Reviewer's report

Title: Are there differences in mean birth weight between neighbourhoods in a Nordic welfare state: a 10 year cohort study

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Reviewer: Juan Merlo

Reviewer's report:

This is a very worthy and interesting study that investigating the role of neighbourhood socioeconomic characteristics (ethnic segregation and economic deprivation) on birth weight within three large cities from equalitarian country. The hypothesis of the authors is that the known association between neighbourhood socioeconomic disadvantage and low birth weight is minor in Sweden since this country has national system of equalizing resources.

The idea that the effects neighbourhood characteristics on individual health are modified by the macro context where the neighbourhood are placed is intuitive and has been discussed previously regarding income inequality (1) and social capital (2). The authors should elaborate and clarify their main hypothesis further stressing that the apparent discrepancies in neighbourhood effects in studies from different countries (and the negative findings obtained in the present investigation) could be understood by the national level of egalitarianism.

As it is now, the introduction part of the manuscript is a bit staccato and need be improved.

Method section

The description of the record linkage used for constructing the database is unclear and needs be improved. The start of this section gives the impression that the Swedish National Birth Register was only used to obtain smoking information of the mother. Please, be systematic when describing the registers and inform on all the variables obtained for each register.

The authors must provide a better description of the Birth Register and the reason for using other databases like the LOUISE for obtaining socioeconomic information of the mothers since socioeconomic information is actually present at the Birth Register. The authors should explain the reasons for using the Multi-generation register. What kind of information was retrieved from this register? Do you need the Multi-generation register for identifying the mothers? It is nor enough with the Birth Register? Also the information of the source of the neighbourhood variables is scarce and even if the authors provide references, this information should be explicit in the paper. Moreover, the authors should revise and improve the bibliographical references 15 to 20.

Please, provide information on how the neighbourhood was defined. What are the criteria for defining the boundaries? Was the same definition used in all the three cities? Ideally you should provide a map for each of the three cities.

I really question the use of a dichotomous variable for the mother’s ethnical variable (i.e., Swedish vs. born elsewhere). What is the rational behind this classification? A more extended explanation of this idea can be found in a previous publication (3) I should use a more extended classification of countries of birth based, for example, on the World Bank Classification of Country Economies.(4)

Could you indicate the number of missing values for the smoking variable?

How is gestational age defined across the years?

How is parity defined? Why is this variable included?

Could you describe the variable maternal length? Why is this variable included?

The construction of the “Economic status” neighbourhood variable is rather unusual. The ratio between the proportions of low and high income is highly correlated with either low or high income proportions, so the authors should explain the meaning and theoretical advantages of ratio…
In any case the criterion for categorisation of the neighbourhood economic status is not given. Have you use deciles? The denomination of the categories as level of resourcefulness is also arbitrary and should be supported by a theoretical reasoning. Also, what kind of income do you use The Relative ethnic composition based on “visible” minorities should be better explained... what do you men with “visible”? Could you indicate the country of birth that compounds the categories? How is “integration” related to “visibility”?

Analytical approach

Why do you discuss the neighbourhood variables in the model 1? (raws 4 and 5 under “Analytic approach”) This model has only a random effect for the neighbourhood level but not neighbourhood characteristics.... This paragraph is confusing.

You stay that in the analysis the neighbourhood variables included one observation on ethnic and economic status of the neighbourhood for each year ... This mean that the reference category is year-specific... Could you develop this approach? Have you consider adjusting for calendar year and an average measure of neighbourhood characteristics?

In my opinion the formulae provided by the authors for the multilevel modelling are not strictly necessary for most of the readers. Rather the focus would be on the substantive contain of the models and the reasoning behind.

The expression “the neighbourhood variation was calculated as the reduction in neighbourhood level variance” is inappropriate... The authors describe the “Proportional change in variance (PCV)” not the calculation of the neighbourhood variation

The statement on model 2 that argues for considering neighbourhood variables before individual variables in the model should be discussed… many individual level variable are compositional factors rather that mediator factors of neighbourhood effects. It depends of the theoretical framework discussed.

Have you “explored” random slopes? It is possible the individual level association is modified by the neighbourhood environment; a fact that is hidden is you only investigate intercept variance.

Finally, are the results similar when using MCMC rather than IGLS estimation method?

Results

At the beginning of the results you inform on Table 1 and them you stay that the neighbourhood variables (i.e., ethnicity and income) are highly correlated. This correlation is not present in Table 1 even if the text does suggest that. I would rewrite this paragraph.

The high correlation between the neighbourhood variables indicates that they provide similar information and may create problems of multicolinearity. What is the opinion of the authors on this respect?

Assuming your approach (neighbourhood variables before individual variables in the modelling) I do not agree with your conclusions. What you should conclude is that the effect of Neighbourhood economic status - adjusted by neighbourhood ethnicity - (model 2) is mediated by individual gestational length (model 3).... You should not conclude that neighbourhood deprivation does not affect birth weight… I think you need to argument on what individual characteristics are pure compositional like mother’s age, and what variables are mediators like smoking .... The problem is that some variables are both compositional confounders and mediator of contextual effects. The mathematical model does not inform you on this aspect.

I do not agree with your reasoning on individual and neighbourhood level ethnicity in the second paragraph from the bottom of the discussion part... Why crude measured ethnicity leads to neighbourhood ethnicity acting as a proxy of individual ethnicity (?)

You should consider the recent commentary of Oakes (5) on multilevel analysis and a coming response in the International Journal of Epidemiology by this referee (still in press). Check the categories of neighbourhood variables and be sure that extrapolation and “contextual confounding” (as defined by Oakes) is not present in your study.

Finally a quick search in Medline shows a number of previous publications on birth weight and contextual
In collusion this investigation is based on a worthy database and studies a relevant question applying multilevel analysis for analysing both neighbourhood variance and the association between neighbourhood characteristics and birth weight. However, at this stage the analysis needs a deeper elaboration.


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

Level of interest: An article of importance in its field

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

Statistical review: No

Declaration of competing interests:

'I declare that I have no competing interests'