Author's response to reviews

Title: Validity of self-reported weight, height and resultant body mass index in Chinese adolescents and factors associated with errors in self-reports

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Author's response to reviews: see over
Dear Editor,

RE: MS: 5298685033062856 - Validity of self-reported weight, height and resultant body mass index in Chinese adolescents and factors associated with errors in self-reports

We deeply appreciate your comments on our manuscript. We would also like to thank the reviewers for their constructive and helpful comments and suggestions. We agreed with the majority of the reviewers’ comments and have revised our manuscript accordingly.

Thank you for considering our revised manuscript.

Yours sincerely,

Hong Yan on behalf of authors

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Our response as follows:

Reply to Reviewer 9771927353146225:

We are extremely grateful for your review of the manuscript. You have raised a number of important issues, all of which are helpful. We agree with most of your comments and have modified our manuscript accordingly, as documented below.

Reviewer’s report
Title: Validity of self-reported weight, height and resultant body mass index in Chinese adolescents and factors associated with errors in self-reports
Version: 1 Date: 13 October 2009
Reviewer: Frank Elgar

Reviewer’s report:
This paper examines a well documented problem with obesity screening using Body Mass Index criteria (i.e., inaccuracy of self-reported height and weight) in an Asian population of adolescents. The methods are appropriate to the research question and the data analyses appear to be appropriately carried out. However there are some minor issues the authors should address.

1. I expected a more thorough evaluation of prior validation studies in the Introduction. Some studies are described in the Discussion, however it is useful to evaluate their methods as well as conclusions before describing the present study. This study is essentially a replication of what has been found in other populations.

Reply: the reviewer was right, and we thank you for your comments. We have added some information and reconstruct this part in introduction. (P.3, L.37-59) “Previous validation studies that have examined the accuracy of self-reported height and weight have applied several different methods. Comparing mean difference of reported and measured value was most frequently presented in validity studies, and was primarily employed to assess validity in some studies [12-15]; correlation coefficient is also applied widely and some studies use it as main methods to assess validity [16, 17]; sensitivity and specificity [14, 18-20] or chi-square[21] for screen overweight; intraclass correlation coefficient [16, 22] and eta-square [21] were also applied in studies; Bland-Altman’s
plots of limit of agreement [15, 21, 23-25] and kappa statistics [13, 17, 23] were also used to evaluate validity. When the aim was to compare two methods (continuous data), comparison of means tells us little about the accuracy of the methods; correlation is only a measure of association; Bland-Altman’s plots of limit of agreement is a better method [26]. When the approach comes for screen overweight, sensitivity and specificity can be applied.

Previous validation studies shown inconsistent outcomes in adolescents. Some studies have suggested that adolescents’ self-reports of height and weight were valid [16, 17, 19], while others have raised concern about the accuracy of self-reported anthropometric values in adolescence [12, 14, 18, 20, 21, 27-29]. Furthermore, the validity of self-reported height and weight has not been adequately evaluated in diverse youth samples, especially in different cultural contexts [30]. Most previous studies on adolescents have been conducted in Western populations, and there are no reported validity studies conducted in Asian children and adolescents, whose body size and culture are different from those of their Western counterparts. Previous validation studies in Japanese adults [23] and Japanese adult women [31] have shown more accurate self-reported height and weight than in the Western studies. Can Asian adolescents also accurately report their height and body weight?”

2. As well, the public health concern about rising rates of obesity is mentioned in the last paragraph of the Introduction. I suggest to the authors that this is an appropriate start point for this study and should be emphasized in the first paragraph of the Introduction.

Reply: Thanks for your comments. We have moved these to the first paragraph and reconstructed the paragraph. (P. 3, L. 23-36) “The prevalence of overweight and obesity is increasing among children and adolescents worldwide [1-3]. Adolescent obesity has increased rapidly in recent years [4]. Obesity early in life is a risk factor for the development of many chronic diseases such as type 2 diabetes mellitus and cardiovascular diseases [5], and is likely to track into adult life [6]. The large population of China combined with the emerging adolescent obesity epidemic means there is an urgent need for appropriately validated methods to monitor the trends in overweight and
obesity in youth, and to evaluate programs. Body mass index (BMI) is the most commonly used index to define overweight and obesity. Some studies use reported weight and height to derive BMI values and estimate the prevalence of overweight and obesity [7-11]. Reported data on weight and height are easier to collect than measured data, and would potentially be suitable for large scale surveillance systems and epidemiological studies. But the inaccuracy of these reported values may skew obesity evaluation, risk factor identification and the evaluation of interventions. Thus, validation studies of reported height and weight are of interest in Chinese adolescents.”

