Global Burden of Diseases: Cursed For Public Health

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Abstract

It is challenging to provide in effect and high-quality care to patients without knowing their diagnoses; similarly, for health systems to be effective, it is needed to appreciate the important challenges in efforts to develop population health and how these challenges are varying. Before the early 1990s, there was no inclusive and inside dependable source of information on the global burden of diseases. To close by this gap, the World Bank and the World Health Organization sprang the Global Burden of Disease (GBD) Study in 1991. A comprehensive and inclusive burden of disease report must be based on a reliable set of estimations for mortality and morbidity. For this reason the Global Burden of Diseases, Injuries and Risk Factors project (GBD) aims to measure population health worldwide. The World Health Organization (WHO) has subsequently produced estimates of GBD for the years 1999, 2000. The benefit of the GBD method is that reliable methods are functional to critically evaluate available information on each condition, make this information equivalent and systematic, estimation results from countries with incomplete data, and report on the burden of disease with the use of standardized metrics. The overall burden of disease is evaluated by means of the disability-adjusted life year (DALY), a time-based measure that associates years of life lost due to premature mortality (YLLs) and years of life lost due to time lived in states of less than full health, or years of healthy life lost due to disability (YLDs).

Key Words: Global Burden of Disease (GBD), World Health Organization (WHO), Disability-adjusted life year (DALY), Years of life lost due to premature mortality (YLLs), years of healthy life lost due to disability (YLDs).

1. Introduction

A basic requirement for evaluating the cost-effectiveness of health interventions is a comprehensive assessment of the amount of ill health (premature death and disability) attributable to specific diseases and injuries. A new methodology, the number of disability-adjusted life years (DALYs), was developed to assess the burden of disease and injury in 1990 for over 100 causes by age, sex and region. The DALY concept provides a combinative, extensive methodology to capture the entire amount of ill health which will be incurred during one's lifetime [17]. It differs in many respects from previous attempts at global and regional health situation assessment which have typically been less detailed, and limited to its area of causes of diseases.

The Global Burden of Disease (GBD) Study was commissioned by The World Bank in the early 1990s to provide a comprehensive assessment of disease burden in 1990 from over 100 diseases and injuries, and from 10 selected risk factors, for the world and 8 major World Bank regions [11, 12, 13]. The estimates were combined with research into the cost-effectiveness of intervention choices in different populations to develop recommended intervention packages for countries at different stages of development [14].

The work is presented here is extension of the work of Murray and Lopez in this direction, by applying their techniques and data to estimate the burden of disease among the world’s poorest and richest population groups [18].

The estimate of the burden of disease is calculated among the 20% of the global population living in countries that have the world’s lowest average per capita incomes and for comparative purposes, an estimate was also prepared for 20% of the global population living in the richest countries.
2. Estimation Procedure

It consists of four steps:

**Step I:** Identifying the Poorest and Richest (20%) of the Global Population

A. The world’s countries were listed in ascending order in terms of income adjusted to achieve purchasing power parity [4] [5].

B. The population size of each country [6].

C. A line was drawn on the list at that point where the cumulative population of the countries above it equaled 20% of the total world population.

**NOTE:**

The peoples above the line were defined global poorest 20%.

The peoples below the line were defined global richest 20%.

**Step II:** Estimating the Total Number of Deaths from All Causes in the Poorest and Richest Global 20%.

A. The number of people at each age level and in each gender group was determined through reference to standard United Nations [1][2][3].

B. The death rates for people in each age/gender category:

1. Obtaining the country’s life expectancy from United Nations’ table [7].

2. Choosing the most appropriate of nine available model life tables, provided in Murray-Lopez group [8].

3. Taking the death rates for each age/gender category according to Murray-Lopez group [9].

C. The number of people in each country/age/gender category as determined in (Step II.A) was multiplied by the corresponding death rate as estimated in (Step II.B), and the resulting numbers of deaths for each country/age/gender category were aggregated.

**Step III:** Disaggregation of the total number of deaths from all causes by each of the three principal disease groups: [16]

Group I (communicable, maternal, perinatal, and nutritional)

Group II (non-communicable)

Group III (accidents and injuries)

**Step IV:** Estimating the Number of DALYs in the Global Poorest and Richest 20%.

A. The DALY/death ratio for each age/gender/category was calculated by dividing the numbers in DALY tables by those appearing in death tables.

B. The ratios produced in Step IV.A were multiplied by the number of deaths caused by the corresponding disease group in each country/age/gender category within the regions concerned [10].

3. Types of Assessment

I use two types of assessment.

1. The Health of the Poor Alone-- This is the comparison of group of intra population disease. Because it is the most relevant approach to a poverty alleviation strategy—a strategy concerned with improving the health status of the poor alone.

2. Differences between the Health of the Poor and the Health of Others--This is the comparison of group of inter population disease; it shows the results of between the global poor and the global rich or between the global poor and the rest of the world.
4. Findings

The most notable features of Figure 1 are: “the inverse relationship between economic status and communicable diseases, and the opposite relationship between economic status and non-communicable conditions”.

