Reviewer's report

Title: A study of trends in access to water supply and sanitation in 31 major sub-Saharan African cities

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Reviewer: Oliver Cumming

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Comments submitted to BMC Public Heath

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1. Is the question posed by the authors well defined?

Yes – but the authors should give the period of time over which trends are assessed (p. 5 – 2000-2012). This is missing also in the abstract and final paragraph of the background where the objectives are stated.

2. Are the methods appropriate and well described?

I would like to see this more clearly described as an ecological analysis and the limitations of the methods and data more clearly discussed.

I found that the description of the statistical analysis was inadequate (p. 12); with six or seven pages (p. 5-11) describing the variables in comparison to one short paragraph describing the analysis. For the multivariate regression, my reading of their analysis (p. 12) is that the authors ran regression models for the association of each independent variable (*9) with each dependent variable (*4) with each of these regressions controlling for each of the other independent variables as potential confounding factors (*8). I would like to see a more detailed description of the statistical analysis and specifically how confounding and the likely multiple interactions were explored.

3. Are the data sound?

There are very important limitations to the data used that are for the most part acknowledged (p. 29). I would have gone further in discussing the limitations of using 2 data points per country to compare trends. I wasn’t entirely clear whether the authors are presenting the average annual increases in water/sanitation access for the interval between the two available surveys in each country or whether a regression line has been fitted to estimate an interval for 2000-2012 and the average annual increase calculated on that basis.
One major challenge when considering trends in urbanisation and water/sanitation infrastructure in Africa is the partial representation of informal settlements. In many countries/cities, nominally ‘representative data’, such as DHS or MICS, partly or wholly excludes these areas that can constitute 40-50% of the total population. This is a particular problem for this analysis as both the rates of rural/urban migration and the rates of progress in improving water and sanitation access may differ significantly between formal and informal areas.

4. Does the manuscript adhere to the relevant standards for reporting and data deposition?
Yes

5. Are the discussion and conclusions well balanced and adequately supported by the data?
In the discussion, I felt that the authors maybe over-extend themselves with regard to their interpretation of certain findings. I feel that little can be said about the relationships between many of the variables explored (e.g. population density/national GDP/national ODA and progress on water and sanitation) beyond stating that there is inadequate data with which to assess these associations. One example of this is the discussion of the ‘more obscure effects of ODA on cities’ (p.25).

6. Are the limitations of the work clearly stated?
I would go further to emphasise the limitations of the analytical element of this work. The authors conduct an ecological analysis of city level data made up from various data sources (some at the city level and some at the national level) all of which are likely to be at best partial with regard to the large sections of the urban population living in informal settlements. In terms of the ‘trends’ for access that are analysed, these are based on two data points only and with significant variation between countries as to when these occurred (e.g. for Niger, the two surveys are 1998 and 2003; whereas for Luanda, it is 2007 and 2011).

The bivariate and multivariate analysis reveals very little of any use and any findings reported must be interpreted with real caution (e.g. avoiding statements such as, “Although outside both 95% and 90% intervals, it is worth noting that... with a p value of 0.11” [p.20] – I’m not so sure it is worth noting).

I feel the authors could have gone further in their analysis to explore some of their ‘independent variables’ as interaction terms rather than explanatory variables or confounders; maybe this was done but it’s not clear. See above for concerns on how the problem of confounding was addressed in the many multivariate regressions that were seemingly run (p. 18-23).

7. Do the authors clearly acknowledge any work upon which they are building, both published and unpublished?
Yes, I actually found the background/introduction very useful and many people will be interested to read this summary of work in this area. I would though have preferred to see more primary references. For example, on p. 4-5 (sentence beginning, “There is also limited evidence…”) it would have been nice to have some reference to the Moraes and Barreto studies.

8. Do the title and abstract accurately convey what has been found?

Title – yes (but state the period over which trends are assessed: 2000-2012)

Abstract – yes

9. Is the writing acceptable?

I felt that this paper could be shortened considerably, particularly the description of the data (dependent and independent variables) in the methods section and the results section.

The descriptive analysis in the results section, which for me is the most useful contribution of this paper, could still be condensed further with better use of tables. The bivariate/multivariate analysis should be reduced significantly with the reader directed to Table 2 and pages 19-22 forming a couple of paragraphs beginning with line, “across the nine independent variables, little significance was found with any of the measures of access to WS&S” (p. 19).

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Needs some language corrections before being published

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

Declaration of competing interests:

I have no competing interests to declare