Author’s response to reviews

Title: Status and Associated Factors of Birth Registration in Selected Districts of Tigray Region, Ethiopia

Authors:

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Reviewer’s comments and/or questions and their respective responses
Reviewer one: Timothy Adair

The dependent variable in the regression assumes that issuance of a birth certificate automatically follows registration. However, this is not true in other countries, especially if there is a fee for a birth certificate. Can the authors provide more detail on how this process is automatic?

Answer: Article 47 (5) of the legal framework (Proclamation no. 760/2012) enacted to execute vital events registration system states that a certificate of registration of vital event shall be issued upon payment of service fee prescribed by a regulation. However, practically, no payment is needed for a child to get registered and obtain birth certificate in Ethiopia currently. This is owing to the fact that the system is new for Ethiopia. There has not been regular, compulsory and continuous registration of vital events till August 2016. Hence, considering the economic capacity of the people and to encourage the people to register vital events as they occur, the government is delivering the service for free. Hence, birth certificates are being issued for free in Ethiopia. It is a must for a child to get birth certificate at the time of registration. So, in the context of Ethiopia, both birth registration and issuance of birth certificates are being carried out concurrently; that is birth registration is always accompanied by the issuance of a birth certificate in Ethiopia.

Does the respondent have to show that they have a birth certificate or is it simply based on their response? Also, is it just the mother asked this question, or the father as well?
Answer: During the data collection process respondents (mothers who gave birth to at least one child since August 2016) were asked whether they have registered the birth of their children and secured birth certificate or not. Following that those who reported they do register and had certificate for their children were asked to show the certificate in order to avoid confusion with other cards or certificates. This question was asked to the mothers because in the context of Ethiopia, mothers are the main custodians of children’s wellbeing mainly at early age. To be specific, the survey data are collected from mothers.
What exactly were the knowledge-related questions specified in page 10, lines 206-207? Are these in Table 2? Please specify.

Answer: In order to know whether the respondents have knowledge about birth registration and certification or not, they were asked series of knowledge related questions. The first question is: Have you ever heard about birth registration? Subsequently, those who have ever heard about birth registration were asked other knowledge related questions such as 'do you know the legal time when to register the birth of a child and secure birth certificate? Do you know where to register a child and get birth certificate? And do you know the uses of birth registration and securing certificate? Hence, these questions are presented in table 2.

In Table 2, what were the correct answers for "Do you know where to get birth certificate" and "Do you know the uses of birth registration"? Please specify.

Answer: The questions do you know where to get birth certificate" and "Do you know the uses of birth registration are knowledge related questions and the answers for these questions are yes/no type and at the end those who said ‘Yes’ were asked to tell the name of the government office in charge of birth registration and to list one or two uses of birth registration, respectively.

Is the source of information in Table 2 the main source or any source - was more than one option allowed?

Answer: Respondents were asked to report main source of information. Hence, they reported one main source for their information.

In Table 3 the title refers to birth registration but the first 2 columns refer to birth certificate - use consistent terminology.

Answer: In the context of Ethiopia, both terms are more or less the same. Meaning if the birth of a child is registered, it is a must to get birth certificate. Certificate is issued at the time of registration. It only takes 30 minutes to register the birth of a child and secure birth certificate. The reason for this fast issuance of certificate is that birth registration and other vital events as well as issuance of certificate is decentralised in Ethiopia. They are being implemented at local or grass-root levels. However, to keep consistency, we will use the same terminology.

In Table 3 it is unclear why the variable 'mother has birth certificate' is included - is this different from the dependent variable?

Answer: Yes, it is different. The dependent variable is whether mother has registered the birth of her last child and secured certificate or not. Hence, the outcome variable in this study- possessing birth certificate of a child or not, is a binary variable which took a value one if mother had registered the birth of her child and got birth certificate, zero otherwise. Because in Ethiopia, the issuance of a birth certificate automatically follows birth registration as stated above. But, the variable “does the mother have own birth certificate” secured by backlog birth registration system was considered as one predictor variable. Because from the literature we found out that the propensity of a mother to register the birth of her child is high if a mother has own birth certificate compared to those who do not have. Backlog registration of birth is just to enable one to register the birth that occurred before the enactment of the law and start of the system in the nation.

Knowledge of birth registration is a confounding variable and would be better to not include in the regression. It seems that it would be appropriate to conduct a separate regression to predict whether the respondent has knowledge of birth registration.
Answer: The variable Knowledge of birth registration is excluded from the model.

Page 3, line 56 should mention that the UNICEF data are based on self-reported levels of birth registration, not that in official statistics. The review of the Ethiopian civil registration system does not give any idea how complete birth registration data are of if any of the data are published as vital statistics. This should be detailed.
Answer: Corrected in the manuscript.

The manuscript should also mention the utility of other data collected as part of birth registrations that are of much value, such as birth order, birth weight and age of mother, which are detailed in the UN Principles and Recommendations for Vital Statistics Systems, as well as Phillips et al, How useful are registered birth statistics for health and social policy? A global systematic assessment of the availability and quality of birth registration data, Population Health Metrics, 2018.
Answer: Corrected and added in the text of the manuscript.

