Cardiovascular disease burden in a country: In the context of Sri Lanka

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Abstract
Cardiovascular diseases (CVDs) are the leading cause of death worldwide and account for a significant portion of health loss and avoidable health system costs. The burden of CVDs has increased in recent decades almost everywhere in the world, but it has disproportionately affected low and middle-income countries. While more studies on the prevalence of CVDs are available, there is limited evidence presenting a complete picture on the burden of CVDs in Sri Lanka. In this context, this study aims to provide a comprehensive picture on the burden of CVDs in the country. This study used data available on the websites of ministry of health and department of census and statistics in Sri Lanka to present the comprehensive picture of the burden of CVDs in Sri Lanka. Overall, in 2019, there were an estimated 398,027 cases, 17,144 deaths, due to CVDs in Sri Lanka. The proportion of deaths attributable to CVDs increased from 24.92% to 28.05% between 2004 and 2019. Aside from implementing preventive measures, the health sector must also prepare for long-term care of patients with CVDs, which could have substantial repercussions for resources and operations.

Introduction
Sri Lanka is an island nation of 65,610 square kilometers, with a population of approximately 21 million. The recent estimates for mortality from CVD (cardiovascular diseases) for Sri Lanka was 524 deaths per 100,000 which is higher than that observed in many high-income countries. Coronary artery disease (CAD) is the leading cause of death in Sri Lanka while stroke is the third cause of death. CAD accounted for 34% of deaths in an autopsy study. For comparison, CAD accounts for only 17% of deaths in the US and UK. Many of these deaths are premature (the person dies too early) and could be prevented, delayed or even well-controlled when it is diagnosed at the early stages of the atherosclerosis process, through a number of lifestyle changes and accurate pharmaceutical treatment and management. CVD refers to all the diseases of the heart and circulation, including coronary heart disease, atrial fibrillation, heart attack, congenital heart disease and stroke [1].

Materials and Methods
The objective of this is to provide comprehensive picture on the burden of CVDs in the country. This study used the publicly accessible data available in the Department of Census and Statistics and medical statistics unit of Ministry of Health websites [2-3]. Descriptive summary measures were used to describe the data.

Results
There were an estimated 398,027 prevalent cases of CVDs in both sexes in 2019. About half (52.19%) of these cases were male in Sri Lanka. In 2019, there were 58,976 total number of deaths in Sri Lanka. Among them 29% was due to cardiovascular diseases.

Figure 1: Number of deaths due to leading causes in Sri Lanka
Figure 1 illustrates leading causes for deaths in the last 8 years in Sri Lanka. It can be clearly seen that the first leading cause for deaths is cardiovascular diseases. When compared with other causes, the number of deaths due to cardiovascular diseases is significantly high.

![Figure 2: Deaths due to CVDs from 2004 to 2019 in Sri Lanka](image)

A total of 17144 CVD deaths were estimated to have occurred in 2019, with 9557 deaths among males and 7587 deaths among females (Figure 2). It implies that death rates are much lower among women compared to men. Furthermore, it can be seen that the number of deaths per 100,000 population has gradually increased from 2004 to 2019.

The number of deaths of CVDs increased steadily with age, reaching a peak at the 70+ age group (Figure 3). Moreover, Figure 3 also depicts the number of deaths due to CVDs in age groups 50-69 and 70+ have drastically increased with past decades. Those two age groups are the significant age groups for CVDs. In 50-69 group, the number of deaths of CVDs has increased from 4095 in 2004 to 6906 in 2019. Similarly, in 70+ age group, the number of deaths of CVDs has increased from 4665 in 2004 to 8803 in 2019.

Figure 4 indicates that kids below five years of age, 43% of the deaths are due to CVDs in 2019, which increased steadily with age. The highest proportion of deaths being attributable to CVDs in the age group 70+ years, 8813. The mortality rate due to CVDs is higher in males than in females. A total of 17144 CVD deaths were estimated to have occurred in 2019, with 9557 deaths among males and 7587 deaths among females. In 2019, approximately 2.6% of the total deaths from CVDs is from the age groups below 16 years.

![Figure 3: Number of deaths with age and year](image)

![Figure 4: Number of deaths with age and gender](image)

There has been a steep rise in the proportion of deaths attributable to CVDs out of total deaths. In 2004, approximately 24.92% (95% UI: 21.23-27.51) of the total deaths were due to CVDs, which has increased to 28.05% (95% UI: 25.54-31.37) of the total deaths in 2019. In 2004, 28.17% (95% UI: 25.92-31.13) of the deaths in males and 27.09% (95% UI: 24.94-30.28) of the deaths in females were due to CVDs, which increased to 30.47% (95% UI: 27.82-33.69) of the total deaths in males and 29.07% (95% UI: 26.34-32.46) of the total deaths in females in 2019 (Table 1).

