Reviewer's report

Title: Medical, Developmental, and Academic Correlates of Birth Weight

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Reviewer: Andrea F de Winter

Reviewer's report:

This article examines how birth weight affects medical diagnosis, the timing of developmental milestones achievement and performance in the school environment. This is an important topic. However, my conclusion is that the contribution of this article cannot be assessed. My concerns are described below.

1. Introduction and abstract

The introduction describes the problem of obesity and its consequences. The link between birth weight and obesity should be more supported by evidence in the literature.

2. Study participation

Information on study participation is missing which is important for the assessment of the quality of the study and the generalizability of the results.

2.1. Information on the recruitment procedures is missing. How were the eligible individuals invited? Were all consecutive eligible individuals with sensory processing problems starting treatment invited to participate?

2.2. The response rate of the larger study is not described. Is the participation of eligible individuals adequate or is selection bias present?

2.3. Inclusion and exclusion criteria for this and the larger study are not described. This may have a big impact on the generalizability of the results.

2.4. Sampling in a clinical setting might introduce bias or this might have impact on the generalizability if the research findings. For example, a large number of boys (73%) are participating in this study. What are the explanations for the low number of girls in your sample?

3. Birth weight as main dependent variable

Assessment of the main dependent variable: body mass index using birth weight. Is the dependent variable adequately valid and reliable to limit misclassification bias? My answer would be “unsure” or “no”.

Participants were children between 4-12 years. Significant variability in height and weight gain especially in specific groups such as preterm born children may be present. Excessive growth in early childhood may predict overweight and obesity better than birth weight. Furthermore, birth weight is related to gestational age. Full terms are more likely to be classified as “high birth weight”, whereas
late preterms are more likely to be classified as normal or low birth weight although late preterms might have a high weight in relation to their gestational age.

In my opinion the correlation between both variables is not very high (.38). Furthermore, this gives no insight in the reliability of the classification which is used in this article (low, normal and high birth weight). A measure of reliability (e.g., kappa) is more adequate. Relevant for this study might be the meta-analysis of Zhao et al. (Eur J Pediatr, 2012) showing that high birth weight (#4,000 g), but not low birth weight (<2,500 g) was associated with an increased risk of overweight in adults.

Furthermore, it is unclear if missing data might have an important effect on the assessment of the relationship between birth weight and body mass index. Parents with obese children are more reluctant to report their weight and length?

Based on these concerns I think that the construct “birth weight” should be the central focus of this article and not obesity/overweight. In my opinion birth weight should be the independent variable.

4. Assessment of milestones and other factors

Research shows (Jaspers et al, 2010; assessing the validity of parental recall) that parental recall of birth weight and gestational age is valid (no systematic error) but not very precise. However, Jaspers et al. showed that the recall of early child behavior was poor (kappa values of 0.03 to 0.10). The retrospective data collection in this study might have introduced information bias and this should be discussed as an important limitation of this study.

4. Age at time of evaluation

It is not clear what the assumptions of the authors were when they decided to examine ‘age at time of evaluation’ as a co-variable in all analyses.

5. Results

The relationship between the results and the tables could be strengthened. For example, in the results frequencies are mentioned but those cannot be found in the tables. Furthermore, more concise writing would improve the result section.

6. Presentation of data

The p-values of all tests should be included in the tables to provide a clear overview of all results.

In Table 2 data are presented on medical diagnoses, treatment, skills etc for the total group. It would be more informative if data are presented for the total group and low, normal and high weight group. Furthermore, to improve the connection with the other tables it might be relevant to present the frequency of medical diagnoses (yes/no), other evaluations etc.

In Table 3-5 the number of children varies. In the method section the authors stated that 602 children participated in the study. However, the number of
children with medical diagnoses (yes/no) is only 157. Are there a large number of missing values in this dataset? And what is the influence of those missing data?

7. Discussion

In the discussion the concept “birth weight/ overweight obesity” is related to other research findings but it might be confusing because the concept is used as independent and dependent variable in the discussion. Furthermore, the limitations of the study are not presented in the discussion.

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

**Quality of written English:** Not suitable for publication unless extensively edited

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

I declare that I have no competing interests