Communicable diseases are concentrated among and most important for the global poor. Among this group, communicable illnesses are responsible for a clear majority of deaths (58.6 %) and DALY loss (63.6 %). This is a notably higher percentage than for the population of the world as a whole.

Among the poor, non-communicable conditions cause 32.0% of deaths and 23.3 % of DALY loss, which is much less than communicable conditions.

5. Specific Diseases [15]

Table 1A: Leading Causes of Death in Different Population Groups

<table>
<thead>
<tr>
<th>Cause</th>
<th>Global poor</th>
<th>Global rich</th>
<th>Entire global population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory Infections</td>
<td>13.4%</td>
<td>25.4%</td>
<td>12.4%</td>
</tr>
<tr>
<td>Diarrheal Diseases</td>
<td>11.3%</td>
<td>22.6%</td>
<td>11.9%</td>
</tr>
<tr>
<td>Perinatal Conditions</td>
<td>7.9%</td>
<td>12.0%</td>
<td>8.7%</td>
</tr>
<tr>
<td>Childhood Cluster Diseases</td>
<td>7.8%</td>
<td>10.2%</td>
<td>8.7%</td>
</tr>
<tr>
<td>Ischaemic Heart Disease</td>
<td>7.3%</td>
<td>4.8%</td>
<td>7.3%</td>
</tr>
</tbody>
</table>

Table 1B: Leading Causes of DALY Loss in Different Population Groups

<table>
<thead>
<tr>
<th>Cause</th>
<th>Global poor</th>
<th>Global rich</th>
<th>Entire global population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory Infections</td>
<td>11.8%</td>
<td>22.1%</td>
<td>11.0%</td>
</tr>
<tr>
<td>Diarrheal Diseases</td>
<td>11.0%</td>
<td>13.2%</td>
<td>10.5%</td>
</tr>
<tr>
<td>Perinatal Conditions</td>
<td>10.0%</td>
<td>9.5%</td>
<td>8.5%</td>
</tr>
<tr>
<td>Childhood Cluster Diseases</td>
<td>8.8%</td>
<td>8.8%</td>
<td>7.2%</td>
</tr>
<tr>
<td>Ischaemic Heart Disease</td>
<td>8.1%</td>
<td>5.2%</td>
<td>6.7%</td>
</tr>
</tbody>
</table>

Table 1 provides figures for the five leading causes of poor health: Section A deals with deaths, and Section B with DALYS.
Among the global poor, the leading causes of death are communicable diseases. Respiratory infections and diarrheal diseases (each) cause more than 10% of total deaths, and perinatal conditions and the childhood cluster of diseases (This cluster consists of pertussis, polio, diphtheria, measles, and tetanus.) are each responsible for almost 8% of deaths. A non-communicable disease, ischaemic heart disease, is in fifth place, and is responsible for 7.3% of deaths.

Respiratory infections and diarrhea remain the leading problems when ill health is assessed in terms of DALY loss instead of death. Ischaemic heart disease drops out of the top five causes.

Among the global rich, all the top five causes of death and of DALY loss are non-communicable diseases.

**Significantly**, neuropsychiatric conditions, which are responsible for only about around 1% of deaths but constitute the leading cause of DALY loss, accountable for nearly one-fourth of the total [19].

### 6. GENDER DIFFERENCES [10]

![Figure 2A](image1.png)

**Figure 2A** Causes of Death by Gender

![Figure 2B](image2.png)

**Figure 2B**: Causes of DALY Loss by Gender

Figure 2 provides estimates of the relative importance of the three principal groups of diseases for men and for women. Section A deals with deaths, Section B deals with DALY loss.

Mainly Two patterns emerge here:

First, the communicable disease groups are relatively more important for poor women than for poor men. The basic reason is that, maternal health is included here, which obviously affects women only.

Among the rich, these differences disappear. It becomes almost same for both men and women, while non-communicable conditions become more important for women than for men.

**Note:** when maternal conditions are included, diseases in the communicable conditions group are responsible for about 7.5% points more of total deaths and 11.4% points more of DALY loss among poor women than among poor men. When maternal conditions are excluded, those figures fall to 6.3% points more for deaths and 7.5% points for DALY loss. But there is more to say than this, even maternal conditions are
removed still communicable diseases account for a higher proportion of death and disability among poor women than among poor men.

Secondly, injuries are much less important for women than for men among both the global poor and the global rich. In each group, the percentage of deaths and of DALY loss among women attributable to injuries is only of one-half of the men.

