Author's response to reviews

Title: Perinatal mortality in non-Western migrants in Norway as compared with their countries of birth and Norwegian women

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Author's response to reviews: see over
Dear Editor
BMC Public Health

Thank you for considering our manuscript *Perinatal mortality in non-Western migrants in Norway as compared with their countries of birth and Norwegian women* for publication in BMC Public Health.

Thank you also for the useful comments.

We now submit a revised version of our manuscript with all changes marked in yellow. Please find our replies to each of the reviewers’ comments below.

We hope that we have adequately responded to the comments and that our manuscript may now be accepted in BMC Public Health.

Kind regards

Zainab Naimy
Reviewer 1:

Reviewer’s comment 1

The insecurity of the PMR figures from countries in more than 3 decades of chaos like Afghanistan and Somalia should be stressed.

Our reply:

We now emphasize the insecurity of the PMR figures from Afghanistan and Somalia in the Discussion: “In particular, the PMRs in war affected countries such as Afghanistan and Somalia need to be interpreted with caution.”

Reviewer’s comment 2

Motivation for lack of adjusting for socioeconomic backgrounds factors, well known maternal lifestyle factors related to PM, gestational age("prematurity" etc), maternal diseases.

Our reply:

We have now included gestational age at birth (categorized as < 37 or ≥37 weeks) in our data analyses (Table 3). The results are included in the Results and in the Discussion.

We did not have information on socioeconomic background factors in our data, and address this in the Discussion: “Individual information on migration status, social and behavioral factors that could explain the differences in risk were not available in our data.”

Lack of adjustment for maternal diseases is addressed in the Discussion: “While diabetes and preeclampsia have been associated with increased risk of perinatal death [19, 22], we do not know whether information on maternal diseases in The Medical Birth Registry of Norway is valid for migrant women [22, 23]. The reported differences in perinatal mortality between groups in our study should, however, encourage further research on risk factors in these migrant groups.”

Reviewer’s comment 3

The reason for exclusion is not described.
The reason for inclusion is not motivated: in an obstetric perspective it is very unfair not to exclude multiple pregnancy when it comes to PM.

Our reply:

Perinatal mortality rates in different countries as reported by the WHO, does not exclude multiple pregnancies. We are comparing PMRs in Norway to the PMRs as reported by the WHO. Therefore, we included multiple pregnancies in our analyses. We did, however, adjust for multiple pregnancies when estimating the OR for perinatal death in offspring of women from non-Western countries as compared to Norwegian women. The estimated risk of
perinatal death in offspring of non-Western women as compared to Norwegian women remained almost unchanged when including only singleton pregnancies (data not shown).

Reviewer’s comment 4

The result that "giving birth before 2001 is a risk for PM" is of importance and could be problematized further in Discussion. Has there been an increase awareness among health care providers in Norway to give care to women from other countries than Norway over the years that are included in the study, 1986-2005?

Our reply:

The perinatal mortality declined in Norway during the study period for all women, not only for migrants. The variable is used as potentially confounding factor since some migrant groups gave birth in the last part of our observation period.

Reviewer’s comment 5

The reasons for migration is not known in the material and it should be stressed as an limitation. thus, the authors discussion of differences in outcomes on country group level (Vietnames, Pakistanis, Thai etc) could be better understood by the reader

Our reply:

Lack of data on reasons for migration has been added as a limitation in the Discussion: “Individual information on migration status, social and behavioral factors that could explain the differences in risk were not available in our data.”

Reviewer’s comment 6

It would be of interest to compare data on perinatal mortality in Norway when the BNP was on the "same level” as today Somalia/Afganistan. Is it possible to get any kind of historical data ? thus the importance of social and economic factors is shown and not only discussion of accessibility to health care as the major explanation for differences.

Our reply:

Reporting of births to the Medical Birth Registry of Norway started in 1967. Therefore we cannot estimate perinatal mortality in Norway with certainty before 1967. In 1967 the perinatal mortality rate in Norway was considerably lower (22 deaths per 1000 births) than in Somalia/Afghanistan in 1995, 2000 and 2004.

Link:
http://www.fhi.no/eway/default.aspx?pid=233&trg=MainLeft_5670&MainArea_5661=5670:0:15,3278:1:0:0::0:0&MainLeft_5670=5544:50919::1:5675:3::0:0
Gross Domestic Product (GDP) per capita in Norway in 1967 was 2514 US dollars, while GDP per capita in Afghanistan for 2004 was 196 US dollars. GDP per capita for Somalia for 2004 is not available from the World Bank.


Given that GDP per capita for Afghanistan in 2004 is lower than GDP per capita in Norway for 1967, comparing perinatal mortality in Norway when the BNP/GDP was at the same level as in Afghanistan, is unfortunately not possible.

We do however stress in the Discussion that that whilst the difference between the PMRs in Norway and countries of birth may be an indirect measure of the effect of quality health care available to all women, socioeconomics factors may also play a role: “However, low PMRs in migrants in Norway may also be explained by other factors that affect women’s health, like improved housing, sanitation and educational opportunities in Norway.”

