Author's response to reviews

Title: Accuracy of self-reported body weight, height and waist circumference in a Dutch overweight working population

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RESPONSE TO REVIEWERS

Title of manuscript: “Accuracy of self-reported body weight, height and waist circumference in a Dutch overweight working population” by J.C. Dekkers et al.

Reviewer 1

Rino Bellocco

We thank the reviewer for the useful comments on our manuscript.

Minor essential comments

The reviewer states that a multivariate simple regression analysis to analyse the simultaneous effect of the factors we are interested in would add value to the paper. We agree with the reviewer and have added a multivariate regression analysis to analyse the simultaneous effect of sex, age, SES, measured weight, height, BMI and WC on the bias of self-reported anthropometrics. Moreover, we entered the health-related factors smoking status, frequency of weighing, medication use and number of attempts to lose weight in the regression models.

We also ran univariate regression analyses to evaluate what of the abovementioned factors were associated with the bias of self-reporting anthropometrics. The regression analyses are now mentioned in the ‘Statistics’ section (p.9, lines 1-8) and the results of the regression analyses are reported in the Results section (p.12, lines 19-29; p13, lines 3-21).

The reviewer asks to explain why WC was only measured for a random sub-sample. For budgetary reasons we were not able to do the additional biological measures for all subjects. Therefore, we only did these additional measurements in a random sub-sample. We now do report this in the Methods section (p5, lines 8-9).

The reviewer states that we should highlight the difference between statistical and clinical effects in the Discussion and Conclusions (particularly in the abstract). We now do so in the Abstract, the Discussion and Conclusions.

Abstract

1. The reviewer mentions that the conclusions do not directly follow from the results. We agree with the reviewer and have adjusted it.

The reviewer also says that we need to clarify the difference between statistical and clinical/epidemiological effects. We now do so (p2, lines 27-28).

2. “WC is reported without being properly referred to”. We now do properly refer to WC throughout the manuscript.

3. We do not understand the remark of the reviewer that ‘p’s should be properly named (pvalue)’. Does the reviewer means that ‘p’ should be replaced by ‘pvalue’? The reviewer also says that 0.000 must be avoided by, for instance, reporting p<0.05. In line with the suggestion made by the reviewer, we have changed p=0.000 into p<0.001 throughout the manuscript and where appropriate we reported the p-value with two decimals.
**Paper**

**Statistics**
The reviewer mentions again that he would have appreciated a multivariate analysis. As said above, we have done multivariate analyses and have added the results to the paper in the Results section.

**Results**
1. The reviewer asks to please change pvalues=0.000 to pvalues<0.05. See our answer under the subheading ‘Abstract’, point 3.

2. The reviewer asks to explain two sentences in the Results section as it is not clear how the two are related. We agree with the reviewer that these sentences may need some explanation. We have now clarified the sentences in the Results section (p10, lines 21-23).

3. The reviewer wonders whether in every category of sex, age, BMI there was a homogeneous effect. If so, we needed to simplify this. Indeed, our results showed a homogeneous effect in every category of sex, age and BMI. We have simplified these findings in the Results section by also reporting the misreporting of the overall prevalence of overweight (overweight and obesity combined). (p11, lines 11-26).

4. Figure. As suggested by the reviewer we made clear that the four figures in Figure 1 refer to four different outcomes by showing them on one page and adding a, b, c and d to the different outcomes. As asked by the reviewer, we changed the label of the Figure.
Reviewer 2
Anne Taylor

We greatly acknowledge the reviewer for her valuable comments on our manuscript.

Minor essential revisions required

1. The reviewer made the remark that we were not consistent in spelling out waist circumference and using the abbreviated form (WC). As asked by the reviewer, we made this consistent throughout the manuscript.

2. We also were not consistent in using social economic status and SES throughout the text. As requested by the reviewer, we now properly refer to social economic status or SES.

3. Edits
   We edited the text according to the remarks made by the reviewer. Some remarks need some more explanation, which is given below:

d. What is VU University? In fact, VU stands for “Vrije Universiteit”. ‘Universiteit’ is the Dutch word for university. As the meaning of ‘VU’ would not be clear for foreigners, we added the word ‘university’ to clarify that ‘VU University medical center’ addresses a university hospital.

f. The reviewer asks if consistency could be employed regarded to the use of decimal points.
   Throughout the text, we now report all results (p-values, b’s, kappa’s, ICC’s) with two decimal points. Only very small p-values we report with 3 decimals (i.e., p<0.001).