7. THE POOR-RICH GAP

Table 2A: Mortality Gap between the Global Poor and the Global Rich

<table>
<thead>
<tr>
<th>Cause</th>
<th>Actual number of deaths (000)</th>
<th>Number of deaths at death rates of global rich (000)</th>
<th>Number of excess deaths (col. 2 - col. 3,000)</th>
<th>Percentage reduction needed to eliminate excess deaths (col. 4/col. 2 x 100)</th>
<th>Percentage of total poor-rich gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communicable</td>
<td>8,150</td>
<td>642</td>
<td>7,517</td>
<td>92.1%</td>
<td>77.0%</td>
</tr>
<tr>
<td>Noncommunicable</td>
<td>4,445</td>
<td>3,011</td>
<td>1,438</td>
<td>32.3%</td>
<td>14.7%</td>
</tr>
<tr>
<td>Injuries</td>
<td>1,315</td>
<td>510</td>
<td>805</td>
<td>61.2%</td>
<td>8.8%</td>
</tr>
<tr>
<td>Total</td>
<td>13,912</td>
<td>4,163</td>
<td>9,760</td>
<td>70.1%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Table 2B: DALY Gap between the Global Poor and the Global Rich

<table>
<thead>
<tr>
<th>Cause</th>
<th>Actual number of DALYs lost (000)</th>
<th>Number of DALYs lost at rates of global rich (000)</th>
<th>Number of excess DALYs lost (col. 2 - col. 3,000)</th>
<th>Proportion of DALYs lost that is excessive (col. 4/col. 2 x 100)</th>
<th>Percentage of total poor-rich gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communicable</td>
<td>301,719</td>
<td>23,920</td>
<td>277,799</td>
<td>92.1%</td>
<td>78.9%</td>
</tr>
<tr>
<td>Noncommunicable</td>
<td>110,486</td>
<td>31,750</td>
<td>78,736</td>
<td>28.7%</td>
<td>9.0%</td>
</tr>
<tr>
<td>Injuries</td>
<td>62,301</td>
<td>42,635</td>
<td>19,666</td>
<td>68.4%</td>
<td>12.1%</td>
</tr>
<tr>
<td>Total</td>
<td>474,506</td>
<td>122,322</td>
<td>352,184</td>
<td>74.2%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Table 2 records the amount of excess death and disability suffered by the world’s poorest 20%, illustrating the poor-rich gap.

Section A of Table 2 deals with deaths; section B covers DALY loss. Each section presents the findings in two different ways:

Column 5 indicates the excess deaths/DALY loss suffered by the global poor that is attributable to a given group of diseases.

This percentage represents the extent to which mortality or morbidity from the disease could be reduced by lowering the age/gender-specific rates suffered by the poor to those suffered by the rich.

Column 6 indicates the percentage of total excess deaths/DALY loss suffered by the global poor - the percentage of the total poor-rich gap that is attributable to that disease.

The finding shows that, the great majority of deaths and disability caused by communicable disease—92.1% of deaths and 92.1% of DALY loss—among the poor is excessive, which directly referable to differences between rich and poor. Non-communicable diseases also cause excess death and disability among the poor. So we can say that age/gender-specific death/disability rates from non-communicable as well as from communicable diseases are higher for the poor than for the rich [25, 26].

Excess death and disability from communicable diseases among the poor is responsible for nearly four-fifths of the total poor-rich gap in health status (77% with respect to deaths and 78.9% with respect to DALYs).

8. Comprehensiveness of Approach

The findings of this report showing that non-communicable diseases are less important for the poor than for the rich, which is differ from those of earlier studies based on similar data. The reason of the difference is mainly for approach is taken [20, 21].
The earlier findings were based primarily on poor-rich comparisons of age-specific death rates from non-communicable diseases among adults, which showed the existence of higher rates among the poor than among the rich [22]. Here simple existence of a higher death rate among the poor for a single type of disease is not focused, mainly focus on a comparison of the size of the poor-rich differences associated with different types of disease [23, 24]. The objective is to identify those diseases where the poor-rich differences are greatest from which the poor suffer the greatest.

8. Limitation of this study
The limitation of this study is:

What may be true of communicable diseases and non-communicable diseases as a whole is not necessarily so for each and every communicable and non-communicable disease.

There are almost certainly advanced developing countries in which non-communicable diseases are more important than communicable diseases, even it is in country’s poorest 20% list.

9. Conclusion
Despite the progress of technology and the cause of knowledge of diseases during the past decade, but still understanding of global epidemiology has been modest. There is an urgent need for a globally-coordinated research and development effort for data collection and analysis in poor countries should be set up. That can routinely release comparable information to establish how disease and risk factor burden is changing in populations. Strategy from a global perspective, overlook the uneven distribution of different diseases across social class should be taken extensively. The use of a distributional perspective shows that the non-communicable conditions that represent emerging problems, which is less important for the global poor, tend to cluster among those who enjoy higher living standards. The communicable diseases on the other hand, are concentrated primarily among the poor. As a result, any shift of emphasis in global disease priorities agenda would represent a move away from the problems that are most important for the poor toward those that is of greater importance for the better off. In light of the role of cost effectiveness and the potential for targeting that has been discussed here, for reflecting the reality to policymakers and researchers. The numbers can legitimately illustrating the impact of policy interventions to modify future disease trends. It represents a far more suitable basis for policy development than simple projections of those trends. These differences also indicate a pressing need for future estimations of the burden of disease to focus on the conditions prevailing among the groups that are of greatest concern from a poverty or equity perspective.

References:
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