

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Comparison of birthweight between school health records and medical birth records in Denmark: Determinants of discrepancies.
AUTHORS	Jensen, Camilla; Gamborg, Michael; Heitmann, Berit; Sørensen, Thorkild; Baker, Jennifer

VERSION 1 - REVIEW

REVIEWER	Lule Abubaker Swaib Medical Research Council/Uganda Virus Research Institute, Research unit on AIDS Uganda
REVIEW RETURNED	22-Jun-2015

GENERAL COMMENTS	<p>The authors are to be commended for their clever use of the ready available data. This is a well written and interesting paper trying to answer an important epidemiological question. The design, conduct and analysis seem appropriate. The study not only shows a strong correlation but also a good agreement between the two sets of records. I have a few minor concerns.</p> <p>First, the authors acknowledge that birth weight records in the CSHRR could have been reported by fathers or any other guardian other than the mothers and also obtained from the child's infancy health book provided shortly after birth. However the results are reported as maternal reported data. Could this be reported not to reflect that the CSHRR records were based on maternal recall? Secondary, size at birth (as normal, big and small) has been reported as an important factor for later recall of birth weight. Parents are less likely to recall accurately child's birth weight for normal weight than for small or big babies. It would be interesting to find out how this affected the reported weights at school entry in this population.</p> <p>Thirdly, the authors have only cited studies that have previously showed very strong correlation and good agreement. It is important to cite work that has shown very low correlations and poor agreement and what could have caused the differences.</p> <p>Finally, it is shown that for a long time the Danish pound was used for reporting birth weight. However it is not clear if some parents or guardians reported birth weight in pounds. The authors could clearly state the system used to record birth weights in both the CSHRR and the MBR.</p>
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REVIEWER	Ali Khashan University College Cork, Cork, Ireland
REVIEW RETURNED	03-Aug-2015

GENERAL COMMENTS	<p>Jensen et al., examined the correlation between birthweight as recorded in the Danish Medical Birth Register and birthweight reported by parents to the school when the child was 5-7 years. Using several analytical approaches, they found high correlation between birthweight from the register and the school records. Overall, the manuscript is clearly written and the analytical approach is interesting and thorough. The research is an important one in obstetrics and perinatal epidemiology. The authors may wish to address the following comments:</p> <p>1) The main concern in this study is the maternally reported birthweight. As the authors acknowledge, they do not know the percentage of children that their parents used the child's infancy health book to report birthweight. If this was common, then the school data is irrelevant to the research question and the results may be misleading. Unfortunately, without more detailed information and analysis on the source of birthweight data reported to the schools, the study is of limited value and the conclusions may be wrong.</p> <p>2) Why the data are limited to 1973-91? Data in the Danish Medical Birth Register is available beyond 2010 and it is surprising this study is limited to old data. This brings the generalizability of the results into question.</p> <p>3) What is the rationale of using the birthweight categories as reported on page 7?</p> <p>4) Restricting birthweight to 500-6150 grams is important, however, some birthweight measures within that range may be questionable depending on gestational age. Please see Khashan et al., Psychosomatic Medicine 70:688–694 (2008).</p> <p>5) The Bland-Altman plot is the most important analysis and it should be described in more details. The assumptions should be checked and the results reported. The statistical analysis should give some detail on how the plots are interpreted.</p> <p>6) Results, first paragraph. Percentages should be reported with the absolute numbers.</p>
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VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

Reviewer Name Lule Abubaker Swaib

Institution and Country Medical Research Council/Uganda Virus Research Institute, Research unit on AIDS Uganda Please state any competing interests or state 'None declared': None Declared

Please leave your comments for the authors below The authors are to be commended for their clever use of the ready available data. This is a well written and interesting paper trying to answer an important epidemiological question. The design, conduct and analysis seem appropriate. The study not only shows a strong correlation but also a good agreement between the two sets of records. I have a few minor concerns.

1) First, the authors acknowledge that birth weight records in the CSHRR could have been reported by fathers or any other guardian other than the mothers and also obtained from the child's infancy health book provided shortly after birth. However the results are reported as maternal reported data. Could this be reported not to reflect that the CSHRR records were based on maternal recall?

Thank you for pointing this out. Based upon this comment and the suggestion by the other reviewer,

we have rephrased how we describe the source of the information. This is now reflected in the title and throughout the manuscript. Changes in the key sections of the manuscript are described below.

Title: Comparison of birthweight between school health records and medical birth records in Denmark: Determinants of discrepancies.

Abstract: Objective: To compare reported birth weight (BW) information in school health records with BW from medical birth records, and to investigate if maternal and offspring characteristics were associated with any discrepancies.

