Author's response to reviews

Title: Differential prevalence and associations of Overweight and Obesity by gender and population group among School Learners in South Africa

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Author’s response to reviews:

Reviewer 1: Saad Siddiqui

Dr Siddiqui has not raised any critic points.

Reviewer 2: David Meyre

Point 1: Dr Meyre argued that the importance of the study was limited and comments that numerous reports have been published which provide similar conclusions. We are not of the same opinion, as already presented in the background section of our manuscript, that childhood obesity in Sub-Saharan Africa is one of the biggest epidemics of our time. We believe that there can’t be enough scientific evidence on this, especially while rates still are expected to rise. In our opinion it is rather good that our conclusions match those of previous reports, since it shows the actual situation. In fact, our study adds to compelling evidence on this health issue and promotes informed public health decision-making, not only in the Western Cape but also in other Sub-Saharan African regions.

Point 2: Dr Meyre raised concern on the classifications of the ethnic groups and that we did not base them on genetic data. He suggests excluding mixed or unclear ethnicities from the analyses. Our classification is based on the officially recognised ethnic grouping in South Africa and is common to use in research. As mentioned in our article, the Coloured group is one of the five ethnic groups in South Africa. We explain in the study population section who the Coloured group comprises (Methods section, lines 10-12, page 4). We have to acknowledge that the
classification of ethnic groups based on genetic data is more reliable. Therefore, we have added this information in the Limitation section (Discussion section, lines 26-27, page 9). In our opinion basing the ethnic classification only on self-reported data is not optimal and we will consider this remark in our future study designs. However, the established means of determining race and ethnicity, as commonly used for census and health questionnaires, is self-identification. There is still no consensus on the discussion on what the gold standard is and some researcher still consider the definition of race by self-identification [SIRE] as the gold standard in research.

Point 3: Dr Meyre comments on the measures of physical inactivity, smoking and drinking behaviours and critics that they are not precise and have not been validated. As explained in our Methods, physical inactivity was assessed using an adaptation of the validated questionnaire designed by Arvidsson and colleagues that was modified for local conditions (Methods section, lines 32-33, page 4). We also explained in this section that learners were asked generally if they smoked and if they consumed alcohol. We decided to rephrase the sentence for clarification purposes (Methods section, line 9, page 5). Furthermore, we discussed the use of self-reported data on behavioural risk factors in the Limitations section of our paper (Discussion section, lines 21-26, page 9).

Point 4: Dr Meyre questions why we used percentile cut-offs for hypertension and overweight/obesity, while cut-offs for dyslipidaemia are not based on age and sex-adjusted percentiles. As explained in our Methods, for the assessment of childhood obesity we used age-gender-specific cut-off points from international references provided by the International Task Force as developed by Cole and colleagues which is standard procedure for the assessment of childhood obesity. The dyslipidaemia assessment was based on cut-offs provided by South African Clinical Guidelines because it is standard procedure to use for this study population. We accidently provided the wrong reference before and corrected this now (Methods section, line 31, page 5).

Point 5: Dr Meyre raised concern that we didn’t use a Bonferroni correction for multiple test and argues that many of our associations claims were therefore false positive/ random. In general, there is no formal consensus for when Bonferroni procedures should be used. We felt it important to explore the heavily inter-dependent variables in our study and not to miss a possible effect. Furthermore, the study was restricted to a small number of planned comparisons of carefully selected relevant variables. In this case a Bonferroni correction isn’t advisable. We believe that by not employing Bonferroni corrections our paper is scientifically more informative.

Point 6: Dr Meyre comments that we describe the significant sex*ethnicity interactions but do not describe the differences observed in each ethnic group. We actually do describe these differences in our Results (Results section, lines 17-26, page 6).

Point 7: Dr Meyre suggests reporting the associations of BMI with continuous cardio-metabolic traits in addition to binary cardio-metabolic traits. We added these findings to our Results (Results section, lines 27-29, page 7).
Point 8: Dr Meyre also comments that reporting unadjusted and adjusted statistical tests was redundant and increased the multiple testing burden for no reason. He suggests only reporting association tests adjusted for covariates. We would argue that in regression analyses, univariable analyses are usually a necessary initial step for the selection of variables to be included in multivariable analyses, particularly in exploratory (hypothesis generating) analyses like those conducted in our study.

