Reviewer's report:

**Title:** Ethnic differences in overweight at the age of two: the role of prenatal factors, birth outcome and postnatal factors

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**Reviewer:** Grete Helen Bratberg

Ethnic differences in overweight at the age of two: the role of prenatal factors, birth outcome and postnatal factors

This study showed that children of Turkish or Moroccan origins were 2-3 times more likely to become overweight at age two years compared to native Dutch children. It also showed that both prenatal and postnatal factors may explain ethnic differences, suggesting that mothers’ pre-pregnancy BMI and 6 months postnatal weight gain constitute the most explanatory factors.

Strengths of this study are the prospective study design, the large study cohort and the possibility to take both prenatal and postnatal information into account. The paper was easy to read, findings were interesting and the tables informative, but there are some major and minor concerns to be noted.

**Major Compulsory revisions**

The title of this paper may mislead the reader to think that the findings could be generalized to ethnic differences in general. All children included in this study were born in Amsterdam, with its own urban characteristics and with its own ethnic minorities/cultures. The title should therefore make it clear that this study is derived from the ABCD study.

It was concluded that the ethnic differences largely were attributed to their mothers BMI before pregnancy and 6 months weight gain, but how much these factors exactly contributed remains inconclusive. In the discussion part the statements were more discreet (p 11, paragraph 2) “...and the results suggest at least a role for the maternal prepregnancy BMI and infant weight gain in the first 6 months to explain the ethnic differences...”. There is some discrepancy between these statements that should be clarified.

The authors’ state in the abstract (and elsewhere) that little is known about ethnic differences and explanatory factors related to overweight in infancy. According to PubMed there is a large body of literature, also from the Netherlands with focus on ethnic differences especially between Dutch, Turkish and Moroccan children. Of some reason, only a few of them have been mentioned. E.g. a recent study of de Wilde et al. (2009) showed that the prevalence of overweight among Dutch girls 3-16 years had decreased between 1999 and 2007 while Turkish children
had become more obese during the same period. Since the outcome data in this study was obtained during 2005-2006, these changes in prevalence trends should be of relevance for the findings of this study.

The follow-up study of Mesman et al. (2009) based on the same study cohort (ABCD), showed that ethnic differences in BMI were present when these children were 14 months and that weight and BMI levels largely were explained by mothers pre-pregnancy BMI. Although the study of Mesman et al. was cited in the discussion part (p 12, paragraph 2), a more detailed account of this previous study could have been given in the introduction. On basis of the body of knowledge within this research area, the authors could make it more ready what this study adds.

Measuring weight gain

Despite of many disparities between the ethnic groups, the weight gain the first 6 months appeared to be the predictor that remained most important. Since Turkish and Moroccan children on average were born smaller than Dutch children, the phenomenon of “catch up growth” may have been more present. Previous studies have shown that the tempo of weight gain seem to be of more importance than the actual increase in weight, but this distinction is to my knowledge not made or discussed in this article. The authors could make it more clear for the reader whether “weight gain during the first 6 months (per 100 gram) (p.7 paragraph 2) refers to absolute or relative weight gain.

Biological interactions and analytic approach

Ethnicity was the main exposure (predictor) and overweight was the main (and only) outcome variable. A range of other potential predictors were included, but it is not clear whether these predictors could act as confounders, mediators or also effect modifiers in multivariate models. In the above mentioned study of Mesman et al. (2009), it was suggested that at least one third of the effect between pre-pregnancy BMI and infant BMI was due to intrauterine influences reflected through birth weight, but such premises have not been taken into account.

It has also been suggested that there may be an additive interaction between maternal pre-pregnancy BMI (overweight) and breast-feeding on the risk of overweight among children 2 to 14 years of age. Li C, et al (2005) found that children of mothers who were obese and who were never breast-fed had the greatest risk of becoming overweight. If, e.g. this combination was more common among Turkish and Moroccan mothers, the conclusions of this study could be far more complex. Perhaps the authors could stratify the study cohort and conduct analyses within the different ethnic groups to explore the impact of each of the explanatory factors.

Dutch mothers as reference group were on average taller with lower BMI (before pregnancy) and with higher education than mothers in other ethnic groups. At least theoretically, one could suggest that a statistical interaction between maternal education and ethnicity may explain some of the observed differences in overweight at age 2 years. Tests of interaction terms between ethnicity and
some of the potential determinants (i.e. maternal BMI, gender and weight gain) were performed (p.11 first paragraph), but it is not clear for the reader why these variables in particular and not others, were tested.

Since many of the included predictors may be related, e.g. mothers height and BMI, actions to avoid collinearity in multivariate models should have been described.

Minor Essential Revisions

The reference list is only partly carried out according to the reference style used in BMC Public Health.

This is a prospective study including 3156 infants followed from before birth until 2 years of age. Information was collected from different data sources and different time periods dealing with both cases (infants) and their maternal origins, i.e. before pregnancy (mothers’ recall), different medical records (pregnancy, delivery and child health care) combined with self report questionnaires. A flow-chart may have made it easier for the reader to get a better overview and thus improving this paper.

It is not enough clarified why this study is based on data from only about the half (N=3432) of the 7050 women included in the ABCD study (p. 6, first paragraph). In the result section mothers of included cases were compared with those excluded but criterions are not outlined in the method section.

Weight and length data at age 2 years, were collected (phase 2) from the Youth Health Care (p 6). I assume this refers to the public child health centers in Amsterdam? Preferably this could be better explained for the reader. Moreover, the standard procedures (last paragraph p. 6) used at the YHC centers could be described in more detail. It is not clear from the paper whether postnatal information i.e. duration of breast feeding and weight gain during first 6 months were obtain from the YHC centers or elsewhere.

In this study the authors state (p.7 last paragraph) that analyses have followed a rational hierarchical format with no reference. Despite that the authors thoroughly explained the analytic steps that were followed and that tables were very informative, it is not quite clear what this particular approach aim at.

There are some slips of the pen (especially inconsistent wordings) throughout the article and in the method section in particular. These could easily be adjusted and thus improve the article.

In the discussion part the authors ask whether mothers recalls of their weight before pregnancy could be biased (self-reports of BMI), but suggest this problem to be similar for all groups of women. According to literature however, ideal body sizes, are relative and not necessarily similar for the included ethnic groups.

Due to the limitations discussed (p 13, paragraph 2), the other ethnic groups included in this study, i.e. “African descents” and “others” should perhaps have
been excluded from this study cohort.

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