**Reviewer’s comment 7**

Table 2, title lack information of when and where the data come from.

**Our reply:**

Table 2 is now numbered as table 3. According to BMC Public Health guidelines the table title cannot exceed 15 words. Thus information about when and where data is from is provided in the table legend.

**Reviewer’s comment 8**

Some references are only in local language-Title should be translated into English.

**Our reply:**

References in local language have now been translated into English.
Reviewer 2:

Major essential revisions/queries:

Reviewers comment 1

It would be of interest to know something more about the excess mortality that is occurring for those immigrant groups with higher PMR compared with the Norwegian-born. Is it possible to separate stillbirths from early neonatal deaths in the analyses, in addition to giving the total PMR? Other data would suggest that the excess deaths among immigrants may mostly be in stillbirths. Separating deaths in this way may give clues to explanations about some of the disparities with Norwegian-born women.

Our reply:

We have now performed additional data analyses and separated the stillbirths from the early neonatal deaths. Results are presented in the table below.

Table 4 – Perinatal deaths by gestational age at birth, stillbirths and early neonatal deaths.

<table>
<thead>
<tr>
<th>Mothers country of birth</th>
<th>Total number of perinatal deaths n</th>
<th>Perinatal deaths &lt; 37 weeks % (n)</th>
<th>Perinatal deaths ≥ 37 weeks % (n)</th>
<th>Stillbirths % (n)</th>
<th>Early neonatal deaths % (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norway</td>
<td>8097</td>
<td>66.4 (5373)</td>
<td>33.6 (2724)</td>
<td>66.1 (5357)</td>
<td>33.8 (2740)</td>
</tr>
<tr>
<td>Pakistan</td>
<td>159</td>
<td>66.7 (106)</td>
<td>33.3 (53)</td>
<td>69.2 (110)</td>
<td>30.8 (49)</td>
</tr>
<tr>
<td>Vietnam</td>
<td>44</td>
<td>75 (33)</td>
<td>25.0 (11)</td>
<td>65.9 (29)</td>
<td>34.1 (15)</td>
</tr>
<tr>
<td>Somalia</td>
<td>71</td>
<td>60.5 (43)</td>
<td>39.4 (28)</td>
<td>67.6 (48)</td>
<td>32.3 (23)</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>61</td>
<td>67.2 (41)</td>
<td>32.8 (20)</td>
<td>73.7 (45)</td>
<td>26.3 (16)</td>
</tr>
<tr>
<td>Philippines</td>
<td>47</td>
<td>55.2 (25)</td>
<td>46.8 (22)</td>
<td>74.5 (35)</td>
<td>25.5 (12)</td>
</tr>
<tr>
<td>Iraq</td>
<td>31</td>
<td>74.2 (23)</td>
<td>25.8 (8)</td>
<td>58.1 (18)</td>
<td>41.9 (13)</td>
</tr>
<tr>
<td>Thailand</td>
<td>26</td>
<td>69.2 (18)</td>
<td>30.8 (8)</td>
<td>57.7 (15)</td>
<td>42.3 (11)</td>
</tr>
<tr>
<td>Afghanistan</td>
<td>16</td>
<td>56.3 (9)</td>
<td>43.7 (7)</td>
<td>56.3 (9)</td>
<td>43.7 (7)</td>
</tr>
</tbody>
</table>

Table legend: Perinatal deaths by gestational age at birth, and proportion of stillbirths and early neonatal deaths of all perinatal deaths according to country of birth for women giving birth in Norway from 1986 to 2005 (n= 1 102967).

The numbers are small within each cell in the different migrant groups and there is little evidence that the increased perinatal mortality in certain immigrant groups is explained by increased risk of stillbirth.

We now summarize this table in the Results: “There was no significant difference between migrant and Norwegian women in the proportion of perinatal deaths that were stillbirths, 67.9% (309/ 455) and 66.2 % (5357/8097) respectively, (p= 0.442, chi square test).”

Discussion: “…..do not provide further understanding of the excess perinatal mortality in migrants. Neither does the small difference between migrant and Norwegian women in the proportions of perinatal deaths that were stillbirths.”
Reviewer’s comment 2

Preterm birth is commonly a major contributor to perinatal mortality. Does preterm birth differ between the groups of interest in this study? Are the authors able to adjust for gestation, along with age, parity, plurality and year of birth? Further, is it possible that the excess deaths in some immigrant groups are in fact more likely to be at or near term, compared with the Norwegian-born? I ask because we have some suggestions of this in (unpublished) data in Australia, and if that is the case, then it may highlight a need for greater vigilance and support for immigrant women regarding the signs of compromise in fetal wellbeing close to term, and/or better processes to enhance communication between women and their caregivers at this time, especially for women who are not fluent in the host country language.

