Abstract

We provide a comparative study of completeness of death counts and adult mortality (45q15) produced by the National Statistics Office (IBGE), IHME and estimates produced by research group in Brazil (country and states). Estimates of quality of data and under-registration of death counts are crucial to produce estimates of life table, population projections and to the global burden of diseases study. In the case of state level data in Brazil, it is important to considered spatial and temporal variation in the quality of mortality data. There are three main sources of data quality evaluation in Brazil, but there are very little comparative studies across them and how they evolve over time and across states in the country. We find significative differences in estimates that affect both levels and trends of completeness of adult mortality in Brazil and states, but there is a clear convergence trend in the most recent period.
Introduction

The study of the pattern and level of mortality are very important in understanding the population dynamics, urban planning and social policies, especially at the local level. The basic pillar of this system is the correct recording of the number of deaths by age and sex in a country, as well as information on causes of death and disease that are also critical to the development of appropriate health policies. Furthermore, it is important to produce proper estimates of mortality at the national and subnational levels to subsidize the understanding of population dynamics.

However, in less developed countries, estimating mortality becomes a challenge, since the quality of information is generally unsatisfactory (Luy, 2010; Setel et.al, 2007). Thus, a number of demographic methods have been developed to evaluate the quality and to estimate mortality at the different levels. (Brass, 1975; Preston et al., 1980; Bennett and Horiuchi, 1981; Hill, 1987; Hill and Timaeus Choi, 2005; Hill, You and Choi, 2009).

This paper reviews the evolution of completeness of registration of deaths in Brazil and adult mortality, 45q15, over the last four decades for state level, according to three sources. We present estimates of under-reporting of death counts by sex by Queiroz, et.al (2017) and compare with estimates produced by IBGE and IHME.

Data and Methods

We focus our comparison on censuses years (1980, 1991, 2000 and 2010). Population data, by age and sex, are obtained directly from the National Statistics Office (IBGE) (www.ibge.gov.br) and mortality data are obtained from the Ministry of Health Database (www2.datasus.gov.br).

In our analysis, we evaluate the coverage of reported deaths using formal demographic methods, called Death Distribution Methods – DDM. The estimates were presented in Queiroz, et.al (2017) using the R–package (DDM package) developed by Everton Lima, Tim Riffe and Bernardo Queiroz. The method utilized by IBGE to produce their estimates are available at (www2.ibge.gov.br/home/estatistica/populacao/tabuadevida/metodologia.shtm). The method used by IHME is available at healthdata.org.

Results

In this abstract, we focus on the 45q15 estimates. The main differences on the adult mortality probability (45q15) between the National Statistics Office (IBGE, 2016) and research group in Brazil (Queiroz, et.al, 2017) are related to 1980s and 1990s period. IBGE estimates were expressively lower than ours in 14 of the 27 brazilians states during this period for females (Figure 1), the behaviour of male estimates follows proportionally the same pattern in all comparisons. The IBGE estimates, combined with 5q0, would result in biased estimates for the life expectancy at birth for some states, and even more, some of those biased estimates were attributed to states that were known for their lack of development in their health systems, like Piauí, Maranhão and Tocantins. Our estimates, obtained from the several papers
cited below, are closer to what is used by the UN Population Division.

Figure 1 – Adult Mortality Probabilities, 45q15, Brazil – Queiroz, et.al (2017) vs IBGE, Females, 1980-1991

The estimates start to converge with the ones produced by the National Statistics Office (IBGE) in the 2000s (Figure 2), and both estimates continue this convergence when compared with the 2010s (Figure 3), but even though we can still notice a pattern of slight underestimation on IBGE’s estimates compared to ours (Figure 2). One thing that can be pointed out observing the estimates from both sources is the fact that the most developed states, like São Paulo and Rio de Janeiro, are usually the ones that have both estimates pointing on the same direction, meanwhile some less developed states still have a large discrepancy between our estimates and the ones produced by IBGE.
Figure 2 – Adult Mortality Probabilities, 45q15, Brazil – Queiroz, et.al (2017) vs IBGE, Females, 1991-2000

Figure 3 – Adult Mortality Probabilities, 45q15, Brazil – Queiroz, et.al (2017) vs IBGE, Females, 2000-2010
Discussion

Estimates in adult mortality remains a challenge for demographers and health public researchers in most less developed countries, and one of those challenges is to overcome the lack of quality of vital data. In Brazil, the quality of data still imprecise for a lot of states, mostly the less developed ones. The possible causes for an imprecise vital record can be many, and even more, this lack of data quality can compromise even the most precise and robust estimates on mortality. Our results are very similar to what Schmertmann and Gonzaga (2018) observed when comparing their estimates to IBGE.

Substantial differences between estimates may exist because of differences in data source, methods and/or modelling assumptions used. In the case of GBD estimates, since population estimates and envelope mortality are the basis of the model, trends and levels in causes of deaths might not be what we actually see. Then, it is very important that the data and methodology used by different researches be clear and reproducible by others. In most cases, because methodology in papers and results in websites are not very clear and methods and data are not available, it is not easy to reproduce results.

References