4. In the second paragraph of the background the text reads: “knowledge on body weight and height in a population is relevant to … and to identify those individuals who are at increased risk to develop overweight and obesity-related health problems and to die prematurely”.
   The reviewer disagrees that the measures weight and height are good indications to ‘identify individuals’, but that these measures are rather relevant as population assessment tools.
   We agree with the reviewer that it is not possible to assess the individual risk to develop health problems. Therefore, we have changed the wording of the sentence (p3, line 8).

5. It confuses the reviewer that the self-reported WC measurement is included under two sub-headings (study design & anthropometrics) as it does not make clear whether the self-reported WC was done before or after the clinical appointment.
   We agree with the reviewer that this may yield confusion and therefore we have deleted it under the subheading ‘Study Design and Procedures’.

6. The use of ‘additional files’ confuses the reviewer. The use of ‘additional files’ may cause some confusion, however, we used ‘additional files’ in our manuscript as the ‘Instruction for Authors’ prescribes to do so.

6 a & b. The reviewer thinks that the range of ICC numbers could be included in the text and that the additional files 2 and 3 should be included in the paper (even if at the expense of the figures).
   As suggested by the reviewer we included the range of ICC numbers in the text. We agree with the reviewer that the additional files 2 and 3 contain interesting information to
include in the manuscript, however we do not want to include them at the expense of the figures. In our opinion the figure is too informative to leave out. We have now included the additional files 2 and 3 as Tables 4 and 5 to the manuscript. As we also included two new Tables in the manuscript (containing results of the regression analyses), there will be seven Tables in the manuscript.

7. The reviewer asks how many people were actually misclassified for BMI from the self-reported data. Of the 861 overweight subjects, 45 subjects (5.2%) classified themselves as having a healthy weight and 11 subjects (1.3%) misclassified themselves as being obese. Of the 437 obese subjects, 100 subjects (22.9%) classified themselves as being overweight based on self-reported BMI. The other 337 classified themselves correctly as obese. Thus, all together, 146 subjects (11.2%) were misclassified for BMI from the self-reported data.

8. It is correct that BI should be CI. We changed this throughout the manuscript.

9. Discussion

a. The reviewer asks to comment on the limited nature of using education as a proxy for SES. We used education as a proxy of SES in our study for three reasons: 1) Most other studies on the accuracy of self-reported body weight, height and WC used education as proxy for SES, which makes comparison possible. 2) SES can also be conceptualized with other socioeconomic variables, like income. However, we had many missings income, whereas education level was only missing from two subjects. 3) Education is a good indicator of SES and commonly used in other studies.

We address this issue in the Discussion (p15, lines 10-13).

b. The reviewer would like to see some discussion on the definition of self-report given such detailed instructions was given to each respondent. We agree with the reviewer that one may argue whether body weight and waist circumference were self-reported, as subjects were asked to weigh themselves and measure their waist circumference prior to filling out the questionnaire. However, as we did not ask whether subjects weighed themselves and measured their WC prior to filling out the questionnaire, we are not sure whether these measures were self-assessed. We now address this point in the Discussion (p16, lines 19-24).

c. The reviewer suggests to discuss on the overall significant findings given the huge power of the study.

We agree with the reviewer that it is important to discuss our findings given the huge power of the study. Finding a significant difference does not mean that this difference is an important clinical difference. We address this point in the Discussion (p16, lines 25-29).
Reviewer 3
Sarah Connor Gorber

We thank the reviewer for the useful comments on our manuscript.

Referee’s Comments

* The reviewer mentions that it is still important to monitor the bias over time and to examine the bias and its implications in different countries, but that this may be better done in a population based survey that collects data on the entire population rather than limiting it to a clinical trial of overweight and obese respondents.

We agree with the reviewer that it would be better to study the bias of self-reported anthropometrics in an entire population than in a group of overweight and obese persons. However, our study was set up to evaluate the effectiveness of a lifestyle intervention program in overweight workers. Consequently, one of the inclusion criteria to enter the study was to be overweight (BMI ≥ 25 kg/m²). The idea to study the accuracy of self-reported anthropometrics only came up halfway the course of the study. In the Discussion we also address this issue by saying that studying the bias of self-reported anthropometrics in overweight and obese subjects is a limitation of our study and that it should also be studied in subjects with a normal weight (p16, lines 6-9). However, despite the inclusion of only overweight (and obese) subjects in our study, we do believe that the results in our manuscript contribute to a better understanding of the bias of self-reported anthropometrics.

* We now refer to the review article by Gorber et al., 2007 in our manuscript.

Specific Comments

* The reviewer states that we are actually studying self-assessed instead of self-reported waist circumference as participants were mailed measuring tapes and asked to measure their waist.