End of introduction: Therefore, in this study, we compared reports of BW obtained at the first school examination and recorded in health records with the recorded BW from medical birth records, and we investigated if maternal and offspring characteristics predicted the discrepancies between BW values in the two registers.

Discussion, first line: We found that reports of BWs in the CSHRR agreed very well with the recorded BWs in the MBR.

Study conclusions, last page of manuscript: Overall, reported BW in the CSHRR agreed very well and accurately with recorded values from medical birth records, suggesting that these values are valid. Discrepancies in BW were more often seen among married women, women with several children, and among children who were below 6 or above 8 years at recall. These results suggest that research on associations between BW and adult onset diseases will not be biased by the use of information on BW that is obtained during childhood from school health records.

2) Secondary, size at birth (as normal, big and small) has been reported as an important factor for later recall of birth weight. Parents are less likely to recall accurately child's birth weight for normal weight than for small or big babies. It would be interesting to find out how this affected the reported weights at school entry in this population.

This is an interesting and important question that we did not originally address in the manuscript. We have conducted a supplementary analysis, and we did not find any indications that this occurred in our population, rather the opposite. We found that the standard deviations of the differences between the registers were significantly larger in low and high birth weight groups, as compared with the middle group (Table 1). At this time we have not included these in the manuscript, but we are willing to do so if the editor finds this of interest. The analysis is performed on the data from 1979 and later, to avoid the rounding issues in the early part of the MBR.

Table 1. Comparison of recalled versus recorded birth weight values in the CSHRR and the Medical Birth Register by categories of birth weight

Birth weight (g)* N Std. Dev. (g) of the difference

500-2499 1817 264**

2500-3999 26,762 124

4000-6150 3148 203**

*Taken as the average of birth weight values in the CSHRR and Medical Birth Register

**Significantly different from the 2500-3999g group using Levene's test. $P < 0.0001$

3) Thirdly, the authors have only cited studies that have previously showed very strong correlation and good agreement. It is important to cite work that has shown very low correlations and poor agreement and what could have caused the differences.

The reviewer is correct; we only cited studies showing strong correlations and good agreements as we were unable to identify any other studies in the literature that showed poor correlations or agreement. We limited our search to parental recall early in life, but we are aware that there is another body of literature examining parental recall at late ages. As this is beyond the scope of this work, we have chosen not to cite these works. As we appreciate the point the reviewer has made, we have included a sentence in the introduction to reflect the lack of studies showing poor agreement.

Introduction: As such, it is possible that parents recall their children's birth weights very well, or that there is publication bias in this area as studies demonstrating low correlations or poor agreement were not identified in the literature.

4) Finally, it is shown that for a long time the Danish pound was used for reporting birth weight. However it is not clear if some parents or guardians reported birth weight in pounds. The authors could clearly state the system used to record birth weights in both the CSHRR and the MBR.

Thank you for bringing this to our attention. We have removed a discussion of pound errors entirely. Any such pound errors are unlikely to have occurred during the period this study covers (1973-1991), as the metric system was officially introduced in 1907, and the usage of the Danish pound as a measurement of decreased steadily thereafter. Our discussion was more applicable to the earlier periods of the register.

Nonetheless, we re-examined the birth weight against birth weight plot for the later period (1979-1991) with the pound-kilogram difference in mind. As 1 kilogram is equal to 2 Danish pounds, a 1 kilogram birth weight would be recorded as 1 kilogram in the Medical Birth Register and as 2 kilograms in the CSHRR (and so on). Based upon this, we added lines to the birth weight against birth weight plots; points that lie on the dashed lines indicate potential pound errors. Based upon this, we identified ~8 values in the 1973-1978 period and ~9 values in the 1979-1991 period where this may have occurred. Therefore, few values were affected. These plots could not be uploaded here, however they were attached during the submission process as material for the editors to review.

Reviewer: 2

Reviewer Name Ali Khashan

Institution and Country University College Cork, Cork, Ireland

Please state any competing interests or state 'None declared': 'None declared'

Please leave your comments for the authors below Jensen et al., examined the correlation between birthweight as recorded in the Danish Medical Birth Register and birthweight reported by parents to the school when the child was 5-7 years. Using several analytical approaches, they found high correlation between birthweight from the register and the school records. Overall, the manuscript is clearly written and the analytical approach is interesting and thorough. The research is an important one in obstetrics and perinatal epidemiology. The authors may wish to address the following comments:

1) The main concern in this study is the maternally reported birthweight. As the authors acknowledge, they do not know the percentage of children that their parents used the child's infancy health book to report birthweight. If this was common, then the school data is irrelevant to the research question and the results may be misleading. Unfortunately, without more detailed information and analysis on the source of birthweight data reported to the schools, the study is of limited value and the conclusions may be wrong.

