Author's response to reviews

Title: Inadequate prenatal care and its association with adverse pregnancy outcomes: A comparison of indices

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Author's response to reviews: see over
Response to Reviewers’ Comments

Title: Inadequate prenatal care and its association with adverse pregnancy outcomes: A comparison of indices

Dear Dr. da-Silva,

We appreciate the thoughtful comments and suggestions submitted by the reviewers. A number of revisions have been made to the manuscript based on the reviewers’ suggestions, and are detailed under the corresponding suggestions from the reviewers below.

I hope these revisions are acceptable, and look forward to hearing from you.

Sincerely,

Maureen Heaman, RN, PhD

Reviewer's report
Title: Inadequate prenatal care and its association with adverse pregnancy outcomes: A comparison of indices
Version: 2 Date: 17 July 2007
Reviewer: Arden S Handler

Reviewer's report:
General
The authors present an analysis of the utilization of prenatal care in Winnipeg, Canada from 1991-2000. They examine patterns of utilization using four indices that have been used or are in current use in the U.S.: the Kessner index, the GINDEX, the R-GINDEX and the APNCU (Kotelchuck index). This article is important as Canada has no national data on utilization of adequate prenatal care. The article will be better served by only comparing the two indices that are currently considered to be the state of the art in the U.S.: the R-GINDEX and the APNCU. It will also be better served by presenting the findings, discussing the complexity of prenatal care measurement, and suggesting that a gestational-age specific examination of the indices is potentially useful, not calling for the discontinuation of these indices.

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached.)
1) An objective such as "to determine the presence of gestational age bias among the four indices" assumes a priori such bias exists. There is a need to change the language so that the authors "biases" are not revealed.. Language such as "assess whether or not and to what extent gestational age bias exists" is more appropriate.
We revised the objective re gestational age bias to read, “assess whether or not and to what extent gestational age bias exists” (both in the Abstract and in the body of the paper).

2) Given that the Kessner index and the GINDEX are based on the flawed coding strategy of only requiring "9" visits for a determination of adequacy and that there is an agreement in the field that both the R-GINDEX and the APNCU are qualitatively better indices, I do not think the article should include all four indices. I would focus only on the two indices that actually reflect the current state of the art with respect to prenatal care utilization indices, the R-GINDEX and the APNCU. A focus on these two indices would allow the reader to get a much better handle on what the authors are trying to do and the meaning of the results presented.

We eliminated the Kessner and GINDEX indices from the analyses, and now only compare the two indices in current use (R-GINDEX and APNCU).

3) The authors call for the discontinuation of the prenatal care indices (R-GINDEX and APNCU) and suggest the use of gestational-age specific analyses. As noted by Kotelchuck in his response to Koroukian and Rimm, 2003, the APNCU does not "adjust" for gestational age; "the APNCU Index merely compensates for expected number of PNC visits at each gestational age." When Kotelchuck presents the APNCU by gestational age, he finds that within a gestational age stratum, the higher the adequacy of utilization, the better the birth outcomes. This is equivalent to comparing a "cohort" analysis to "cross-sectional" data -- an elevated risk for low and high prenatal care users (the cross-sectional line) does not necessarily mean that the relationship between "more pnc" and pregnancy outcomes doesn't exist within each "cohort" (gestational age group). In addition, it might be expected that the relationship between adequacy of prenatal care and birth outcomes using these indices will vary by gestational age (as found in this article) given the fact that "adequate" prenatal care compared to "inadequate" for a preterm infant has a different meaning than "adequate" prenatal care compared to "inadequate" for a term infant.

As such, given the complexity in studying prenatal care use, calling for the discontinuation of the prenatal care indices (particularly, R-GINDEX and APNCU) seems unusually strong, and premature given that there is no routine use of such indices in Canada. I would eliminate such a call from this article and also rethink the alternative method-- is gestational age specific analysis enough? Would the authors recommend the method of Koroukian and Rimm as referenced in their article? Koroukian and Rimm used gestational age specific analyses that were unadjusted and did not account for the timing of initiation of prenatal care. Is this truly what the authors want to recommend?

We removed the suggestion to discontinue use of the indices for studying the association with preterm birth and LBW; instead stated that the indices should be used with caution because of
gestational age bias. We expanded our discussion of alternative methods for using the indices to study the association with preterm birth and LBW.

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Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)
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Discretionary Revisions (which the author can choose to ignore)
What next?: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions
Level of interest: An article whose findings are important to those with closely related research interests
Quality of written English: Acceptable
Statistical review: No, the manuscript does not need to be seen by a statistician.
Declaration of competing interests:
I declare that I have no competing interests. Arden Handler
Reviewer's report

Title: Inadequate prenatal care and its association with adverse pregnancy outcomes: A comparison of indices

Version: 2 Date: 19 September 2007
Reviewer: Nancy Hessol

Reviewer's report:

General

The 4 objectives of this study were: to determine trends in prenatal care utilization in Winnipeg, Canada from 1991-2000; to compare 4 indices of prenatal care utilization in identifying the proportion of the population receiving inadequate prenatal care; to determine the association between inadequate prenatal care and adverse pregnancy outcomes using each of the 4 indices; and to determine the presence of gestational age bias among the 4 indices. Using population-based data on women and hospital-based singleton live births from 1991-2000, the authors calculated rates of inadequate prenatal care using the 4 indices, examined agreement between the indices, and used logistic regression to determine the association between inadequate prenatal care and adverse pregnancy outcomes. Then also determined whether the association between inadequate prenatal care and LBW or SGA differed by gestational age. The main conclusions were that the association between inadequate prenatal care and preterm birth and LBW varied depending on the index used for the analyses, with AORs ranging from 1.0 to 2.1. Variation was not seen when SGA was the pregnancy outcome, AOR 1.4. All indices demonstrated heterogeneity across gestational age strata. The authors conclude that the 4 indices cannot be used interchangeably and that they suffer from gestational age bias.

