EDITORIAL

Metrics matter: the case of assessing the importance of non-communicable diseases for the poor

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As the saying goes, ‘bad publicity is better than no publicity.’ So I was gratified to see in IJE such a prominent, even if highly critical, reference to a piece that two colleagues and I did nearly 15 years ago and that I’d thought long forgotten.

In our piece my colleagues and I had questioned, on equity grounds, the then-incipient shift in emphasis from communicable to non-communicable diseases (NCDs) in global health policy. Using 1990 data from the 1996 World Health Organization (WHO) global burden of disease (GBD) study, we had estimated that communicable illnesses were still responsible for a majority of the disease burden in the poorest quintile of the world’s population. But in the richest quintile, the situation was the reverse: NCDs were overwhelmingly dominant.

This finding had led us to advocate a continuing focus on communicable diseases because of their central importance to the health of the global poor, a group of especially high priority in the 2015 Millennium Development Goals that were then being formulated. To move toward NCDs, we argued, would result in increased attention for a set of conditions far more relevant to the world’s better-off.

Not surprisingly, perhaps, NCD advocates did not find this argument very compelling. Nor did any of the four commentators on a similar argument for India advanced by S.V. Subramanian and colleagues in the article featured in this current IJE collection of papers on equity and the pattern of disease.

Among the several arguments advanced by the commentators disagreeing with this conclusion, two stand out. The first is that Subramanian et al. have simply misread the available literature, and that the burden of disease from NCDs is in fact higher among the poor. The second is that, even if they did not misread, NCDs now constitute an adequately important (and growing) minority of the disease burden in even the poorest population groups to justify significant attention.

Inadequacy of the current metric

As for the first of these arguments, my limited independent knowledge about Indian epidemiological conditions prevents adding to the evidence put forward by Subramanian et al. and the four commentators. But I don’t find the issue all that important: even if the NCD advocates are right, they haven’t proven very much, for the measure under debate is far too narrow for an adequate assessment of whether NCDs (or any other disease types) are more important for the poor than for the better-off.

This measure is the socioeconomic gradient of disease, as measured by class differentials in age-specific or standardized rates for a single set of diseases. That is part of the story, to be sure, but is far from its totality. What’s needed for an adequately informed judgement about social differences is a far more complete and meaningful metric like that employed by Subramanian and colleagues in one of the cases they cite. This is the percentage of the total disease burden in a given population group attributable to the different diseases or disease types from which the group members suffer. This fuller metric can—and often does—produce very different results from the narrower, traditional focus on age-specific/standardized rates for a single disease type.
To illustrate the point, I'll refer to the Gwatkin et al. analysis of the 1990 global burden of disease figures that I noted briefly at the outset, since it employed a fuller metric. But first, a claim and a disclaimer. The claim is that, whereas other aspects of this analysis proved controversial, no one has yet challenged the validity of the particular calculation that I'm about to present. (The most frequent criticism concerned our omission of the middle three quintiles of the global population—about which more later, in the equity assessment of the new, 2010 GBD figures I have begun and that will include all five quintiles). As for the disclaimer, I recognize that the 1990 figures appearing in the calculation are significantly out of date and may well differ substantially from the current situation. My purpose in presenting them is thus not to portray contemporary reality, but rather simply to illustrate the different results that can be produced from employing alternative analytical approaches to data about the distribution of disease burden in any given situation.

Briefly put, what my colleagues and I did was to list the countries appearing in the 1990 GBD figures according to per capita income; divide their total population into quintiles; and, for the top and bottom quintiles of the population, calculate a variety of indicators. Our ultimate objective was to estimate in each of the two quintiles the percentage of total disease burden attributable to communicable diseases, to NCDs and to accidents and injuries. But, while we were at it, we calculated several other indicators relevant for the current discussion.

One of these was the rate of NCD disease burden for each specific age group in each quintile. The results are presented Table 1. They are in line with what NCD advocates would expect: at each age, the age-specific rate for death and disability attributable to NCDs was higher among the poor than among the better-off. For example, the bottom-top quintile ratio starts at 1.8 for the 0–4 years age group, rises to a high of 4.9 for the ages 5–14 years, then declines to 1.2 for people over 70 years of age.

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>Non-communicable diseases</th>
<th>Communicable diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age-specific death rate (per 10,000 population)</td>
<td>Poor-rich ratio (col. 2/col. 3)</td>
</tr>
<tr>
<td>Poorest 20%</td>
<td>Richest 20%</td>
<td>Poores t 20%</td>
</tr>
<tr>
<td>0–4</td>
<td>19.3</td>
<td>10.7</td>
</tr>
<tr>
<td>5–14</td>
<td>7.8</td>
<td>1.6</td>
</tr>
<tr>
<td>15–29</td>
<td>6.1</td>
<td>2.6</td>
</tr>
<tr>
<td>30–44</td>
<td>14.8</td>
<td>9.9</td>
</tr>
<tr>
<td>45–59</td>
<td>83.8</td>
<td>51.3</td>
</tr>
<tr>
<td>60–69</td>
<td>254.1</td>
<td>160.7</td>
</tr>
<tr>
<td>70+</td>
<td>737.1</td>
<td>601.6</td>
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Better metric, different finding
Yet despite this, our broader measure of disease burden showed NCDs to be more important for the top than for the bottom quintile. This is shown in Table 2, where NCDs are responsible for 85% of deaths in the top quintile, compared with 32% in the bottom quintile [Comparable disability-adjusted life-year (DALY) figures, not shown in the table, are 76% and 23%, respectively]. The opposite is the case for communicable diseases, which are attributed with 59% of deaths (64% of DALYs) in the lowest quintile, but only 10% of deaths (15% of DALYs) in the highest quintile.

