Stroke mortality in Brazil: one example of delayed epidemiological cardiovascular transition

Paulo A Lotufo, Universidade de São Paulo
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Paulo A. Lotufo1,2* and Isabela M. Benseñor1,2,3

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Introduction

The authors of ‘Disease Control Priorities in Developing Countries’ adapted the concept of epidemiologic transition to cardiovascular diseases. Briefly, there is first a shift from rheumatic heart disease to hypertensive disease and hemorrhagic stroke, after that, a shift to stroke, mainly, and coronary heart disease (CHD) in middle aged. And finally, a switch from stroke to CHD mortality (1).

In Brazil, the cardiovascular epidemiologic transition has occurred in some places, but not for the entire country. In 2005, the last year available with official health statistics, considering all causes of deaths, stroke (either type) is still the leading cause of mortality, with 90,006 deaths; CHD is the second most common cause, with 84,945 deaths. This pattern is more prevalent among women (44,813 for stroke deaths and 35,807 for CHD deaths) than men (2).

Considering the magnitude of stroke mortality, it should be considered as a critical public health problem and a main area in academic medicine. However, resources of medical care toward cerebrovascular disease – for prevention, treatment, and rehabilitation – are scarce compared with the CHD medical care network. The ‘stroke awareness’ among the population is extremely low (3). A search of ‘PubMed’ using the keywords ‘stroke and Brazil’ and ‘cerebrovascular and Brazil’ yielded few papers, approximately one-tenth of the results for ‘coronary disease and Brazil.’ The limited dimension of cerebrovascular disease publications in Brazil contrasts with the recent increase of Brazilian scientific publications (4).

We will show (1) the comparison of stroke death rates in Latin America, (2) the association between per capita income and proportional mortality among the 26 Brazilian states and the Federal District, and (3) the relation between social exclusion and stroke mortality in the city of São Paulo.

International comparison

We previously compared the mortality rates from stroke in Latin-American countries (5). All of them have mortality system coverage above 80% of all deaths. The age-adjusted mortality (×100,000 inhabitants) rates for stroke in Brazil are very high: the mortality rate from stroke (128) in Brazil (men) was the highest when compared with Argentina (107), Uruguay (99), Chile (96), Venezuela (85), Cuba (82), and Mexico (59). This scenario is harsher because the coverage of all deaths in Brazil has been the lowest when compared with these countries. In other words, Brazilians are at a higher risk of cerebrovascular death when compared with their neighbors.

Income and stroke mortality

We evaluated the association between stroke mortality and income in 2005. Because of incomplete coverage of the deaths in some States, we used the proportion of stroke deaths compared with other cardiovascular diseases and the male–female ratio using Spearman’s rank correlation coefficient. Table 1 shows that the poorer the state, the higher the proportion of stroke deaths. No association was found in terms of gender.

Socioeconomic status and stroke mortality

For the city of São Paulo – the largest and richest metropolitan area in Brazil – due to the good quality of mortality statistics, it was possible to use age-adjusted mortality ratios from different stroke subtypes and to perform a comparison with a socioeconomic status variable, the social exclusion index. The social exclusion index is a combination of several indicators applied to each of the 96 districts of the city. Values close to the unit indicate the best situation, with fewer indicators of social exclusion. We calculated the age-adjusted deaths for each neighborhood and categorized them according to quartiles of the social exclusion index (6). We considered the quartile with less social exclusion as the referent, and using Poisson regression, we calculated the odds ratio and the 95% confidence interval. A P for trend was determined considering quartiles as the unit of analyses.

Table 2 shows that the risk of stroke deaths in the city of São Paulo was two times higher in the neighborhoods with bad

Correspondence: Paulo A. Lotufo*, Av Lineu Prestes, 2565, 05508-000 São Paulo, Brazil. Tel/Fax: +55 11 3091 9241; e-mail: palotufo@hu.usp.br

1Hospital Universitário, University of São Paulo, São Paulo, Brazil
2Faculdade de Medicina, University of São Paulo, São Paulo, Brazil
3Hospital das Clínicas, University of São Paulo, São Paulo, Brazil
Poverty and inequality as the reason for a delayed epidemiologic transition

The turning point of the transition from infectious diseases to nontransmissible diseases in Brazil occurred in the 1960s considering the whole country. However, considering the main cities, such as São Paulo and Rio de Janeiro, since the end of the World War II, cerebrovascular disease mortality rates have surpassed ‘old cardiovascular diseases’ such as rheumatic heart disease and syphilis aortic disease (7). Further, in the 1960s, the number of CHD deaths exceeded the number of stroke deaths in these cities. A decline in all cardiovascular diseases has been reported since the 1980s, but certainly it is less pronounced in deprived areas where the burden of stroke is higher (8).

The present stroke mortality rates in Brazil are unacceptable considering other successful medical care practices in the country such as the immunization coverage, AIDS program, and organ transplantation or donation and, regarding cardiovascular diseases, CHD units. One target for public health providers is to reduce the burden of stroke mortality by increasing prevention measures such as hypertension control and acute treatment for stroke sufferers, as presented by the Brazilian Stroke Society (9).

References


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<th>Table 1</th>
<th>Spearman’s rank correlation coefficients of the ratio of per capita income and proportional mortality among all 26 Brazilian states and the Federal District, 2005</th>
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<tr>
<td>Mortality index</td>
<td>Spearman’s correlation</td>
</tr>
<tr>
<td>Stroke/all cardiovascular diseases</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>−0.615</td>
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<tr>
<td>Female</td>
<td>−0.548</td>
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<tr>
<td>All</td>
<td>−0.636</td>
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<tr>
<td>Male/Female stroke ratio</td>
<td>−0.086</td>
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<table>
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<th>Table 2</th>
<th>Odds ratio (and 95% confidence interval) of stroke mortality among 96 neighborhoods of the city of São Paulo, Brazil, according to quartiles of the social exclusion index</th>
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<tbody>
<tr>
<td>Quartiles of social exclusion</td>
<td>Lowest</td>
</tr>
<tr>
<td>Men</td>
<td>1.00</td>
</tr>
<tr>
<td>Women</td>
<td>1.00</td>
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</tbody>
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Sources: Department of Health of the City of São Paulo (mortality) and reference # 5 (social exclusion index).