Author's response to reviews

Title: Factors associated with antenatal care adequacy in rural and urban contexts - results from two health and demographic surveillance sites in Vietnam

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Author's response to reviews: see over
To BMC Health Services Research Journal

Dear Editor,

Enclosed is the revised version of my article “Factors associated with antenatal care adequacy in rural and urban contexts - results from two health and demographic surveillance sites in Vietnam”. The article has been revised according to the Reviewers’ helpful comments.

In the following sections, the reviewer’s comments are cited in Italics, followed by our response, point by point. The text that has been inserted in the manuscript is given in bold within quotation marks “” and new text is underlined (and also in the manuscript).

Reviewer 1:

Title: “ANC adequacy” is not defined in the title, maybe think of another title summarizing you main findings instead.

The word "adequacy" has been used in some articles with different definitions. In this paper ANC adequacy is defined to meet the Vietnamese national recommendations for basic antenatal care. So we keep the word “adequacy” in the title.

The new title is “Factors associated with antenatal care adequacy in rural and urban contexts: results from two health and demographic surveillance sites in Vietnam”.

1. p4: In the first sentence of the background it is stated that 4 million neonates die every year. I am not able to find this figure in the reference cited, please select another reference, like Black, R. E., S. Cousens, et al. (2010). "Global, regional, and national causes of child mortality in 2008: a systematic analysis." Lancet 375(9730): 1969-1987. It is estimated that the figure is lower than 4 million due to the latest years’ of attention and progress.

The number of annual neonatal deaths is likely to be lower now but there are no official updated data. The recent reports from UNICEF (The State of the world's children 2009: Maternal and Newborns health. Report of Division of Communication, UNICEF, 2008) still stated that there are almost four millions neonatal deaths annually in the world. This number was also referred to in one recent paper of the reviewer (Malqvist, M. 2011.
Neonatal mortality: an invisible and marginalised trauma. Glob Health Action 4 as mentioned below.

2. p4: It is stated that three ANC visits are recommended in Vietnam. How does this relate to WHO recommendations, and why is it different? Are there any special recommendations on a minimum of ANC services? Is for example ultrasound considered feasible for all? On p 8 and 9 this is discussed somewhat, maybe move and extend this part to the background.

For developing countries, WHO recommends 4 ANC visits at 4th, 6th or 7th, 8th and 9th month during a normal pregnancy. A review study conducted by WHO showed that a moderate reduction of number of visits does not affect pregnancy outcomes but may reduce the women’s satisfaction. Reducing the number of visits also reduces the cost of ANC so it might be more relevant for Vietnamese women. We have not been able to find whether this is the reason for the Vietnamese recommendation or what other reasons have been considered.

We has described in the beginning of the third paragraph in the background section that “WHO recommends four ANC visits at 4th, 6th or 7th, 8th and 9th month for women with normal pregnancy in middle and low income countries. National ANC recommendations vary between countries regarding number of visits, timing of visits and service contents of visits. In Vietnam, the national recommendations for uncomplicated pregnancies are at least three ANC visits, one in each trimester with adequate services during each visit.” (3rd paragraph, page 4)

Ultrasound is not mentioned in MoH recommendation as an ANC service for all pregnant women. One of the reasons might be that this service is not available at all CHCs, where otherwise almost all ANC services are recommended to be available for normal pregnant women.

One sentence has been added in the third paragraph of the background section: “Ultrasound examination is not officially recommended for pregnant women but is available in all hospitals and most private clinics.” (1st paragraph, page 5).

3. p6: In the methods section you mention distance to health facilities. Please state what measure is given, is it straight-line distance or road distance? And how has it been calculated?

The distance to health facilities were road distance, estimated by respondents. The figure mentioned in the paper was the mean of these estimates.
It has been made clear in the method section that “The average road distances to access the nearest public hospital, estimated by respondents, are 1.8 km in DodaLab and 10.2 km in FilaBavi.” (3rd paragraph, page 6).

4. p7: For data quality a random sample of three percent were re-interviewed. Do you have any figures on the accuracy? Maybe not needed to be presented in the paper, just for personal curiosity.

Yes, three percent were re-interviewed and the results showed that for 88% of all forms in DodaLab and 91% in FilaBavi, both interviews fully coincided. The most common incorrect information were date of last menstruation and the date of interview.

“There was a good correspondence between interview and re-interview showing 12% in DodaLab and 9% in FilaBavi with some mismatch, mostly on date of the last menstruation and date of interview”. (4th paragraph, page 7).

5. p7: One of the criteria for high risk pregnancy is defined as nullipara. In the results 11-13 % are defined as high risk, but there are around 50 % nullipara in the material. Please correct.

In our study, only nullipara aged 40 or more (not all nullipara) are defined as high risk pregnancy (Dangal G 2007) so 11-13% of women at high risk are correct.

