Reviewer's report

Title: Population uptake of antiretroviral treatment through primary care in rural South Africa

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Reviewer: Deanne Langlois-Klassen

Reviewer's report:

This paper explores potential factors associated with the acceptance of HIV antiretroviral therapy (ART) within a decentralized primary healthcare system operating in rural South Africa. The authors found that distance to the nearest health facility was a key predictor of ART uptake among HIV-infected persons. Identification of barriers to ART acceptance and utilization with rural and remote areas is critical, especially within areas with recently decentralized ART services.

Major Compulsory Revisions

1. The study question is not adequately defined. Although the end of the introduction section highlights three study objectives, the primary purpose of the study is unclear.

2. Methodology: In general, the methodology needs to be more clearly and concisely described. Details about the study population and study site were not readily evident and were somewhat deficient (e.g. size of the study site; the proportion of the demographic surveillance area (DSA) represented by the study site; age definition of ‘adult’; starting month of study period given that full calendar year was not used; clarification that study population consisted only of HIV+ positive on HAART who were household members in the study site)

   a) Please explain why a stronger matching methodology (e.g. using sex or age in addition to name) was not used.
   b) Assignment of cases to the clinical catchment corresponding with the primary healthcare facility from which the patient obtained HAART would be a stronger methodology than that of assignment based on degree of overlap. What impact would this alternate strategy have on the estimates?
   c) The denominator used to estimate the proportion of ART uptake is problematic as it does not take current ART eligibility criteria into consideration. This omission will significantly underestimate ART uptake as only those eligible for ART (and who are subsequently offered ART) have the actual opportunity to receive ART. Please address this issue.
   d) Para3: estimated HIV prevalence within the study site appears inaccurate given that “substantial geographical heterogeneity in HIV prevalence” was known to exist within the setting (see Intro). Consequently, HIV prevalence estimates
should be re-calculated based solely on consenters within the study site (i.e. the Hlabisa portion of the DSA) as opposed to consenters within the whole DSA.

e) Last paragraph: Please provide further clarification about what numbers were adjusted? Also, given that the HIV surveillance estimates were biased due to systematic differences between consenters and non-consenters (Welz et al., 2007), would adjustment of numbers to ensure compatibility with the estimates from the HIV surveillance not have introduced bias into this study?

4. Methodology re: “assessing the distribution of ART treatment uptake”. Why was a sample (as per Results para3) used instead of all HIV+ persons linked to the study site? If a sample must be used, provide the sampling methodology as well as statistical analysis to expose any statistically important differences between those included and those who were not.

5. Results: A table (accompanied by statistical analysis) outlining the basic demographic attributes of study participants (HIV+ receiving ART and HIV+ not receiving ART) needs to be constructed.

Minor Essential Revisions

1. Throughout the manuscript, care should be taken to use consistent and accurate terminology. For example, ART should replace the more general term of “treatment” as the later could encompass multiple forms of care (e.g. treatment of opportunistic infections). Additionally, consistent names for the different data sources are needed.

2. Several edits are needed in order to comply with the journal’s requirements as per Instructions to Authors, including reference format (in text and reference list), figure legends, writing all abbreviations in full before first use.

3. Introduction, para1: the statement “increasingly attention is focused on whether antiretrovirals could be targeted…” appears to be a misrepresentation of the cited source which models the potential impact of universal (not targeted) ART for all HIV+ persons.

   a) The data source for information about patients’ homestead or local area needs to be identified, including references where appropriate.
   b) The number of patients linked directly and indirectly to clinic catchment areas should be placed in the Results section.
   c) Para2: as estimates were based on 2008 HIV sero-surveillance data, information about HIV prevalence in 2008 should be provided instead of that of 2004 (as provided in the 2nd paragraph of Methods).
   d) Used at the beginning of a sentence, “74%” should be replaced with “seventy-four percent”.
   e) The demographic database used for linkage needs to be more accurately identified.

5. Results:
a) Limit results to only those of the study site. For example, how many patients in the study area (instead of the sub-district) ever initiated ART? Lost to follow-up? Died? Transferred out?

b) As clinical catchment sites are a key component of the analysis, a table of the attributes of the six clinical catchment sites should be provided (i.e. for each catchment, provide data about the population size and characteristics (age-sex distribution; urban/rural status, assets index, estimated HIV prevalence, etc) and assessed with appropriate statistical analysis.

c) Table 1 requires two additional columns to the immediate right of the covariate column n order to provide the number and proportion of (i) HIV+ residents on ART and (ii) HIV+ residents not receiving ART.

d) Non-results need to be relocated to the discussion section (para2 sentences 5 & 8; para3, the beginning of sentence 2.

e) Statistical analysis of ART uptake in the clinic catchment areas should be completed, including assessment of the potential impact of the phased roll-out of ART roll-out if some catchment areas had earlier roll-out through primary healthcare facilities than other.

f) The details within Figure 1a and 1b are difficult to read. Can this be enlarged without losing clarity? Also, as results related to Figure 1a and 1b are not presented together in the body of the manuscript, these would better be presented as separate figures (e.g. Figure 1 and Figure 3).

g) Para5 has reference to Table 2 but only one table has been provided

6. Discussion:

a) The term “living next door” is uninformative. What distance from the clinic does this encompass?

b) Para1, 2nd last sentence. “at less than 5 km” needs to be revised (consider “at nearly 5 km”)

7. Paragraph spacing: add a space between para1-2 in Methods and omit a space between para5-6 in discussion.

Discretionary Revisions

1. Methods: The significant detail about the demographic surveillance area and Hlabisa HIV treatment program distracts the reader from information about the actual study site. It is suggested that his information be relocated to “Background”.

2. Results: what proportion of the study population actually received ART treatment and follow-up at the PHC facility within their assigned catchment area?

3. Discussion:

a) para4 sentence 3: run-on sentence should be restructured. Also, consider “individuals in the poorest households are no less…” rather than “more”.

b) Para6: this paragraph could be omitted as it is not related to the study findings and is largely speculative.
**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**
I declare that I have no competing interests