3. The “Subjects and design” subsection of the Methods could be enhanced by specifying the sample size and consent rate. Perhaps the first paragraph of the Results could be moved up into the Methods.

Reply: Thanks for your comments, sample size (already in text) and consent rate are important information, we have added consent rate in the first paragraph of the Results. (P. 8, L. 163-164) “the consent rate is 97.8% (1761 of 1800).” And these information are recommended to provide in Results section, according to Uniform Requirements for Manuscripts Submitted to Biomedical Journals of International Committee of Medical Journal Editors, “The Methods section should include only information that was available at the time the plan or protocol for the study was written; all information obtained during the conduct of the study belongs in the Results section.”

4. Page 6: what is the relevance of ownership of telephones, video cassette players, etc? Were these used to measure material wealth? The “wealth index” should be described here in full detail – not just referenced.

Reply: Yes, ownership of these facilities was used to measure household wealth. We have described the index in more detail. (P. 6, L.119-123) “To assess the household economic status, a wealth index was calculated from the list of household facilities using a principal components method to assign a weight for each asset [38]. Scoring factor of the first principal component is the “weight” assigned to each asset in a linear combination of the assets that constitute the index. The index value of each individual was ranked and divided into three categories (tertiles) - the lower, the middle and the
higher household economic status.”

5. The statistical methods seem appropriate if they were applied correctly, but their description is sparse and ambiguous. For example “Differences were determined by the paired t-test” (p. 6) Differences in what? What form of t-test?

Reply: Thank you for point out this. We have revised these in the text. (P.7, L.127-130)

“Differences of reported and measured values in height, weight and BMI were determined by the student’s paired t-test. Absolute differences of reported and measured values in height, weight and BMI were also calculated. Pearson’s correlation coefficients of reported and measured values were calculated,”

“Measured and reported weight, height and resultant BMI values were ranked and divided into quintiles…” (p. 7) Why quintiles? Wasn’t the aim of the study to test a dichotomized categorization of obese/non-obese adolescents?

Reply: Thank you for the point. We had already provided the agreement analysis of categorizing individuals to Normal weight, Overweight and Obese adolescents. And dividing the subjects into quintiles also provided useful information on agreement of rating individual when a fixed cut-off point is not applied; we think this information is especially helpful to assess whether the reported can be used in epidemiology studies. So we provided this analysis.

With these issues addressed, I think the authors have a compelling set of results here that are an important contribution to the field.
Reply to Reviewer 1247722726320560:

We are extremely grateful for your review of the manuscript. We really appreciate your comments and have revised our manuscript accordingly, as documented below.

**Reviewer's report**

**Title:** Validity of self-reported weight, height and resultant body mass index in Chinese adolescents and factors associated with errors in self-reports

**Version:** 1 **Date:** 1 November 2009

**Reviewer:** Nikolaos Tsigilis

**Reviewer's report:**

The present study examines the accuracy of the self-reported data on population of Chinese adolescents. The topic is very interesting, the manuscript is easy to follow the ideas are presented clearly, the sample size is satisfactory, and the statistical analyzes are the appropriate ones. There are some minor revisions, mainly additional information, which are presented below. Since an effort is made to correct the difference between actual and self-reported anthropometric data, a paragraph should be added in the introduction section presenting the efforts of prior studies and the factors that these studies used to adjust the observed bias.

**Reply:** Thank you for the comments. We have added a paragraph in the introduction. (P. 4, L. 60-65) “Several previous studies have raised algorithm for correction of self-reported BMI, most of them used simple equations[16, 32, 33], but quadratic equation is also published [34]. Age is most frequently appeared in the correction equations, smoking, education, physical activity, self-rated health, body image and ethnicity also used to adjust reported anthropometric data [16, 22, 32, 33, 35]. These correction equations usually increase the sensitivity for detecting overweight or obese subjects.”

**Statistical analysis**

The author should decide whether a gender effect exists. If there a gender effect then the results should be presented separately for each sex. On the other hand,
the results should be reported for the total sample.

Reply: Thanks for the point. For the sake of easy to compare with other similar studies, we provided the results separately for each sex. There is no gender effect in our study, we are glad and agree to report these results for the total sample only. Result for boys and girls have been deleted. (P. 20, Table 2)

Please explain in brief the terms sensitivity, specificity, positive predictive value, and negative predictive value.

Reply: Thanks for point out this. We have added explanations to these terms in the text. (P.8, L.151-155) “Sensitivity measures the proportion of actual positives which are correctly identified; Specificity measures the proportion of negatives which are correctly identified; positive predictive value is the proportion of subjects with positive test results who are correctly diagnosed; while negative predictive value is the proportion of subjects with negative test results who are correctly diagnosed.”

