Reviewer’s report

Title: Temporal trends in female breast cancer mortality in Brazil and correlations with social inequalities: Ecological time-series study.

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Reviewer: Yoon-Jung Kang

Reviewer’s report:

This study described trends in female breast cancer mortality in Brazil between 1990 and 2011 in association with the social inequalities present in Brazil. The significance of this study is the first report to analyse the temporal trends in female breast cancer mortality in Brazil and to correlate them with social inequalities, which is useful for monitoring changes in the epidemiological profile of the population.

MAJOR COMPULSORY REVISIONS

The study analysed trends in female breast cancer mortality rates according to the Social Exclusion Index (SEI) and the Human Development Index (HDI), expressed as the annual percent change (APC) using JoinPoint regression analysis. The study also described the correlation between the variation in the mortality rates and the SEI and HDI, respectively, in each Brazilian state. However, the study did not provide sufficient details in the methods section, and the relevant results were not well described. It is suggested that the paper provide further detail on the following:

• JoinPoint regression analysis – The authors calculated the annual percent change (APC) of the age-standardised mortality rate in each stage using the JoinPoint regression analysis, and the relevant results were described in Table 2. However, the authors did not provide definition of Trend 1 and Trend 2. Some states have APC presented in both trend 1 and trend 2, whereas some state have APC presented in the trend 1 only. Also the period covered in each of the trend 1 and the trend 2 varies by individual state. It is assumed that the authors used maximum 1 joinpoint for this regression analysis, and the trend 1 and the trend 2 reflect this. If this was the case, the average annual percent change (AAPC) in each state, regardless of whether the trend in the mortality rate was constant through the study period or changes in between, should be calculated. It is advised that the authors provide more details in the methods section regarding the choice and the definition of the trend 1 and the trend 2, the number of joinpoint used in the regression analysis, and perform additional analysis to present the AAPC. Given the ‘slope’ of the age-standardised mortality rates in some states was constant, the authors might want to compare the significance of the test results by alternatively allowing 0 joinpoint to each state.

• Definition of variation in the mortality rates - Figure 3 and Figure 4 describe the correlation between the HDI or the SEI and the variations in female breast cancer
mortality rates in Brazil between 2001 to 2011. However, it is not clear whether the variations in the mortality rates indicate the difference in the maximum age-standardised mortality rate minus the minimum rate or the difference in the age-standardised mortality rate in 2011 minus the rate in 2001. It is advised that the authors provide further details on the variation in the mortality rate.

DISCRETIONARY REVISIONS

Some of the methods and results can be better presented with additional analyses. For example:

• Analysis of the temporal trend by the SEI and the HDI - The findings of the study could be far clearer, and the greater significance as a result, if the authors analysed the trend by the SEI and the HDI categories (i.e. use aggregated number of deaths from states in the same SEI or HDI level instead of analysing number of deaths in individual state. Results for individual state can be included in the appendix). Then the authors can calculate the standardized rate ratios (and 95% CIs) of the mortality rates using the highest SEI or the HDI category as the reference group to see how much variation in mortality rate can be explained by social inequalities. The authors could also consider incidence to mortality ratio by the SEI and the HDI categories, respectively, if breast cancer screening program is in place in Brazil and the participation rates vary by those indices.

• Table 1 – The results could be more informative if the authors analysed age-standardised mortality rates in women all ages (not >20 years) and performed a trend analysis in the overall female breast cancer mortality rate between 1990 and 2011. Similarly, age-specific rates are not very meaningful and can be presented in the appendix. It is suggested the authors perform the trends in the age-standardised mortality rates by different age groups. Graphical presentation, rather than the tabular format, will be more informative.

• Table 2, Figure 1 and Figure 2 – I understand the number of tables and figures are limited. However, the results will be clearer if the authors present some part of the results from the Table 2 in a graphical format, and combine the Figure 1 and 2 as Figure 1.(a) and Figure 1.(b). This is that the period columns could be omitted from the Table 2 and the age-standardised mortality rate in each state could be presented as a figure.

MINOR ESSENTIAL REVISIONS

Typographic errors were identified. For example:
• Line 110 – please change >20 years to ≥20 years
• Line 131 – IDH (2000)? Did you mean HDI (2000)?
• Line 132 – IDH (2010)? Did you mean HDI (2010)?

A lack of coherency was identified throughout the manuscript. For example:
• Results (line 137-154) – The study firstly described the results in terms of age-adjusted mortality rate, followed by individual state, then describe the age effect again. It is suggested the authors describe the results in line with the results tables, i.e. describe the mortality rates by age group as per Table 1 then
describe the mortality rate and the associated trend by individual state as per Table 2.

- Line 192-197 – although this is a relevant discussion point, this paragraph is rather hanging between the previous paragraph (line 185-190) and the next paragraph (line 199-207). It is suggested the authors restructure this paragraph (perhaps after line 207).
- Line 209-214 – how is this relevant to the current study finding? It is suggested the authors provide the implication of the study finding on this kind of initiative.

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

I declare that I have no competing interests.