Why the difference? One reason is that the broader metric takes into account the relative size of the socioeconomic differential across disease types, which the focus on NCDs alone does not. A second is that such a metric also factors in differences in the age distribution across socioeconomically-defined population groups, which is missing from an age-specific approach.

The significance of the first reason can be seen by looking at the figures in Table 1 which present age-specific data for communicable diseases in a format analogous to that for NCDs. As can be seen there, communicable conditions are much more highly concentrated among the poor than among the better-off in
Table 3  Age distribution of the poorest and richest 20% of the global population, 1990

<table>
<thead>
<tr>
<th>Age group</th>
<th>In poorest 20%</th>
<th>In richest 20%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;15 years</td>
<td>41.2%</td>
<td>21.1%</td>
</tr>
<tr>
<td>15–59 years</td>
<td>52.9%</td>
<td>61.8%</td>
</tr>
<tr>
<td>60+ years</td>
<td>5.9%</td>
<td>17.1%</td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

each age group. For instance, for the age group 30–44 years, the low-high ratio for communicable conditions is over 18:1, compared with 1.5:1 for NCDs. In the age group 45–59 years, the communicable disease high-low ratio is about 15:1. For NCDs, it is 1.6:1.

The important point is that higher prevalence of NCDs among the poor does not make NCDs unique. Almost all diseases are more prevalent among the poor. (To illustrate: 25 of the 26 specific disease types that my colleagues and I covered were more prevalent among the poor, when measured on the basis of age-standardized rates.) In light of this, what matters for prioritizing disease types in terms of their relevance for the poor is not simply whether they are more prevalent among the poor, but rather the magnitude of the poor-rich difference in prevalence across disease types. Thus, in terms of age-specific or age-standardized rates alone, a disease type with rates 20 times higher among the poor than among the better-off deserves higher priority from a poverty perspective than does a type with rates twice as high.

Data for the second of the two reasons—differences in age structure—appear in Table 3. The figures shown there confirm what is widely known in demographic circles: that poor population groups tend to be considerably younger than better-off ones. This can be seen most clearly at the two ends of the age spectrum: 41% percent of people in the poorest quintile of the world’s population in 1990 were below 15 years, which was almost twice the 21% of people below 15 years in the world’s richest quintile. On the other hand, only about 6% of that poorest quintile were aged 60 years or older, which is less than a third of the 17% in the richest quintile aged 60 years or older.

This is significant since communicable diseases tend to be concentrated among the younger age groups, and NCDs among the older ones. For example, nearly 70% of all communicable disease deaths (and over 75% of all DALY loss) in the world in 1990 occurred among people below 15 years of age, compared with less than 10% of all NCD deaths (and less than 20% of DALY loss) in that age group (data not shown). Death and disability from communicable diseases can thus be expected to play a greater role in younger, poorer population groups than in better-off, older ones, even when cause/age-specific mortality and disability rates are the same.

To be sure, standardizing for age is useful for many analytical and policy purposes but the identification of disease priorities for the poor is not one of them. It makes no sense to establish disease priorities for socioeconomic groups of a population on the assumption that the population’s age structure is different from what it actually is.

Different argument, firmer ground

In their other argument—that the number of poor people affected by NCDs is large enough to be of concern even if they do yet constitute a majority—NCD advocates are on firmer ground. Even in 1990, for instance, according to the data of Table 2, NCDs were responsible for nearly one-quarter to one-third of the disease burden of the global poorest 20%; and these numbers have presumably increased since then, as has the proportion of the global population for whom NCDs cause a majority of the disease burden.

There is clearly no justification for ignoring a set of diseases that affect so many people. The question, rather, is how much attention NCDs currently deserve relative to communicable diseases, and when and at what speed that attention should shift from the latter to the former.

I’ll withhold my views on whether the time has yet come for such a shift in global-level priorities until I’ve completed the equity assessment of the 2010 burden of disease (BOD) figures referred to above. In the meantime, I’ll content myself with two closing remarks.

The first is that all concerned with health equity owe a vote of thanks to Subramanian and colleagues for their efforts to ensure that disease control policy in India does not jump the gun and shift its emphasis too early from communicable conditions to NCDs. For the principal beneficiaries of doing so would almost certainly be the better-off rather than the poor. The second point is that, in order to know when the gun has gone off, we need a far better metric and more complete analysis than thus far employed in the NCD debate.

Conflict of interest: None declared.

References

4 Jones-Smith JC. Jumping the gun or asleep at the switch: is there a middle ground? *Int J Epidemiol* 2013; 42:1435–37.
