Author's response to reviews

Title: Institutional delivery in rural India: the relative importance of accessibility and economic status

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Author's response to reviews: see over
Response to reviewers’ comments on the paper Institutional delivery in rural India: the relative importance of accessibility and economic status

We have inserted responses to each comment in italics below.

Reviewer’s report 1: Premananda Bharati

Comments to the author

Discretionary Revisions: If possible, include NFHS III data and compare with NFHS I and NFHS II.

NFHS-III data is referred to on pages 4 (background) and 13 (discussion).

Reviewer's report 2: David H Howard

Major comments

1. The predicted probabilities were calculated inaccurately, yielding some odd results. For example, all of the adjusted predicted probabilities for wealth in table 1 are below the corresponding actual proportions. You calculated predicted probabilities by plugging in the variable means, but for a non-linear function $E[f(x)]$ does not equal $f(E[x])$. Instead, calculate the predicted probabilities for every person in the sample, switching the variable of interest on and off, and then take the average across the entire sample. This will give you $E[f(x)]$.

We do not entirely agree with this point but would welcome any additional comments about this procedure. We did not calculate predicted probabilities by plugging in the variable means, we calculated them from averaging model-based predicted probabilities for every case. It is possible that a sentence in para 2 of p11 has given this impression and we have amended the wording. Distance was represented as a group of binary indicator variables, not as a continuous function. We don't see a problem with the predicted probabilities being low - they are merely model-based predictions and where they are referred to it is in a relative, not absolute, context.

2. If you want to claim that taking clustering into account is important, then I think you need to present results from models with and without random effects side-by-side. The comparisons of your results with those of previous studies are unconvincing because the results may differ because of differences in sample selection or other factors.

The measure of rho, which we show and comment on, demonstrates the importance of the random effects model. However, beyond this, we do not directly compare our results with other studies we merely say that we believe this model is good and appropriate, more appropriate than applying simplistic models, and these are the results we obtain and discuss. We do not set out to demonstrate the effect this model has had on results, over and above a simplistic model, and to do so would waste words and space. We merely say this model is appropriate and here's our results. This is not a methodological paper per se but one presenting substantive results. Surely statistics in 2010 does not need to spell out that clustered samples need to be analysed appropriately or waste time showing what happens if you ignore this.

Minor comments

3. Page 14, second paragraph. You write “…in which community level effects have been taken into consideration, finds a more significant association.” I thought that failure to account for clustering will overstate significance, in which case taking clustering into account will result in a less significant association. Maybe the significance levels differ because of some other factor (sample selection, time period, etc).
A fair point, although there is also a possibility that this approach is better specified and controlled all round. The distance effect here is still weak compared to other model effects (see relative size of AIC change) but nevertheless remains important. Wording changed to accommodate comment.

4. Regarding the policy implications: Sure, it would be great to have more cash subsidies and build more facilities. But life is full of tradeoffs, and it would be nice if your model could help policymakers decide how to make the tough decisions. For example, a policymaker may have to decide whether to spend money on cash subsidies or use the funds to build a new public hospital in an underserved area. Does your model have anything to say about this decision? I think it does. You could simulate the impact on delivery site of offering free care to everyone (which would be similar to the effect of moving everyone into the richest wealth quartile) or ensuring that every person has a facility within 15 km. I don’t know the cost of constructing and operating a new facility, but presumably you could use that information in conjunction with your estimates to figure out which policy will result in the largest increase in institutional delivery.

This is a really good suggestion but we feel it is beyond the scope of this paper. A reference has been added in the discussion (page 17) to highlight this as an important area for future analysis.

5. Does the sample include deliveries where perinatal mortality was the outcome? If not, then the sample is comprised entirely of “successes”. To the extent that the perinatal mortality rate differs between institutional and home delivery (and I would assume that it does), then you may have some misleading inferences. Not a fatal flaw, but it is worth mentioning as a limitation.

The sample includes deliveries where perinatal mortality was the outcome.

6. Throughout the paper the authors refer to the statistical model as a “multilevel” model. It seems you are just estimating a single equation with a village-level random effect. If so, then why not avoid the term “multilevel” model in favor of the simpler and more easily understood terminology: “a logistic model with a village-level random effect”?

Wording changed to refer to ‘a logistic model with a village-level random effect’.

7. Last line, page 5. You write: “…can give misleading results”. Please clarify. Will failure to account for clustering yield biased estimates or will it misstate standard errors or both?

Amended to say….. can give misleading results in terms of both central estimates and their precision.


Emergency Obstetric Care - added

9. Table 2: Why not include variables for the situation where a private provider is closer than a public provider? Or does that situation occur infrequently?

This is included – see table 2 ‘Private institution closer (by>5km)’

10. I suggest omitting the Conclusion. It seems to mostly restate observations from the Discussion or Results.

Conclusions removed and a few key points moved into the discussion section.