We agree with the reviewer that one may argue whether waist circumference was self-reported, as subjects were sent a tape measure and instructions for use. However, as we did not ask whether subjects used the tape measure and instructions for use, we are not sure whether WC was self-assessed. We now address this point in the Discussion (p16, lines 19-24).

* The reviewer suggested citing a study by Van der Voort et al. (2000). Although in this study both self-reported height and measured height were obtained, this study does not particularly go into the accuracy of self-reported height. Moreover, self-reported and measured weight neither such measures for waist circumferences were obtained. Therefore, in our opinion our study is the first one on the accuracy of weight, height and waist circumference in a Dutch population and we chose not to refer to this article in the Introduction.

Methods

* The reviewer states that the Methods section needs to be expanded to provide more detail about conditions under which the data were collected. The reviewer lists several points that need to be clarified.

We now report in more detail in the Methods section how the data were collected. Also all points that were made by the reviewer in this respect have been addressed in the Methods section and Discussion (p16, lines 13-18).
* The reviewer asks why SES was limited to education. We used education as a proxy of SES in our study for three reasons:
  1) Most other studies on the accuracy of self-reported body weight, height and WC used education as proxy for SES, which makes comparison possible.
  2) SES can also be conceptualized with other socioeconomic variables, like income. However, we had many missings income, whereas education level was only missing for two subjects.
  3) Education is a good indicator of SES and commonly used in other studies.

We address this issue in the Discussion (p15, lines 10-13).

* It is correct that the low BMI category correspond to overweight and the high BMI category to obese, as the reviewer supposed. We have clarified this issue were appropriate.

* As suggested by the reviewer, we changed ‘gender’ into ‘sex’ throughout the manuscript.

**Results**

* The analyses were limited to the role of BMI, SES, age and sex as these variables were most consistently found to be measured in studies on the accuracy of self-reported measures, and to be associated with the bias. However, we do agree with the reviewer that, if available, other characteristics known to possibly affect the bias should be examined.

Therefore, with the use of regression analyses we studied the association of bias of self-reporting anthropometrics with measured body weight, height and BMI, age and SES, as well as with the health-related factors smoking status, frequency of weighing oneself, use of medication for overweight-related health conditions and number of attempts to lose weight. We now do report these results in the Results section (p.12, lines 19-29: p13, lines 3-21).

* The reviewer states that running a regression analysis to examine the factors that are associated with the bias would strengthen the paper. As mentioned above, we have done so. We report the results in the Results section and discuss our findings in the Discussion.

* The reviewer is correct by saying that our finding that the prevalence of overweight is over-reported is not consistent with the literature. Regarding the fact that our sample consisted of only overweight and obese subjects, the reviewer would have expected an under-estimation in the prevalence of overweight and obesity when based on self-report.

Actually we do find similar results as reported in the literature, but these findings may be ‘blurred’ by the fact that only overweight and obese subjects were included. Our finding that the prevalence of overweight (based on self-report) is over-reported is due to the fact that obese subjects who under-reported their BMI fall in the category overweight. However, the overall prevalence of overweight (overweight and obesity combined) is under-reported, which is consistent with the literature.

We have added some text in the Results section to clarify the over-reporting of overweight in our population (and subgroups) (p10, lines 22-23; p11, lines 11-26).

* The reviewer suggest that the over-reporting of the prevalence of overweight may be due to the fact that participants are aware that they would be weighed or because they
were participating in a lifestyle intervention study. We address both points in the Discussion.

* The reviewer commends to report the results in the additional tables properly, as the means, SDs and the SDs of the mean differences are essential but rarely reported in these types of studies.

We presented SD’s as this is commonly done with observed data. Giving the CI may lead to confusion. We have now executed regression analysis to evaluate whether the mean difference between measured and self-reported anthropometrics significantly differed between subgroups. We do give the 95%CI around this mean.

* The reviewer needs more explanation on the results of the accuracy of self-reported anthropometrics in relation to gender, BMI, age and SES.

We agree with the reviewer that the report of these results may not be fully clear. We made some textual changes to clarify these results.

**Discussion**

* The reviewer again brings up the issue of self-assessed versus self-reported. Although subjects were asked to weigh themselves prior to filling out the questionnaire, we do not know whether they did weigh themselves. We agree with the reviewer that this may influence the bias and therefore we do address this issue in the Discussion (p16, lines 19-24).

* The reviewer points to new research which shows that the known underestimation of obesity based on self-report is translating into an exaggeration of risk for obesity related morbidity and mortality.

This is a good point and we have taken this information into account when discussing our results (p15, lines 25-28).