General comments: This is a well-written paper that is a contemporary spin-off of an earlier publication by Alexander and Kotelchuck comparing indices of the adequacy of prenatal care. Little research has been published using Canadian data for assessing prenatal care utilization and adverse prenatal outcomes, so this paper does a good job of filling that void. The main findings from this paper are not unique, others have published papers on similar topics, but the use of the Canadian data is novel. The paper would be greatly improved by paring down the aims and analyses and focusing on the most interesting aspects of the study and by supplying the reader with more details on some of the key parts of the methods. Specific suggestions are noted below.

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

1. Page 5, first objective: what is the rationale for the trend analysis? Was there some significant public policy change that warrants this investigation? I think this specific aim is superfluous to the main focus of the paper and should be removed.

Because little research has been published using Canadian data to assess prenatal care utilization, we think it is important to present the data for each of the ten years and to conduct a trend
analysis to determine if there have been any changes in utilization over time. We therefore retained Table 1, but removed the former Figure 1 (comparing trends in rates over time).

2. Page 7, section 1: The Kessner index is old and hardly used anymore. I recommend eliminating this index from the comparative analyses.

We eliminated the Kessner and GINDEX indices from the analyses, and now only compare the two indices in current use (R-GINDEX and APNCU).

3. Pages 7-9, methods section: For indices 3 and 4, you need to detail how women with missing data on PNV visit are categorized. In addition, the authors need to specify if they excluded or how they categorized women with missing indices in their analyses.

Because of the two-stage method we used to determine prenatal care utilization, we were not able to distinguish whether a lack of information meant missing data or no prenatal care, and therefore all cases with no visits determined using either method were categorized as having no care. A statement has been added to the limitations to this effect.

4. Page 9, second paragraph: the analysis of agreement between the various indices adds little to the paper and should be removed from both the methods and results.

The section on analysis of agreement between the various indices has been removed from the methods and the results, and we have deleted the former Table 2.

5. Page 9, third paragraph, sentence on logistic regression: Your outcome is inadequate PNC but what is your reference group? On page 10 in the results section you say that you combined the inadequate care group with the no care group. Did you also combine the intensive, adequate, and intermediate groups together as a reference group? Either way, please specify. If you collapsed the intensive and intermediate group with the adequate group as the referent, this may be problematic as you are likely to dilute the unique characteristics of each of these indices. I would strongly recommend you only use the adequate group as the referent.

The reference group for the logistic regression consists of women with all other categories of prenatal care utilization (i.e., we combined the intermediate, adequate and intensive groups as the reference group.) A statement has been added to the paper to clarify this, and a footnote added to the table. Our statistician advised against using only those women with adequate care as the reference group, because the indices categorize women with adequate care differently. This would result in unequal sample sizes in the reference group between the two indices and we would not be comparing the same women. Our goal was to determine if inadequate/no prenatal care utilization results in poorer outcomes compared to the remainder of the population.

6. Results section: in the United States, race and ethnicity are strongly
associated with pregnancy outcomes and utilization of prenatal care. There is no
mention of race or ethnicity of this study population nor is any adjustment made
for this factor in the analysis. Please explain why.

Unfortunately, race and ethnicity are not recorded in the Manitoba Health administrative
databases, so we could not adjust for these characteristics in the analyses. This has been noted as
a limitation of the study.

Minor Essential Revisions (such as missing labels on figures, or the wrong use of
a term, which the author can be trusted to correct)
1. The pages are not numbered. I numbered my copy of the document starting
with page 1 as the title page. My comments are base on this numbering scheme.

The pages are now numbered. My apologies for this oversight.

2. Page 3, Abstract, last sentence: the term “gestational age bias” is too vague
and should be defined.

We added a statement at the end of the Results section of the abstract to clarify what we mean by
gestational age bias.

3. Page 6, second sentence: what was the population during the ten years of the

We have provided the population for Winnipeg in 1996 instead of 2001 (census data are only
available every 5 years, so 1996 data fall within the time frame of the study).

4. Page 14, second paragraph, first sentence: Avoid absolutes and replace the
word “all” with “most”.

We replaced the word “all” with “most” as suggested.

5. Figure 1: as mentioned under major comments, this trend analysis adds little
to the paper and should be removed.

Figure 1 has been removed.

6. Table 1: please add the total sample size for each year. Also, please show the
percent with missing indices.

In Table 1, we added the total sample size for each year.

7. Table 2: as mentioned under major comments, the analysis of agreement
between the various indices adds little to the paper and should also be removed.
The former Table 2 has been removed.

8. Table 5a-c: Please specify the reference groups for all the covariates (the PNC indices, maternal age, and parity). Were maternal age and parity kept as continuous or categorical covariates? If categorical, what was the reference group?

Description of the categories and the reference group for all the covariates have been added as a footnote to the applicable tables.

9. References: Several of the reference should be proofread. The last lines of references 1-3 have errors (Ref Type, Author). Also reference 4, JAMA should be all capital letters.

As requested by BMC, the paper is prepared using Reference Manager. I selected the bibliographic style entitled “Biomed Central” and cannot control how the references or formatted or how journal titles such as JAMA get presented unless I remove the field codes. If the editor has additional suggestions for formatting the reference list more effectively using Reference Manager, I would be happy to make those changes.

10. My version of the document had a duplicate figure 1.

Discretionary Revisions (which the author can choose to ignore)

What next?: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:
I declare that I have no competing interests.