Reviewer's report

Title: Poverty and health trajectories in early childhood: Exploring the influence of timing and duration of poverty on child health outcomes

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Reviewer: Rosalind Jo Wright

Reviewer's report:

The authors take advantage of a longitudinal study of early child health outcomes in Canada to examine the relationship between earlier life, cumulative, and concurrent poverty on a number of health outcomes. They examine the relationship between poverty trajectories in early childhood in the Quebec Longitudinal Study of Child Development. This has scarcely been considered in relation to early childhood health and thus would inform an existing research gap. The study is well described, consists of a reasonably large sample followed from in utero to about 4 years of age with annual interviews or self-completed surveys of the primary caregivers (mainly mothers). Follow-up at each time point exceeded (90%). Neonatal health data was extracted from medical records. Height was measured in the last two visits.

Outcomes included caregiver report of: (1) the child’s perceived health, (2) number or asthma attacks in the preceding interval, (3) number of acute infections (i.e., a composite of respiratory, otitis media, GI infections) in the past 3 months assessed at each annual follow-up, and (4) cumulative health problems as a composite of 2 or 3 of acute infections, asthma attacks, and growth delays. The latter was based on height determined through caregiver report on visits 1 and 2, and measured on visits 3 and 4.

The main problem with this manuscript is that it tries to do too much. Given the numbers of outcomes examined and the different intervals in which these were assessed during follow-up, it is at times difficult to follow the methods, analysis and results as the paper is currently written. The organization of the manuscript could be improved to enhance clarity. There are also major issues related to the derivation of the outcomes being studied that raise concern in interpreting the results. These are detailed below.

Major compulsory revisions

Introduction:

1. Rather than simply defining how the different temporal features of poverty were conceptualized in the last sentence of the background, the authors should clearly state the a prior hypotheses relative to these trajectories.

2. In the final paragraph of the introduction, try not to use jargon terms such as ‘inspired’. Consider something like, ‘Framed within this life-course perspective,’.
Methods:

3. The authors do not provide justification for the outcomes that were chosen. How reasonable is it to use caregiver report of asthma attacks prior to age 3 years when most of asthma is not diagnosed prior to this age? Is there prior literature to base this choice on, if so please provide the citations in the methods to justify the approach. How precisely was an asthma attack described by a parent – i.e., did the question ask, has your child wheezed, had a wheezing respiratory illness, or what specifically. This needs to be clearly stated.

Many asthma attacks, particularly in the first 2 years of life are related to acute infections (both upper and lower respiratory infections may be related). How correlated were the asthma attacks with acute respiratory infections? It may not be reasonable to try to separate these out in early childhood based on parent reports only.

This is even more problematic for the cumulative health problems outcome given that asthma attacks and acute infections are both included in the operationalization of this indicator. The authors need to address these issues in defining their outcomes.

What is the justification for combing the three types of infections?

4. Control variables also need to be more clearly defined. How was prematurity determined (e.g., less than 32 weeks), how was smoking in the home determined (e.g., if caregiver and/or other adult in household was reported as being a smoker), how was length of breastfeeding defined, etc. Why are some covariates shown in the descriptive tables, 1 and 2, but others are not included?

5. How do the authors justify using caregiver reported height in 2 of 4 follow-up visits and then measured height in the remaining visits to characterize growth delay? Was there any internal validation done whereby they obtained both parent report data and measured data?

6. Page 9, paragraph describing LIC0, it is not clear in the last sentence in this paragraph what measurement error they are accounting for.

7. The authors should justify the use of the LICO in the methods rather than in the discussion as they now do on page 21.

8. Even after reading the methods and analysis sections several times, it was not clear to me what the difference is between the indicator for ‘household income sufficiency’ and ‘predicted household income’ listed in Table 1. The authors should clearly define these in the text and also indicate (summarize) how these are differentially derived in the footnote to the tables. This will make it easier for the reader to follow what is being done in the analysis.

9. Given the structure of the data (repeated measures) and the number of outcomes that require different statistical approaches (Poisson vs. logistic regression), latent class analysis, etc. the paper is far to complicated to follow.
Could the authors consider simplifying by reducing the number of outcomes being examined (which may be justified given the issue raised about correlation between the outcomes being used here)?

Results:
10. Most of the findings that are significant seem related to the asthma and perceived health outcomes. Might the paper focus only on these given the prior point raised? Of course the problems with looking at asthma attacks over this age range as addressed above will also need to be dealt with by the authors. Also, consider showing only the latent class analyses for these outcomes.

Discussion:
11. The authors argument for adequate validity of the maternal reporting of child’s perceived health is not clear. It seems they are offering in support of this the correlation with parent-reported poor physical health outcomes. Is it not the case that one should be concerned about the parent differentially reporting physical symptoms just as they may perceived health relative to SES?

Minor compulsory revisions
Abstract:
1. First sentence of conclusion needs to start with a capitalized word.

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

Quality of written English: Needs some language corrections before being published

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

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