Reviewer’s report

Title: The Social determinants of Health Facility Delivery Among Reproductive Aged Women in Ghana

Version: 1 Date: 04 Jun 2019

Reviewer: Katharine Shelley

Reviewer's report:

General comments -

* I enjoyed reading the paper and felt it was strengthened by using the Andersen framework as a conceptual model to guide and group explanatory variable selection from DHS dataset.

* The discussion does a good job of contextualizing the findings within the broader literature.

* The manuscript would benefit from general copy editing - there are numerous instances where subject and verb are not in agreement in number (singular or plural), as well as general tightening of the sentences.

Title

* Consider whether to keep "among reproductive aged women" in the title - it's not necessary, but rather implied by the subject matter. Instead, you might consider including something about the study design (or data source: DHS) in the title.

Abstract

* Page 2, Line 25: "Influencing the use of health facility delivery" - should it be "influencing the use of health facilities for delivery"?

* Page 2, Line 26: "Reproductive-aged" is hyphenated in abstract, but not in title. Be consistent.

* Page 2, Line 40: May want to indicate,

* Page 2, Line 51 and 53: insert "a" before health facility or change facility to plural facilities
* Page 3, Line 9: Phrasing "to use health facility delivery" seems off to me - should it instead be "to use a health facility for delivery" or xxx time more likely "to deliver at a facility"?

* Page 3, Conclusion: you may want to consider explicitly mentioning the role of quality of care, e.g. in line 21: "...beyond improving physical access, for example improving quality of care.

* Page 3, Key word suggestions: "institutional delivery" instead of "health facility" and "delivery" separately; "social determinants of health" instead of social determinants; I don't think you need "reproductive aged women" as a key word, suggest dropping that one. Add Ghana as a key word.

* Page 3, Plain English Summary: Line 46: change "considerable portions" to something more accurate… e.g. over a quarter of women…

Introduction

* Page 4, Line 11 and 15: might consider replacing risk with "odd" or "likelihood"

* Page 4, Line 46-47: please include a more recent citation than 11 years ago for these important background statistics

* Page 5, Line 24: Check whether the statistic should be a reduction to 319 per 100,000 in 2014 (not 2015), since the DHS was for 2014.

* Page 5, Line 28: Consider including Ghana specific references that help to explain why MMR may have gone down in Ghana; or rephrase the sentence to let the reader know that the reasons stated in the sentence are broadly speaking reasons for MMR reductions globally.

* Page 6, Line 15: It may help to link these statistics with the previous paragraph suggesting inequities remain. Inserting a "For example, …" is suggested.

* General: May want to consider citing some of the recent Ghana DHS analyses on health insurance and MNCH service utilization:
* General: Consider further contextualization of progress made in facility births over time in Ghana. There's a nice graphic in the 2014 DHS on this showing the progression from 1988 (42% through to 2014 (73%), noting the stronger uptick in progress since 2008.

Methods

* Page 8, line 29-36: You alternate between predisposing factors and predisposing characteristics. For clarify, please use only one term.

* Page 9, line 15-16: It's great that the authors have added additional context and reasoning behind the variable selection and definition for perceived need! I am not familiar with the national MNCH guidelines in Ghana, but in most countries all women during ANC visits are urged to go for facility delivery, meaning that nearly all women (since most get at least 1 ANC visit in Ghana) will have been exposed to "need" for going to health facility for delivery. I would therefore recommend couching your "perceived need" variable from DHS in the context that these women with risk factors have been further counseled on their pregnancy risk complications and urged to deliver at a facility (if in fact that's what the DHS variable is getting at - I can't really tell from how it's written in the manuscript - is this variable about women generally getting counseled about potential complications of pregnancy or about women specifically getting counseled about their own personal risk factors/potential complications and need for facility delivery?).

* Study variables:

  o Did you consider including health insurance coverage as one of the sociodemographic enabling factors / explanatory variables? Given the recent papers on this it is worth considering adding to your models. If there is a reason not to include it (e.g. collinearity with wealth index?; Ghana's free maternal care policy negates the need to include it?), it would be worth stating that reason in the paper given the recent literature on this topic (see comment above on Yaya and Wang papers) and your reference in the introduction about Ghana's policies.

  o Did you consider including "region" as an explanatory variable in the model. Service utilization rates can vary widely by region, which can be driven by a variety of factors - some of which could be sociocultural. If there is a reason not to include it, would be helpful to state that.

* Page 10, line 42: Marital status is defined as (married, unmarried) in your manuscript. But what about divorced/separated/widowed - are they dropped from the analysis or included as "unmarried"? Please clarify.
Results:

* Page 12, line 41: for readers unfamiliar with DHS, it is worth stating that the survey asks about live births in the last 5-year period… so it's not just that your sample includes women that responded to the place of delivery question, but that these women had reported at least one live birth in the last five years, and were subsequently asked about their most recent pregnancy and birth experience.

* Page 13-14: I find the descriptive results write up to be quite lengthy. I suggest tightening it up, generally to fit within one to two paragraphs. In cases where you have 3-4 sentences per variable, suggest paring that down to one or two sentences max. The reader can consult the table for all the details of the numbers, but the point of these paragraphs should be to give a general overview.

* Page 15-16: Univariable analysis: You use a variety of descriptions here for describing the odds:
  o … X times more likely to deliver at health facility…
  o … X times more likely to report having health facility delivery…
  o The odds of having health facility delivery…
  o … had a higher likelihood of using health facility for delivery

I think that's okay, but it is important somewhere in the manuscript (methods? Beginning of results?) to reiterate to the audience that this relates to the woman's most recent delivery experience. Also, I think it may be important. Again, I think this section could be condensed to one or two sentences max per variable (e.g. reduce Parity description).

* Page 16-17: Multivariable analysis: important to state that you are presenting AOR, possibly in beginning of the section: e.g. Adjusted OR are presented for factors associated with health facility delivery in the multivariable logistic regression analysis in Table 4.

Discussion:

* Page 17, line 39: this is a problem globally in LMIC, so I suggest using a global type reference - it appears random that you are citing Kenya and India papers.

* Page 17, line 46: you state "Our study revealed that about 72% of childbirths in Ghana occur at
health facility" - I think this was already known from the DHS report. What your study revealed is the socio-demographic factors associated with facility delivery. Please restate!

* Page 17, line 48: When comparing the 72% from DHS 2014 to Boah's study, which was rural based, it might be worth citing the % of facility delivery in rural settings (from DHS), as the more apt comparison.

* Page 18, line 18: if age and marital status have been found to have predictive value, did you consider keeping them in the model as important covariates (even despite not being statistically significant? Why/why not?

* Page 21, Parity: This seems like a typo: "As birthing times increased, the likelihood of a home delivery decreased." Shouldn't it be "increased"? earlier you state in the findings section that the "Odds of having health facility delivery among women who had given birth once were 1.58% (95%CI = 1.18-2.12) times higher than mothers with 3 or more births." - meaning that women giving birth for the first time are more likely to deliver at the facility…

* Page 21, line 25. Consider different word choice for "aggravate"

* Page 21, I appreciate the discussion of quality of care very much as this is a likely driver of women's decision making around facility delivery. I don't believe the quality of care concerns are strictly for women with multiple pregnancies, but all women; therefore, I'd suggest you could move that discussion into the strengths and limitations section. Data on quality of care and respectful maternal care is important contextually and would strengthen the study if available. You may want to cite one of the many recent papers on respectful maternity care (e.g. Afulani et al. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6293963/)

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