Author’s response to reviews

Title: The long-term effects of adolescent pregnancies in a community in Northern Ghana on subsequent pregnancies and births of the young mothers

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Author’s response to reviews:

Reviewer #1:

1. The paper states (p.6), "women … who could not afford to visit a hospital … were offered a free consultation..." and "thus, only women with actual health complaints were considered in the study." How do the authors address concerns that women who have poorer health than the general population make up the sample and thus may bias the outcomes? For example, one study found that women who had recurrent stillbirth had a two-fold incidence of diabetes and hypertensive disorder compared to those who experienced their first stillbirth (Samueloff et al 1993 http://europepmc.org/abstract/med/8277486 ) How do the authors account for concerns about the possible poor health of sample subjects, and its influence on pregnancy outcomes?

That is, indeed, a very important point. The authors are very thankful for this remark. Unfortunately, we cannot say whether the health conditions have influenced the pregnancies. But the stated health complaints where more about general issues, like body, joint or abdominal pains. It is also not sure, whether the actual health conditions existed already when the women were young, since the participants of the study were mostly around 40 years old. Most probably, the health issues refer to the higher age of the women.

2. Many adolescents have subsequent, short interval births as adolescents. I could not find in the paper an indication as to whether the subsequent births the authors analyze occur as adolescent births, which are associated with higher risk, or if the subsequent births occurred to young adults. For example, a first birth (always high risk) could occur at age 14, and a second birth at age 15. The second birth at age 15 would also be associated with higher risk because it
too is an adolescent birth. It would also be a short interval birth. Thus, if some of the subsequent births are both adolescent births and short interval births (reflecting two risk factors) this would help explain the higher incidence of adverse outcomes in Group 1. The 2014 Ghana DHS (p. 66) notes that 52.4 percent of births to women aged 20-29 are births that occur at intervals less than 36 months apart. (No data are available for aged 15-19 or younger ages.) (A 2005 WHO Birth Spacing Technical Consultation recommended that, after a live birth, the time to attempt the next pregnancy should be 24 months, or almost three years/36 months between births.) Thus short interval births are prevalent in Ghana. Could the authors clarify the ages at which the subsequent pregnancies occurred, and whether they are adolescent, short-interval births, thus reflecting two risk factors, and helping to explain the higher incidence of adverse outcomes in Group 1? Or, did first pregnancies occur as adolescents, and subsequent pregnancies occurred as young adults? Clarifying these factors will advance understanding of the dynamics and possible causes of adverse outcomes in Group 1.

That is another important point. Unfortunately, the questionnaire was primarily designed for the evaluation of FGM in this region of Ghana. Therefore, we only asked for the age of the first pregnancy and then the number of pregnancies the women had thereafter. We did not ask for the exact age for each pregnancy.

3. The WHO Technical Consultation on Birth Spacing also recommended that, after a miscarriage or induced abortion, that women should wait at least six months before conceiving again to reduce the risk of adverse maternal and perinatal outcomes in the next pregnancy. The authors state that they gathered data on abortions. It is unclear if they gathered data on the timing of pregnancies after the abortions (in addition to the number of pregnancies). If they did, they might be able to analyze the extent to which pregnancies occurred less than six months after abortions, and thus possibly also contributed to adverse pregnancy outcomes in Group 1.

For this question the answer will be similar to the one above. It is due to the design of the questionnaire that we cannot answer this important question.

4. The paper does not explicitly state the factors for which it controlled. It does note that socio-economic conditions and parity in Age Group 1 and Age Group 2 are roughly similar. In analyzing adolescent outcomes, some studies adjust for as many as 16 factors (e.g., Conde-Agudelo et al 2005 http://www.sciencedirect.com/science/article/pii/S000293780401779X). How would the authors address concerns that the adverse outcomes we see in Group 1 may be due, for example, to other factors such as short birth intervals, poor antenatal care, rising rates of cesarean section in some countries, or other factors? Could the authors state explicitly how they adjusted for confounding factors?

We are grateful for this relevant remark. We performed some correlations, e.g. with the marital age and the income. No impact on the results could be detected. Furthermore, the participants of both groups of this study not only live in the same country but also in the same geographical region. Thus, it can be assumed, that factors such as poor antenatal care, cesarean section rates,...
are at least comparable in both groups. However, we now mention the role of confounders in the discussion section and cited two more references (page 13, first paragraph).