### Table 1: Proportion of total deaths attributable to CVDs

<table>
<thead>
<tr>
<th>Year</th>
<th>Proportion of deaths in both sexes (95% UI)</th>
<th>Proportion of deaths in male (95% UI)</th>
<th>Proportion of deaths in female (95% UI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>26.87(23.21-29.68)</td>
<td>31.79(28.64-35.27)</td>
<td>28.72(25.94-31.63)</td>
</tr>
<tr>
<td>2014</td>
<td>29.28(25.73-32.19)</td>
<td>32.28(29.17-35.82)</td>
<td>30.5(27.34-33.37)</td>
</tr>
<tr>
<td>2019</td>
<td>28.05(25.54-31.37)</td>
<td>30.47(27.82-33.69)</td>
<td>29.07(26.34-32.46)</td>
</tr>
</tbody>
</table>

**Discussion**

The proportion of deaths attributable to CVDs increased from 24.92% to 28.05% in both sexes (28.17% to 30.47% in males and 27.09% to 29.07% in females) from 2004 to 2019 in Sri Lanka. Similar trend has been observed in neighbouring countries. In India, the proportion of deaths attributable to CVDs has increased from 14.52% to 27.4% of the total deaths.
from 1990 to 2019 [1]. Similar pattern has also been noted in other neighbouring countries including Bhutan and Pakistan [1]. This could be because of the successes in reducing mortality due to other health conditions than CVDs, leading to dramatic increase in the share of deaths attributable to CVDs.

The underlying causes of the rise in CVD prevalence, mortality, and burden include social, economic, and cultural changes brought about by globalization and urbanization [1]. Tobacco use, unhealthy food, low level of physical activity, and harmful alcohol use gradually manifest as intermediate risk factors such as raised BP, raised blood glucose, dyslipidaemia, and high body mass index (BMI) [1]. Addressing these risk factors effectively can also help control diseases other than CVDs, such as diabetes, kidney disease, and cancer. CVD prevention measures include encourage a healthy diet, adequate physical activity, and a reduction in tobacco and alcohol use. Therefore, it is better to promote physical activity levels through the construction of public parks, cycle lanes, physical fitness centres, yoga, and meditation centres. Apart from behavioral risk factors, environmental risk factors like particulate matter pollution, including ambient and indoor air pollution, increases the risk of CVDs [1]. Local governments might endeavor to reduce indoor and outdoor air pollution, which would help to lower the prevalence and death from CVDs. Shifting high-polluting industries away from residential areas and controlling and regulating vehicular emissions could be a useful strategy to reduce ambient air pollution, while promoting clean fuels in domestic use could help reduce indoor air pollution, as people often struggle to find peaceful and less polluted areas for physical activity, morning walks, and jogging in city areas.

Healthy lifestyle counselling could cover risk factors of CVDs such as unhealthy diet, tobacco use, insufficient physical activity, and harmful use of alcohol as important contributors to CVDs. The country should also promote healthy dietary habits such as increased intake of whole grains, legumes, fruits and vegetables, fibre-rich foods, and food rich in polyunsaturated fatty acids and reduced intake of sweetened beverages, salted foods, high sodium foods, trans fat, and red meat. Health education messages alone are insufficient to promote a healthy diet; several other aspects must be considered, such as the cost of processed foods versus fresh items, the distance to fruit and vegetable markets, and the cost of fruits and vegetables [1,5].

Early identification and management of intermediate risk factors, such as raised BP, raised blood glucose levels, and dyslipidaemia may be able to stop the development of CVDs and, consequently, the complications and fatalities that go along with them.

Screening programmes at primary level health facilities could be useful. Previous studies have revealed that such screening programmes at the primary health care level could be effective in the early detection of the disease [1].

In the meantime, the health service provider’s preparedness is just as crucial. It should be mandatory for various governmental levels to guarantee the availability of necessary medications and technology.

Conclusion
This study aims to provide comprehensive picture on the burden of CVDs in the country. This study is based on the data from 2004 to 2019 in Sri Lanka. CVDs have emerged as a major public health issue in Sri Lanka, accounting for a large and growing proportion of deaths in 2019. One key factor could be success in reducing mortality from other diseases, but CVD mortality has stayed steady. Others may be altering their lifestyles, notably their food and physical exercise. Addressing the rising CVD burden in Sri Lanka necessitates addressing the risk factors for these diseases on numerous fronts, with the involvement of all sectors.

Opportunistic screening in health facilities and community screening programmes could aid in the early detection and prevention of disease. Aside from implementing preventive measures, the health sector must also prepare for long-term care of patients with CVDs, which could have substantial repercussions for resources and operations.

Limitations
Availability of data is the major limitations of this study. There is no up to date information regarding CVD records. Officials have updated 2019 database recently.

Conflict of Interests
Author declares no conflict of interest.

References


