to 25)	-0.3 (-0.6 to 0.2)
Oceania	20.2 (15 to 26.8)	20.7 (15.3 to 27.6)	0 (0 to 0.1)	3 (2 to 4.4)	3.2 (2.1 to 4.5)	0.1 (-0.2 to 0.4)	89.2 (56.1 to 138.6)	96.3 (58.2 to 150.2)	0.1 (-0.2 to 0.4)
Western Sub-Saharan Africa	204 (141.7 to 277.1)	221.4 (148.5 to 307.9)	0.1 (0 to 0.1)	8 (4.6 to 11)	5.5 (4 to 6.8)	-0.3 (-0.5 to 0)	202.5 (121.5 to 268.9)	146.6 (110.6 to 180.8)	-0.3 (-0.4 to 0.1)
Eastern Sub-Saharan Africa	245 (167.9 to 333.7)	264.8 (184.8 to 357.5)	0.1 (0 to 0.1)	4.5 (3.1 to 5.7)	3.7 (2.6 to 4.7)	-0.2 (-0.4 to 0.1)	169.2 (115.7 to 215.5)	138.3 (97.7 to 179.1)	-0.2 (-0.4 to 0.1)
Central Sub-Saharan Africa	211 (137.4 to 300.5)	207.6 (134.5 to 294.5)	0 (-0.1 to 0.1)	9.7 (5.2 to 14.5)	8.5 (5 to 13.8)	-0.1 (-0.3 to 0.2)	269.3 (147.8 to 379.3)	230.4 (141.7 to 346.6)	-0.1 (-0.4 to 0.2)
Southern Sub-Saharan Africa	262.9 (178.6 to 362.3)	240 (159.9 to 334.8)	-0.1 (-0.1 to 0)	12.4 (9.7 to 14.9)	11.3 (9.3 to 14.1)	-0.1 (-0.2 to 0)	294.2 (236.5 to 345.3)	252.7 (209.5 to 310.6)	-0.1 (-0.2 to 0)

Figures

Figure 1

Age-standardized prevalence rates (A), death (B), and DALY (C) of cardiomyopathy for 204 countries and territories, both sexes, 2019. DALY: Disability-Adjusted Life Year.

Figure 2

Contribution of alcoholic cardiomyopathy, and other causes to cardiomyopathy prevalence, both sexes, globally and by region, in 1990 and 2019.

Figure 3

Temporal trends in age-standardized death rates of cardiomyopathy for 21 world regions by SDI, both sexes, 1990–2019. For each region, points from left to right depict estimates from each year from 1990 to 2019. SDI, Socio-demographic Index.

Supplementary Files

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