P.7, L. 123 – 125. “Measured and reported …agreement.”

Please explain in brief the difference between quadratic weighted Kappa statistic and Kappa statistic and justify the application of the quadratic weighted Kappa.

Reply: we really appreciate you for your comments. We have added the explanation in the text. (P. 7, L.145-149) “Quadratic weighted kappa is to assign weights to each disagreement pair with smaller weights indicating smaller agreement and commonly used for ordinal scales, whereas unweighted kappa treats all disagreements equally. Unweighted kappa, therefore, is inappropriate for ordinal scales of present study.”


Please state explicitly which these three categories were.

Reply: Thanks for the point. We have stated it in the text. (P.7, L.144-145) “ – normal weight / underweight, overweight and obesity group. Because underweight is rare (only 11 subjects), we combined it to normal weight group.”
P. 8, L. 151-162. “The difference between … especially BMI”

The interpretation of the observed differences should be assisted by the calculation and provision of an effect size index. Moreover, it would be interesting to calculate and present the intraclass correlation coefficient as an additional measure of agreement.

**Reply:** Thank you for the suggestions; we have added the effect size in the text. (P.8, L.169-170) “The effect size is 0.217 for the weight, 0.164 for height and 0.393 for BMI” and we added intra-class correlation coefficient in Table 2. (P. 20, Table 2)

P. 9, L. 190 – 193. “Multivariable linear … in Table 3.”

Additional information is needed for the regression analysis. First the authors should provide the formula on which the corrections were made, the unstandardized and standardized coefficients, and clearly state whether the assumptions of the regression analysis were satisfied (e.g., normal distribution of the residuals).

A table presenting the classification results based on actual, self-reported and corrected measures should be added.

**Reply:** Thanks for this point. We are sorry for not explain it in full detail. We have added some information in the text. “Categorical variables were transferred into dummy variable sets, and these dummy variables were introduced into the regression analysis. Adjusted means (or marginal means) were calculated.” (P.10, L.219-221) We displayed results in this form, so that it can be seen clearly in the table that which category has higher discrepancy and the difference between categories. And we ask the reviewer to allow us to remain this form of showing results. In the regression analysis, we used adjusted means which means that difference is adjusted by all the other co-variables in linear regression model. And this is not that we have a fixed formula to correct the means.

About the assumptions of the regression analysis, we have added a sentence in the text. (P.10, L.221-222) “The data meet the assumption of independence, linear and normal distribution of the residuals.” And the sample size is large, so we think regression can be used in this case.

Thanks the reviewer for the advice to form a new table. We have added this in the
Discussion section

A speculation should be provided explaining why the area of residence as well as the socio-economic status contributed to explanation of the difference between actual and self-reported data.

Reply: We have added a point in the text explain the potential reason for the effect of SES and area of residence. (P. 13, L. 290-297) “Adolescent in different household economic status may pose them mentally different. Superiority complex may affect adolescents of relatively rich family and they may ready to report a higher height.” “In suburban area, adolescents and their parents may be less concerned about their weight problem for weight problem is relatively less serious and they may less frequently weigh them. They are less likely to report their weight and height accurately.”

The issue of generalizability of the results to Chinese population should be also addressed.

Reply: Thanks for raised this point. We have added a point discussing the generalizability of this study. (P.14, L.315-323) “Xi’an is a city located in central part of China. Since China is a vast nation with social, economic, cultural and natural environmental diversity, the result of this study cannot generalized to the whole country. Although this is the first time to assess validity of self-reported weight and height in China, it may bring important information especially to those neighboring big cities which have similar patterns.”

Finally it would be stated if there was any category for underweight adolescents? If no, this decision should be justified. In addition, the impact of the number of categories on the classification results should be also discussed in the Discussion section.

Reply: Thank you for the point. Underweight adolescents are rare in this population, only 11 adolescents categorized into underweight according to Chinese cut-off point (lowest
5% curve). And this is a small sample for analysis. Moreover there is no IOTF cut-off point for underweight, using Chinese curve will yield inconsistent standards of the categories. Considering the above, we don not divided underweight adolescents into a separate group for analysis. And we have added sentences in the text. (P.7, L.145) “Because underweight is rare (only 11 subjects), we combined it to normal weight group.”

We have addressed impact of the number of categories on the classification results in Discussion section. (P. 12, L. 259-262) “And we need to mention that quadratic weighted kappa coefficients tend to increase with the number of categories. Although, as the number of categories increases, so does the proportion of the variability in the true variable captured by the imperfect ordinal variable [46].”