PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Equity and determinants of routine child immunization program among tribal and non-tribal populations in rural Tangail sub-district, Bangladesh: A cohort study
AUTHORS	Rahman, Aminur; Reza, Ashek; Bhuyian, Badrul; Nurul, Alam; Gupta, Sushil; Mustari, Shabnam; Anwar, Iqba

VERSION 1 – REVIEW

REVIEWER	Joseph Mathew PGIMER Chandigarh India
REVIEW RETURNED	23-Mar-2018

| GENERAL COMMENTS | 1) The research question sought to be answered in this study is unclear.
2) The aim of the study is stated as "(1) to estimate coverage of the EPI in rural Bangladesh, and (2) to explore the distribution of vaccination coverage on the basis of socio-demographic factors. However, the methodology chosen to address these two questions has several limitations (mentioned below).
3) The areas chosen in the study are not necessarily representative of "rural Bangladesh".
4) It is unclear how/why the limited number of factors selected have been considered to represent 'socio-demographic factors'. For example, ownership of a mobile phone is representative of something else, rather than a factor by itself.
5) It is unclear how relevant data on mobile phone ownership from 2011-12 would be in the present time especially as mobile phone penetration (in terms of ownership as well as in terms of infrastructure for mobile communication) is rapidly increasing in most developing countries.
6) It appears that a cohort of babies born in 2011-12 were followed up for the immunization status. For how long? How were they followed up?
7) Since data was extracted from the HA registers, what is meant by inconsistency in the data; and how were these validated?
8) How is a tribal (versus no tribal) population defined? Is it based on geographic location (in which case design bias will creep in) or is it based on the status of an individual family?
9) The detailed description of how vaccination is carried out is not directly relevant to this study.
10) The definition of "fully vaccinated" does not mention a time frame. For example, if a child received all 8 antigens, but two years later than scheduled, how could he be considered "fully vaccinated"?
11) Several obvious risk factors for incomplete/delayed immunization such as maternal education status, household income, number of family members, birth order, access to a vaccination |

facility, co-morbid conditions etc have not been considered at all. This is perhaps because the data in this study were only extracted from the existing HA registers.
12) Results cannot be examined on account of the above methodological limitations.

REVIEWER	Emma Plugge University of Oxford, UK
REVIEW RETURNED	12-Apr-2018

GENERAL COMMENTS	**General comments** Generally well and clearly written but more attention should be paid to use of acronyms (these should be spelled out in full before use – examples include HA, UNICEF, GAVI) and consistent use of UK or USA spelling (e.g. programme/program). **Abstract** This needs revision. The authors state that 'The study estimated valid vaccination coverage of under five children in rural areas of Bangladesh'. In fact they only looked at one area of Bangladesh, not the whole country. This should be made clear. The use of p values in the Results section should be consistent. **Introduction** This is very brief and could be expanded, particularly with reference to groups that often miss out on vaccinations/vaccination programmes fail to reach. There should be more on vaccination coverage in Bangladesh and specifically on coverage on rural Bangladesh; as it stands, the case for focusing on rural Bangladesh and on 'tribal' and 'non-tribal' populations is not clearly established. **Methods** Attention must be paid to definitions of key concepts such as 'valid vaccination', 'not vaccinated', 'rural', 'tribal' etc. Clear definitions are needed. The authors need to justify their use of mobile phone ownership as a variable and the omission of other important variables which have been shown in the literature to be related to vaccination status (it may be simply that this data was unavailable, but they should show that they understand this and also discuss it as a limitation in the discussion section). Much more detail is needed. For example, the authors must detail why these specific geographical areas were chosen, why they feel they can justify the use of non-random sampling, the validity of the database used, justification for the statistical tests used, etc. Furthermore there isinformation in the first paragraph of the results section which is more appropriately put in the methods section. **Results** Table 1 – why did the authors chose to display these variables only? Table 2 – they need to check the figures. Some do not add up to 100% and they need to indicate why (I am assuming it's a rounding issue) The key findings should be emphasised more concisely. **Discussion & conclusions** This would benefit from a clearer structure and the main messages of this paper brought to the fore. The limitations of the study are

	considerable (as mentioned previously) and this section in particular needs to be expanded. The implications of the findings need to be developed and considered further.

VERSION 1 – AUTHOR RESPONSE

1) The research question sought to be answered in this study is unclear.

Ans: Thanks for your comments. We have revised our research questions as "To estimate the valid vaccination coverage of the EPI among tribal and non tribal population in Tangail sub-district and to explore the distribution of vaccination coverage on the basis of socio-demographic factors."

2) The aim of the study is stated as "(1) to estimate coverage of the EPI in rural Bangladesh, and (2) to explore the distribution of vaccination coverage on the basis of socio-demographic factors. However, the methodology chosen to address these two questions has several limitations (mentioned below).

Ans: Thanks for your important notes. We have revised our research questions a s mentioned above.

3) The areas chosen in the study are not necessarily representative of "rural Bangladesh".

Answer: Thank you for your suggestion. Based on your suggestion we will change our title and mention study areas name as Tangail Sub-District, Bangladesh instead of only mentioning Bangladesh.