Our reply:

- We have added gestational age at birth to the descriptive analyses in Table 2, categorized as <37 weeks and ≥ 37 weeks. To further examine the contribution of preterm births to perinatal mortality we include gestational age at birth in the crude and the multivariable data analyses (Table 3). We report the results in the Results and in the Discussion:

  “Also, there was little difference between migrant and Norwegian women in the prevalence of preterm births; 13.8% (5539/40223) versus 12.7% (135453/1062744), (p= <0.001, chi square test).”

  “The small differences between migrant and Norwegian women in the prevalence of preterm births and……..do not provide further understanding of the excess perinatal mortality in migrants.”

- To study whether excess perinatal deaths in migrants were more likely to be at/near term as compared to Norwegian women, we calculated the proportion of perinatal deaths that were at gestational week < 37 and ≥37, and tested if the difference was significant. We report the proportion of perinatal deaths that occurred at gestational week <37 in the Results and Discussion:

  “In migrants 65.5% (298/455) of all perinatal deaths occurred in preterm births as compared to 66.4% (5373/8097) in Norwegian women (p= 0.705, chi square test).”

  “The small differences between migrant and Norwegian women in the prevalence of preterm births and of perinatal deaths in preterm deliveries do not provide further understanding of the excess perinatal mortality in migrants.”
Minor essential revisions/queries:

Reviewer’s comment 1

Page 3, third paragraph: ‘million’ not ‘millions’; and ‘women of childbearing age’, not women in a childbearing age.

Our reply:

Suggested changes have been made.

Reviewer’s comment 2

Page 5: 5364 births were excluded because of missing information on perinatal vital status. Would the authors comment on whether such missing data was more or less likely among immigrant versus Norwegian-born women.

Our reply:

We now clarify: “The excluded births represented less than one percent of the births in each migrant group and in Norwegian women.”

Reviewer’s comment 3

Page 5: Definitions of the groups of interest are according to maternal country of birth, except that a woman was defined as Norwegian ‘if both her parents were born in Norway’. Does this mean that a woman born in Norway is not included, if one or both of her parents were born outside Norway? Why has this definition been used, rather than the simpler one of mother’s own country of birth for all groups? Immigrant women may well have one or both parents born outside their country of origin, but this does not seem to have excluded them from their country of origin grouping. Also, the tables currently actually imply a common definition for all groups, ie maternal country of birth, even for the Norwegian group. Please provide some clarification.

Our reply:

To conduct our study we received pre-categorized nationality groups from Statistics Norway (http://www.ssb.no/english/subjects/00/00/10/innvandring_en/).

The nationality/country of birth definitions are conventions used by Statistics Norway. We did not have data on country of birth for each parent of the mother in the migrant population, thus changes in the definitions are not possible for us.

A Norwegian woman was defined as Norwegian “if she had two parents born in Norway” by Statistics Norway, and while this can be misleading in the tables that imply “country of birth”, we are convinced that very few women in our dataset would not be born in Norway by this definition.
Reviewer’s comment 4

Page 6, second paragraph: presumably the age category which is described as #20, is actually <20, given the next category is 20-24?

Our reply:

≤20 has been changed to < 20.

Reviewer’s comment 5

Page 7, third paragraph: ‘The perinatal mortality declined...’ should be ‘Perinatal mortality declined..’; and ‘less multiple births’ should be ‘fewer multiple births’

Our reply:

First sentence has been removed; second sentence has been changed as suggested.

Reviewer’s comment 6

Page 10, second paragraph: delete ‘an’ before advantageous

Our reply:

The sentence has been restructured.

Reviewer’s comment 7

Page 11, first paragraph: add ‘of’ before Thai; second paragraph: ‘refusal’ not ‘refuse’; ‘risk factors for’ rather than ‘risk factors of’

Our reply:

First sentence has been changed as suggested, second sentence has been removed.

Reviewer’s comment 8

Table 3 describing maternal characteristics by country of birth would be better placed as Table 2 prior to the adjusted analyses in the current Table 2; and preferably also include gestation (or proportion preterm <37 weeks?)

Our reply:

Table 3 with the maternal characteristics has been numbered as Table 2, and now includes proportion of preterm (< 37 weeks) births and births at ≥ 37 weeks.
Reviewer’s comment 9

Figure 1 could usefully show PMR for each of the years available from WHO in countries of origin, rather than just 2004, especially as the whole period for 1988-2005 is shown for Norway. Or alternatively, it could be deleted altogether, as it actually simply repeats information provided in the current Table 1.

Our reply:

Figure 1 now shows the PMR for 1995, 2000 and 2004 for migrant women’s countries of birth. We would like to keep Figure 1, as it visually illustrates the large differences in perinatal mortality between the countries of birth and Norway.

Reviewer’s comment 10

Table 1: PMRs should probably be restricted to one decimal place; the WHO figures have been rounded to whole numbers. I think a consistent approach should be adopted.

Our reply:

We agree, and restrict the PMRs from Norway to one decimal place.