Page 5, line 116 - why was data collected from 384 mothers? There is not detail as to how this number was calculated.
Answer: Birth registration as part of vital events registration system is a newly introduced system in Ethiopia. Practically, it was started on August 2016. Since August 2016 till this research was conducted, no single research was conducted in the nation and the region too. To determine the sample size single population proportion formula was used assuming that the proportion of mothers who registered the birth of their children and got certificate at 50% as there was no previously done research in Ethiopia and the region. Accordingly, the sample size considered for the study is determined based on the following formula.

\[ n = \frac{(Z\alpha/2)^2 P(1-P)}{e^2} \]

Where, \( n \) = the required sample size
\( Z \) = Standard score corresponding to 95% confidence interval
\( P \) = Assumed Proportion of mothers who registered the birth of their children and get birth certificate (50%)
\( e \) = the margin of error (precision) 5%

Page 5, line 119: "lottery method" should just be described as a random sample.
Answer: Lottery method is replaced by simple random sample.

Did the sample design account for the urban or rural status of districts to ensure there was adequate representation of both (especially because birth registration differs so much by this characteristic).
Answer: To get representative sample from each district, the study sites were initially stratified into urban and rural districts and then final sample individuals were taken considering the number of mothers who gave birth since August 2016 in each district (urban and rural). That is proportional to the size of the stratum. That is why place of usual residence of the respondents was taken as one predictor variable in the model.

Who were the Key Informants who were interviewed?
Answer: The key informants interviewed for the research were officers of civil status assigned to register vital events and issue certificates including birth in each district. In total, four districts (two urban and two rural) were taken for the study. Hence, key informant interviews were held with the four officers working at the grass root level to supplement the quantitate data.

Question and comments raised by: Vitaly Postoev (reviewer 2)
Abstract: No information on qualitative part of the study, it should be added to both method and result section.
Answer: Corrected.

Method: At line 108 it was written: "A cross-sectional study design was applied to generate reliable data. However, in addition to this, the researchers employed mixed methods which included quantitative and qualitative techniques." And later they described qualitative instruments. However, we cannot see description of qualitative results in "Results" section. Later, in Discussion, we occasionally found some info about FGD, but it is not well presented and misplaced. I suggest eight (i) to make an additional sub-heading about Qualitative approach in Results section to present data gained from Qualitative part of the research or (ii) to exclude information on qualitative part from the paper.
Answer: Some qualitative results are included in the result section to substantiate the quantitative data.

Authors approached 384 respondents. Is it enough number to get representative sample? The sample size calculation was not presented, so we cannot understand was the number of participants enough. This info should be added. Moreover, generalizability of the results should be discussed.
Answer: Birth registration as part of vital events registration system is a newly introduced system in Ethiopia. Practically, it was started on August 2016. Since August 2016 till this research was conducted, no single research was conducted in the nation and the region too. To determine the sample size single population proportion formula was used assuming that the proportion of mothers who registered the birth of their children and got certificate at 50% as there was no previously done research in Ethiopia and the region. Accordingly, the sample size considered for the study is determined based on the following formula.

\[ n = \frac{(z\alpha/2)^2.P.(1-P)}{e^2} \]
•Where, \( n \) =the required sample size
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•\( P \) = Assumed Proportion of mothers who registered the birth of their children and get birth certificate (50%)
•\( e \) = the margin of error (precision) 5%

Way of data presenting might cause misunderstanding: some continuous data presented as mean and SD (lines 152, 173), some as a median (178). However, it is not clearly stated in Method section, was data checked on normality?
Answer: As there are no outliers in the data, a summary measures mean and standard deviation are used to present some of the continuous variables.

Independent variables and process of their selection are not presented in Method section. Might it cause residual confounding?
Answer: The predictor variables are selected based on existing literatures and empirical findings that show the existence of relationship between the outcome and independent variables.

No information on ethical issues (inform consent, personal data etc.).
Answer: Information on Ethics and consents are presented at the end of the manuscript following authors’ contributions. The journal guideline demands information on ethical issues to be placed at the end.

Results: Some pieces at the result section (lines 148-159) are to be presented in table.
Answer: Results on background attributes are presented in table 1: (see table 1).

Authors implement logistic regression, but dependent variable (registration) has frequency of case (positive answers) about 30%. Taking this into account, OR might overestimate a real association. I suggest using prevalence rate instead or present it as a limitation.
Answer: Prevalence was used in the regression analysis not frequency. In this case prevalence is the number of mothers who registered the birth of their children and secured certificate since August, 2016 divided by the total number of mother in the sample multiplied by 100.

Exact p-values should be presented (lines 250-251).
Answer: The exact p-values for both crude odd ratio and adjusted odd ratios are presented in the table.

Discussion part: Discussion part should be better structured. FGD results should be moved to Results.
Answer: It is reorganized as per the comments
  Lines 290 and 292 conflict each other.
Answer: Corrected
  Line 360 - is ref 23 has correct position in the text
Answer: Corrected

Limitations of the study should be addressed (selection bias, information bias, residual confounding, etc).
Answer: Limitation of the study is incorporated.