The high risk pregnancy is defined as in the manuscript “high risk that is, the women meets at least one of the following criteria: nullipara and aged 40 years or more, multipara with four or more childbirths, women reporting any of the following complications during previous pregnancies: miscarriage, preterm delivery, caesarean section, stillbirth, or neonatal death or any of the following conditions: high blood pressure, diabetes, epilepsy or depression, during the current pregnancy” (2nd paragraph, page 8).

6. p8: Please present how the wealth index was calculated. Was PCA used? Or any other logaritm?

We have described in the manuscript that “Household economic status was measured using a wealth index estimated by Principal Component Analysis of all household variables describing housing and assets. The wealth index scores were grouped into terciles, each containing one third of all households: poor (1st tercile); middle (2nd...
tercile) and rich (3\textsuperscript{rd} tercile). Women were classified according to the tercile of their households.”. (3\textsuperscript{rd} paragraph, page 8).

7. p8: The division into low, middle and high economic condition I find a bit troublesome. The definitions differ for Bavi and Doda, yet they are presented in table 3 as comparable. And what is the division based upon, are there any socio-demographic data that can be used as reference?

The classifications are different and are not comparable between the two areas. It has been clarified in the manuscript that: “The community socioeconomic condition was classified in different ways in the two areas. In DodaLab, the three communes have been strategically selected with different socioeconomic levels according to the official classification by local authorities. In FilaBavi there are three types of geographical area: mountainous, highland and lowland. These differ in reported income per capita and mean distances to the nearest health facility. In the economic analysis they were considered as low, middle and high level, respectively. It is important to note that the concepts of community socioeconomy are not comparable between the areas.”. (3\textsuperscript{rd} paragraph, page 8)

8. p8: What role does distance have to the classification of economic condition. Is this considered in the results?

Distance has not been used as an indicator to classify economic condition. However in the rural areas, where economic condition was classified by geographic types, distance is obviously longer in mountainous areas which was classified as poor community. It has been mentioned in the manuscript, see the previous comment (7.p8).

9. p8: I am lacking any reference to ethnicity in the manuscript. If the two sites are ethnically homogenous I think it should be mentioned and the implications that this will have for the results need to be discussed. If there are ethnic minority groups within the sites it also needs to be taken into consideration, especially for the analysis. Ethnic minority mothers are known to have a lower level of health system utilization and it could be confounding the results.

In our study, minor ethnic groups accounted for 0.7\% pregnant women in the urban and 5.5\% in the rural area. Typically, ethnic minority women use less adequate ANC than the others but no statistically significant difference between the two groups was found.
We have added in the result section that: “Kinh is the majority ethnic group in both sites. Women in other groups accounted for 0.7% in the urban area and 5.5% in the rural”.

(3rd paragraph, page 11).

10. p9: It is stated that all variables were included in the multivariate analysis (which is presented in table 3). This seems to be a bit crude and a number of objections can be made to this approach:

- The relation between different variables are not taken into account, such as parity and age, which are by logic bound to co-incide. Also household economic status and community condition have been stated in the method section to co-incide. These correlations will affect the regression analysis if all are included.


Age and parity as well as education and occupation are correlated. The correlation coefficients are 0.3 and 0.6, respectively. However, the results were almost similar when we run the models with or without one of these two variables. We decided to keep all these variables in the multivariate analysis in table 3.

Generally education, occupation and economic status are correlated. The level of education and economic status is likely to be on a higher level than occupation in the ANC multivariate regression models.

We added this paragraph in the discussion section:

“The choices of explanatory variables in any multiple regression model were primarily made to be able to study hypotheses about the selected explanatory variables. The explanatory variables can be considered being at different levels. For example occupation can in a sense be seen as subordinated to economy and education. The educational level influences the choice of career and as a consequence determines income and economic status; on the other hand, better economic living conditions increase the possibilities to have a better education. The level of education often comes out stronger than occupation in multiple regression results. It can be discussed if both education and occupation (here actually self employment) shall be included in the regression models. Factors at many levels can be of importance. A key reason for
considering levels of this kind should be that it is important in relation to intervention. The present paper though, does not extend to this discussion.

Some variables for example age and parity; education, occupation and economic status might be strongly correlated and technically influence the results of regression analyses that include all available variables. The choices here must be based on investigations of the correlations between explanatory variables. Highly correlated independent variables cause collinearity which can lead to spurious results. However, in our study, the results were not much different when we run the models e.g. with and without the occupation variable. There is a correlation between education and occupation but not very strong. Another example is age and parity. There is a correlation between the two variables but not strong enough to cause problems if both variables are included.” (2\textsuperscript{nd} and 3\textsuperscript{rd} paragraph, page 10).