We thank the reviewer's suggestion for leading us to an improvement in the accuracy of our wording; please see our response to comment 1 from reviewer 1.

2) Why the data are limited to 1973-91? Data in the Danish Medical Birth Register is available beyond 2010 and it is surprising this study is limited to old data. This brings the generalizability of the results into question.

The data included in the study were limited by the ranges available in the registers (i.e. the Medical Birth Register was established in 1973, and the Copenhagen School Health Records Register only extends to 1991). We disagree that the dates included in the study limit the generalizability of the results. We cannot see any reasons for why the association between reports of birth weight in school health records and medical records has changed during the last few decades in our study setting.

3) What is the rationale of using the birthweight categories as reported on page 7?

As birth weight obtained by report is prone to digit preference, we chose categories that allowed for this possibility rather than choosing categories where data become heaped at preferential values. Our explanation is stated on page 7.

P7: BW was analysed as continuous variable (in grams) and divided into categories of 500-1 499, 1 500-1 999, 2 000-2 750, 2 751-3 250, 3 251-3 750, 3 751-4 250, 4 251-5 500, 5 501-6 150 grams, which were chosen to minimize the effects of digit preference. [13]

4) Restricting birthweight to 500-6150 grams is important, however, some birthweight measures within that range may be questionable depending on gestational age. Please see Khashan et al., *Psychosomatic Medicine* 70:688–694 (2008).

In this paper we are comparing the reports of birth weight between two sources. We are aware that birth weight values, even if they seem reasonable, may be incorrect given an infant's gestational age. Therefore we conducted an analysis in the original manuscript (Table S1) to explore this possibility. In the early period of the MBR there were significant differences, but again this is most likely due to rounding procedures used in the MBR. In the later period (1978-1991) there were not significant differences between BWs by categories of gestational age in the two registers. We have added the following to the discussion:

Discussion section: The analyses were restricted to BW values from 500 to 6150 g to avoid overtly erroneous values. A comparison of BW values based upon gestational age categories (taken from the MBR) did not reveal any significant differences in the 1978-1991 period suggesting that these BW values are reasonable given the infant's gestational age.

5) The Bland-Altman plot is the most important analysis and it should be described in more details. The assumptions should be checked and the results reported. The statistical analysis should give some detail on how the plots are interpreted.

We thank the reviewer for this comment, and have included greater details in both the methods and results section as well as the figure legend.

Methods section: To graphically illustrate the agreement in BW values between the two registers, Bland-Altman plots were generated, also by time period. Within the Bland Altman plots, the limits of agreement were drawn at ± 1.96 standard deviations.

Results section: The Bland-Altman plots of the differences in BW between the two registers per average BW generally showed good agreement (Figure 1). In the 1973-1978 period, the rounding procedures in the MBR were apparent. In this period, the plot illustrates that the MBR reports were, on average, lower than in the CSHRR.

In the 1979-1991 period, the Bland-Altman plot did not reveal any systematic patterns of deviations between BWs in the two registers. For the majority of BWs (n= 30 528, 96.2%) the difference between two registers fell within the range of -287 to 284 grams (corresponding to ± 1.96 standard deviations, indicated by the dashed lines in Figure 1). Few values fell above these limits (n = 584, 1.8%) and few fell below (n = 615, 1.9%).

Figure legends: Figure 1: Bland-Altman plots of birthweight (grams) in the CSHRR and the MBR according to MBR procedural changes, the solid line is the mean difference and the dashed lines are ± 1.96 standard deviations.. In the 1973-1978 plot, the mean difference was -287 grams, with a standard deviation of 215 grams. In the 1979-1991 plot, the mean difference was -2 grams, with a standard deviation of 146 grams.

6) Results, first paragraph. Percentages should be reported with the absolute numbers.

VERSION 2 – REVIEW

REVIEWER	Ali Khashan University College Cork, Ireland
REVIEW RETURNED	23-Oct-2015

GENERAL COMMENTS	I would like to thank the authors for addressing my previous comments. The authors should address the generalizability issue in more detail. One can assume that women are more informed about their pregnancy and take part in decision making. If this is correct, it is possible to assume that birthweight recall by mothers may have improved in the past 1-2 decades.
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VERSION 2 – AUTHOR RESPONSE

We have incorporated these points into the discussion. We now state the following on page 24:

"We examined birth weight recall during the birth years of 1973-1991 among Danes, and it is a possibility that recall may have changed since then or that it differs depending on which population is being investigated."