Point 9: Dr Meyre suggests to change the wording of 'affluent'... 'poorer' countries into ‘high-, middle- and low-income countries’. For reasons of consistency we decided to stick with our wording. We refer to developing and developed regions in that paragraph and would not like to add another term for these regions.

Point 10: Dr Meyre suggests to correct the percentage of our study population. We made amendments in the Methods section to this end (Methods section, lines 13-16, page 4).

Reviewer 3: Ju-Sheng Zheng

Major comments:

Point 1: Dr Zheng comments that the definition of socio-economic status(SES) is problematic and raised concern that we didn't use other more reliable indicators, such as educational level of the parents. After some deliberation, we agree that basing SES only on the learners’ toilet system and type of housing is insufficient and therefore decided to remove this variable from the whole study. We made changes accordingly both in the text and in the analyses.

Point 2: Dr Zheng also comments that the use of time watching TV per week for the assessment of sedentary behaviour is not persuasive and asks if we have measured the average time of the TV watching. We have not measured it and discuss this issue in the Limitation section of our paper (Discussion section, lines 23-25, page 9). We plan future research to investigate associations between sedentary behaviour and overweight/obesity in children using the average time of the TV watching.

Point 3: Dr Zheng comments that the definition of dyslipidaemia is problematic and suggests the definitions of the American Association of Clinical Endocrinologists' Guideline. However, we based the dyslipidaemia assessment on cut-offs provided by South African Clinical Guidelines because it is standard procedure to use for this study population. We accidently provided the wrong reference before and corrected this now (Methods section, line 31, page 5).

Point 4: Dr Zheng comments that the statistical section is rather unclear and further comments that the statistical method to do the interaction was not mentioned. As explained in our Methods for group comparisons for categorical variables we used chi square tests and for continuous variables, the Student’s t-test and analysis of the variance (ANOVA) (Methods section, line 35, page 5- lines 1-2, page 6). These group comparisons include the assessments of "interactions" between gender and ethnicity. Dr Zheng also comments that the statistical method to examine the association between overweight/obesity and cardiometabolic risk factors is not mentioned. We
have added this information in our Methods section (Methods section, lines 4-6, page 6). Dr Zheng suggests that we clearly state the statistical methods used in our study. We believe that we describe them detailed in our Methods section (Methods section, lines 32-35, page 5- lines 1-7, page 6).

Minor comments:

Point 1: Dr Zheng suggests adding some explanation for the " coloured learners" in the abstract. We have added “mixed-ancestry” to avoid confusion for readers not familiar with the population in South Africa (Abstract, line 15, page 2).

Point 2: Dr Zheng raised concern that the learners won’t know what vitamin A-rich fruit & vegetables are and asks how we defined it. In the questionnaire, each food group was explained with examples of local foods, for instance for the vitamin A-rich fruit & vegetables food group among others mango, butternut, carrot, and beetroot leaves were listed as examples.

Point 3: Dr Zheng suggests revising one specific sentence in our Methods for clarification purposes. We have rephrased the sentence (Methods section, line 35, page 5- lines 1-2, page 6).

Point 4: Dr Zheng raised concern we did not explain the blood pressure measurement and why the lowest of three readings was used. As explained in our Methods, we followed the WHO guidelines (Methods section, line 31, page 12). These guidelines state recording individual blood pressure measurements with the lowest reading in any position (including standing) to be considered as the “blood pressure taken at that visit”.

Point 5: Dr Zheng comments that we should not use “increase” as this is the cross-sectional analysis, one can only use "associated". In our Results we only use “increase” in the following sentence: “(…) physically inactive (1.32; 1.01-1.72) significantly increased the likelihood of being overweight/obesity.” We believe that we expressed this finding accurately.

Point 6: Dr Zheng suggests changing the wording in one sentence in our Results ("overweight/obese learners were more likely to have..." to "…associated with …"). We have incorporated the suggestion (Results section, lines 20-22, page 7).

Point 7: Dr Zheng also suggests changing the wording in one sentence in our Discussions for clarification purposes. We have rephrased the sentence accordingly (Discussion section, lines 26-27, page 8).

Point 8: Lastly, Dr Zheng suggests changing the wording in one sentence in our Discussion ("subjected to recall bias" change to "subject to recall bias and measurement error.") We have incorporated the suggestion (Discussion section, line 23, page 9).