4) It is unclear how/why the limited number of factors selected have been considered to represent 'socio-demographic factors'. For example, ownership of a mobile phone is representative of something else, rather than a factor by itself.

Answer: We understand our limitation. As data were extracted from the Health Assistants registers where only those type of data were available.

5) It is unclear how relevant data on mobile phone ownership from 2011-12 would be in the present time especially as mobile phone penetration (in terms of ownership as well as in terms of infrastructure for mobile communication) is rapidly increasing in most developing countries.

Ans: Thanks for your comments and though mobile penetration is increasing like other developing countries in Bangladesh but the study area is one of those pockets where usual development is not the case and use of mobile phone still important parameter to measure the financial ability as a proxy.

6) It appears that a cohort of babies born in 2011-12 were followed up for the immunization status. For how long? How were they followed up?

Ans: Cohorts were followed up to completion of his/her vaccination and duration required for completion of different vaccines (Vaccine given Date & time were written in the registers for different vaccines).We followed all the baby born during 2011 and followed till September 2012 to complete measure the full vaccination coverage

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7) Since data was extracted from the HA registers, what is meant by inconsistency in the data; and how were these validated?

Ans: It is right that data were extracted from HA registers. Sometimes say child sex, DOB, religion (very few cases) are missing or inconsistent (religion with family member names is confusing). In that cases, we revisit the HA registers to resolved these issues is there any entry errors. If no entry error, we visit the field sites and contact with HAs and contact with family members through the HA (if needed) and collect the correct information as well as we updated the database as per correct information.

8) How is a tribal (versus no tribal) population defined? Is it based on geographic location (in which case design bias will creep in) or is it based on the status of an individual family?

Ans: We purposively selected study area where tribal and non tribal population but area was chosen where this two groups live together (in same administrative areas)

9) The detailed description of how vaccination is carried out is not directly relevant to this study.

Answer: Ok we understand your point. We included this information just to inform researchers about whole vaccination process in Bangladesh.

10) The definition of "fully vaccinated" does not mention a time frame. For example, if a child received all 8 antigens, but two years later than scheduled, how could he be considered "fully vaccinated"?
11) Several obvious risk factors for incomplete/delayed immunization such as maternal education status, household income, number of family members, birth order, access to a vaccination facility, co-morbid conditions etc have not been considered at all. This is perhaps because the data in this study were only extracted from the existing HA registers.

Answer: Yes we agree with you. We had a plan to collect all the information that you mentioned as we had no financial support and HA registers had not abovementioned information. That's why we were limited to data on HA register.

12) Results cannot be examined on account of the above methodological limitations

Equity and determinants of routine child immunization program among tribal and non-tribal populations in rural Bangladesh: A cohort study
General comments
Generally well and clearly written but more attention should be paid to use of acronyms (these should be spelled out in full before use – examples include HA, UNICEF, GAVI) and consistent use of
UK or USA spelling (e.g. programme/program).
Abstract
This needs revision.
The authors state that 'The study estimated valid vaccination coverage of under five children in rural areas of Bangladesh'. In fact they only looked at one area of Bangladesh, not the whole country. This should be made clear.
The use of p values in the Results section should be consistent.
Ans: Thanks for the valuable comment. It has been addressed accordingly.
Introduction
This is very brief and could be expanded, particularly with reference to groups that often miss out on vaccinations/vaccination programmes fail to reach. There should be more on vaccination coverage in

Bangladesh and specifically on coverage on rural Bangladesh; as it stands, the case for focusing on rural Bangladesh and on 'tribal' and 'non-tribal' populations is not clearly established.

Ans: Thanks for the comment. It has been described in page 5 and highlighted.

Methods

Attention must be paid to definitions of key concepts such as 'valid vaccination', 'not vaccinated', 'rural', 'tribal' etc. Clear definitions are needed. The authors need to justify their use of mobile phone ownership as a variable and the omission of other important variables which have been shown in the literature to be related to vaccination status (it may be simply that this data was unavailable, but they should show that they understand this and also discuss it as a limitation in the discussion section).

Much more detail is needed. For example, the authors must detail why these specific geographical areas were chosen, why they feel they can justify the use of non-random sampling, the validity of the database used, justification for the statistical tests used, etc. Furthermore there is information in the first paragraph of the results section which is more appropriately put in the methods section.

Ans: Important definitions are provided in page 7.

Results

Table 1 – why did the authors chose to display these variables only?

Table 2 – they need to check the figures. Some do not add up to 100% and they need to indicate why (I am assuming it's a rounding issue)

The key findings should be emphasised more concisely.

Ans: Thanks for the comments. It has been addressed accordingly. In table one as there was limitation due to routine program data use, so had no choices to add more variables.

Discussion & conclusions

This would benefit from a clearer structure and the main messages of this paper brought to the fore. The limitations of the study are considerable (as mentioned previously) and this section in particular needs to be expanded.

The implications of the findings need to be developed and considered further

Ans: Thanks for the comment. We have tried to addres