Reviewer’s report

Title: Association of the client-provider ratio with the risk of maternal mortality in referral hospitals: A multi-site study in Nigeria

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Reviewer: Nnanna Ugwu

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This appears to be a good study paper that tackles a critical health issue in Nigeria. However, there are some areas that may need further clarifications from my perspective. These are:

MAJOR REVIEW

In the Discussion, there is a sentence in Page14 that reads, "It was not surprising therefore that the Central Hospital, Benin had the highest numbers and ratio of maternal deaths, since it is evident that they mainly deal with women who had not received antenatal care, but who turned up at the time of delivery or when they experience complication". This tends to suggest that the data on births and maternal deaths in the hospital have been disaggregated into "booked" and "unbooked" categories, can you provide this evidence perhaps in a table? If not please clarify. More so, if birth data is not disaggregated, one would want to believe that if Central hospital Benin conducts more emergency deliveries than others, then it is more likely to have higher percentage of deliveries than others, and not just more maternal deaths and less percentage births as is being presented.

MINOR REVIEWS

A. The results of the study clearly notes that less than 10% of ANC women deliver in the hospital (page 11 line 4), and, in the Discussion, there is a strong argument that increasing health workers in the facilities will improve maternal mortality. While partly agreeing with this view, the question becomes, can the birth outcome for the more than 90% that deliver outside the hospital alter this outlook? If yes, shouldn't a more impact-focused strategy be to investigate the other >90%.

B. If data on maternal deaths could not be accessed in a referral hospital (Karshi hospital in Page 10) over a three year period, can we trust other data like, live births, ANC and others from the same hospital? Are there reasons why they may be unwilling to make data on deaths that public?

C. It is clear that the study period was for three years (Page8) from 2011-2013. It may be necessary to provide the specific months: Are we saying January 1st 2011 to December 31st 2013?
D. The paper points out that Nigeria has six Geopolitical Zones and then understandably notes that the insurgency in the North East Zone made it impossible to conduct study in that area. However, the following statements, "We failed to sample women from the south-east zone in order to balance the representation and ensure that equal hospitals and women from the northern and southern parts of the country are represented in the sample. Thus, the results of the study are generalizable to the entire country and can be interpreted for policy making at national and subnational levels"., tend to suggest that the need to balance southern and northern representation clearly overrides geopolitical representation. Is this true? Do the geopolitical zones in southern Nigeria have similar social, educational and economic configuration such that one can be substituted for the other? Is it possible to have allocated one of the four southern Nigeria slots to a hospital in the South-east zone? Does the decision made above really strengthen the generalizability of the findings?

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