11. p10: The tables 1 and 2 are a bit difficult to read, especially the marks for significance. Please see if it can be presented in a clearer way. Is it possible to form groups, for example it is reasonable to believe that women with low education are also more likely to be self employed and poor and live in a community with a low condition? If it is the same women in all these groups maybe all of them need not to be presented.

We have tried to change according to the reviewer’s suggestion but it is not reasonable in this case. There is a relationship between low education, self employed, poor household and living in a community with a low condition but if we combine these variables, the group of women meet all four criteria is too small.

So we kept the original tables.

12. p10: As noted before, I lack the ethnicity variable in the results.

We have stated in the result section that: “Kinh is the majority ethnic group in both sites. Women in other groups accounted for 0.7% in the urban area and 5.5% in the rural”. (3\textsuperscript{rd} paragraph, page 11).

Results of univariate analysis have been presented in table 1 and table 2 with the comment that “Women in the minority ethnic group used significantly more ANC visits in the two areas and had earlier ANC attendance in the urban” (3\textsuperscript{rd} paragraph, page 11).
“Ethnicity was not included in the multiple regression analyses because the group is small in the urban area and since there was no difference in adequate use of ANC between the majority and minority groups in the rural.” (2nd paragraph, page 16).

13. p11: Are there any possibilities to do interesting stratifications of the material like to look at the group that used only public services for example, or the group of women with low education.

We tried to analyze using stratifications as suggested and found that proportion of women with low education was significantly higher among women who used only public services in both sites and women with high educational level tend to use ANC at private sector more frequently than the others.

This is mentioned in the discussion section that: It is interesting that in both sites, the women with low education used ANC only from the public sector more often than the others while the highly educated women used private ANCs more frequently (p<0.01; results not shown). (4th paragraph, page 19).

14. The discussion I find interesting and covering what can be expected. It is a bit long though and could benefit from some sub-headings that can focus the discussion to specific areas.

Yes. We have revised and made some sub-headings in the discussion section.

Rural – urban difference in adequate use of ANC (page 14).
Factors associated with ANC adequacy in the urban and the rural areas (page 14).
Adequate use of ANC in relation to demographic and socioeconomic characteristics (page 15).

Adequate use of ANC in relation to obstetric and health seeking factors (page 17).

Reviewer 2:
Some minor essential revisions:

1) Page six: should this be “annual” income?

Yes, this is reported annual income. It has been clarified in the revision.
“The median of reported annual income in DodaLab in 2009 is about 1,200 USD per capita, almost three times that in FilaBavi.” (2nd paragraph, page 6).

2) Describe the household sampling frame (briefly).

In FilaBavi HDSS, 69 clusters were randomly selected from 352 clusters of Ba Vi district, each cluster usually correspond to one village. In DodaLab, 3 out of 21 communes of Dong Da district, strategically selected at different socioeconomic levels. All households of these clusters and commune were included in the framework of the two HDSS. From these households, pregnant women were identified and followed in the study. This information has been already in the manuscript without any revision (2nd paragraph, page 6).

3) Discuss the validity of the self report ANC timing, number and content. It is a strength this information is collected prospectively but some further information would be helpful if available.

In our study, timing of ANC was asked only for the first visit and content of services just obtained qualitatively “yes or no” as this was not difficult for women to remember. Data were collected every three months to minimize the influence of “recall bias”, especially on number of visits.

We have added this paragraph in the discussion section: “A question about the timing of ANC was asked only for the first visit and the information about services at the individual visits is not available. Only overall service use during the pregnancy, yes or no, was recorded. Recall bias is likely to be small with the three-month cycle compared to other studies where all questions have been asked after delivery. ANC adequacy was assessed using several indicators unlike earlier study that only used the number of ANC visits. (page 19-20).

4) What was the outcome of the quality control process involving re-interview of selected participants?

“There was a good correspondence between interview and re-interview showing 12% in DodaLab and 9% in FilaBavi with some mismatch, mostly on date of the last menstruation and date of interview.”. (4th paragraph, page 8).
5) Since each set of analyses has a different level of power it is important to comment on commonalities in the direction and size of the effects, as well as the statistical significance.

Analyses were conducted separately with different power for the two areas but the same directions were found. However, there are more statistically significant differences in the rural side than of the urban. It is already mentioned in the discussion section as following:

“The relation between low education and low adequacy of ANC was more obvious in the rural than in the urban area.” (2nd paragraph, page 15).

“In the rural area, the risk of low overall adequate ANC was higher not only among women at low economic condition but also for women at middle level.”. (3rd paragraph, page 16).

Other revisions:
We have created one figure (figure 1) to illustrate the relation between ANC cost and household and individual income.

The information about authors has also been updated and corrected.

Thank you for your consideration.
Looking forward to seeing your response.
Your sincerely,

Tran Khanh Toan