5. Related to the adjustment issue above, the paper states (p.7) that data were gathered on the number of pregnancies (gravidity) and number of children (parity) each woman had. It also notes that there was no significant difference between Age Group 1 (<19) and Age Group 2 (>19) with respect to the number of children (3.7 vs 4.1). No information was provided on gravidity. How do the authors address the concern that gravidity could be higher in the Age Group 1 (< 19) and thus bias the findings in some way?

This fact indeed could influence the results. However, we also evaluated the number of gravidities / pregnancies. It was comparable in both groups (please see Table 1, forelast row). Thus, no bias arises from that.

6. Studies have found that adverse pregnancy outcomes are found largely in younger adolescents (Althabe 2015 https://reproductive-health-journal.biomedcentral.com/articles/10.1186/1742-4755-12-S2-S8; Conde-Agudelo et al 2005 http://www.sciencedirect.com/science/article/pii/S000293780401779X) Should Age Group 1 focus on younger adolescents (< age 16) rather than adolescents under age 19?

The reviewer is absolutely right. We discussed this issue with colleagues from our Department of Statistics, since the groups will be extremely different: group 1, n=32 (vs. n=45) and group 2, n=111 (vs. 98). Therefore, we decided to keep the age groups. Nevertheless, we want to demonstrate that the results remain the same (or even show stronger effects) independently of the cut-off age (see Table below).

Cesarean section

Age group 1: 5

Age group 2: 6

16 years or younger: 5

older than 16 years: 6

OR original groups: 1.8

OR new groups: 3.3

7. Abortion discussion (p.9) - are the authors referring to induced or spontaneous abortion? Or are both types included in this category?
We did not specify this issue. However, when discussing the questionnaire with our co-authors they stated, that an ‘abortion’ is rather an induced one. Otherwise the women in this region declare a spontaneous abortion as miscarriage. In the course of answering this question we remarked a transcription error. The percentage of abortion in group 1 was 15.6% and not 15.2% and for group 2 11.5% and not 13.1%. The percentage was correctly depicted in the Figure. We revised the numbers in the result section (page 9, first paragraph).

8. Infant death. The abstract refers to the loss of a newborn, while the text (p 9) refers to the loss of an infant, and Figure 2C refers to child mortality. Could the authors clarify?

That is in fact a bit confusing. We appreciate this and tried to make it more clear. We asked about perinatal death as well as about death after birth. Possible answer options were: within the first weeks, within the first month and within 6 weeks after birth. When we used the terms ‘loss of a newborn’ or ‘child mortality’ we wanted to describe ‘loss of a baby within the first 6 weeks after birth’. We rephrased this at several passages and in Figure 2c.

9. The authors state (p 7) that they gathered data on premature births, perineal ruptures and other birth complications, yet these outcomes were not considered in the paper. Could the authors clarify?

We also asked for ‘loss of blood’, ‘labour pain’, and as the reviewer stated, ‘perineal ruptures’. Since no difference concerning these findings could be detected between the groups and only few participants answered these questions, we decided not to show these results. Nevertheless, we added a paragraph describing these findings in the results section (page 10, first paragraph).

Reviewer #2:

1. It would have been better to constitute the two groups according to the standard definition of adolescence, so that Group 1 would have been 19 years or younger and Group 2 20 years or older.

The constitution of the age groups was a major point of discussion. We decided that 19 years will be the cut-off age. Otherwise the number of women in the two groups would have been too different.

2. In the Table 1 it would have been good to include the N for each group.

Thank you very much. We added the numbers of participants in the table.

3. It is a pity that the questionnaire did not include any questions whether the women had experienced the female genital mutilation or not. On one hand we know that the practice of FGM
is prevalent in Northern Ghana and on the other other we know that women with FGM are more likely to experience complications at delivery. While the study was of small scale and would not have been able to respond to the question whether the higher rate of cesarean sections and stillbirths among younger women was associated to their FGM status, it would have nevertheless been important to ask about the FGM status.

That was indeed our first focus! We wanted to investigate the impact of FGM on birth outcomes. Therefore, every women was asked about her FGM status. Unfortunately for the study but good for the women, they all reported not to be circumcised. We added this important information in the result section (page 10, first paragraph).