

## **Author's response to reviews**

**Title:** Validity of self-reported weight, height and body mass index in Thailand:  
Implications for population studies of obesity in developing countries

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**Author's response to reviews:** see over

Dear Dr Houtz,

Point-by-point responses to the reviewers' comments follow.

## **Responses to Reviewer's Comments**

### **REVIEWER 1**

1.It is not clear how the sample were recruited, it seems that it's not a probability sampling. The authors enrolled those students who happened to come to the university on the study period. Do they represent the total population of the university students. Those who come to the university might have different characteristics from the majority of the students. For example they might be different in age distribution, socioeconomic status and health concern.

As noted in the Methods section, all STOU students attend on-campus for professional and ethical training before graduation. Thus our sample was drawn from the total population of STOU students and entered our study when they became accessible for direct measurement of weight and height. We believe they are typical of all STOU students.

2.The study was conducted at the university. Is it possible that measurements of height and weight are more or less available compared to when they are at home before the self-reports.

We sought self-report of weight and height before conducting the direct measurements. There is no unusual access to weight or height instruments on the STOU campus. We do not anticipate the self-reports obtained on-campus to be any different to those recorded on mailed questionnaires.

3.Please provide a table of baseline characteristics of the sample

We are able to characterize the ancillary sample only by age and sex. This information is provided in the text, but not in a table. We did not seek any other demographic characteristics from the ancillary sample because our primary purpose was to assess the validity of self-reported BMI.

4.Are there any discrepancies of BMI by age group and SES.

We assume the Reviewer is asking if there are trends in the discrepancies of BMI by age or SES as has been reported in other studies – eg that BMI discrepancies increase with increasing age. There were no apparent trends in BMI discrepancies with age. This was not surprising because our sample comprised primarily young adults – about 75% were under 40 years of age. We did not collect data on SES for this study so could not evaluate discrepancies across SES subgroups.

5.Page 12 paragraph line 6. There is no data provided to support that the sample comprised a heterogeneous group.

We acknowledge the Reviewer's point that we have not presented underlying characteristics of our sample. Our intention in the phrase "... comprised a more

heterogeneous sample...” was to highlight the difference between our sample and the Japanese sample - specifically, our sample is not homogenous in being public servants from a single workplace. We have omitted the sentence describing our sample as heterogeneous from the text. Its omission does not detract from the observation made about the Japanese sample being homogeneous.

6. The authors express about the problem of generalization of the results to the general population. It's still not convinced if the results could generalize to the STOU cohort.

Both the STOU cohort and the height-weight study sample reported here were drawn from the overall body of STOU students. Also, our height-weight study sample and the STOU cohort were similar for age range, mean age and sex ratio. We believe the height-weight results can reasonably be generalised to the cohort.

## **REVIEWER 2**

### Major compulsory revisions

1. Statistical method part describes the statistic tests that were used to analyse the data. The results of the tests have to be presented in the result part or in the tables, which is not the case presently, except for correlations in table 1. P values of paired t-test for comparison of the means, p values of the Chi-squared test, etc. should be reported.

We have added test results to Tables 1 and 2.

2. Several results are presented in the discussion part, whereas they were not mentioned in the result part. This should be corrected:  
a. "...the significant height over-reporting, of 1.1 cm in men and 1.2 cm in women, among individuals of normal weight status...", p.12-13. This is a result that was not mentioned in the result part or in the tables.

This result is in Table 2. We apologise for the confusion - but we had mistakenly reversed reporting of the results for men and women. We have corrected this and have also reported to two decimal places, for greater consistency with Table 2. The sentence (p12, 2<sup>nd</sup> last sentence) now reads:

A finding in our study not observed in other studies was the significant height over-reporting, of 1.18cm in men and 1.13cm in women, among individuals of normal weight status.

b. "In our study, specificity was 94% and 99%, and sensitivity was 78% and 77% for men and women respectively." This sentence should be in the result part and not in the discussion. P. 13.

We made this change, embedding the above sentence in a paragraph in Results (p9, 2<sup>nd</sup> last para), which now reads:

When self-reports were used to determine overweight/obese, in both sexes, sensitivity was higher and specificity lower than when used to determine obesity. Specificity was 94% and 99%, and sensitivity was 78% and 77% for men and women respectively. PPVs were similar in men, but decreased slightly in women. NPVs decreased by much larger amounts, 12 percentage points in men and four in women.

c. "Obesity prevalence was underestimated in our study by 7.8% in men and 4.7% in women". This sentence should be in the result part and not in the discussion. P. 14.

We made this change, merging the above result into a sentence on page 9 of Results (p9, last sentence), which now reads:

These prevalences, underestimated by 7.8% in men and 4.7% in women, were statistically significantly lower than the "true" prevalences based on measured values of 36.9% and 16.7% (Table 3).

d. "Application of the "reduced BMI threshold" method significantly reduced under-estimation of obesity prevalence estimated in our study, to 3.1% in men and 1.1% in women". This sentence should be in the result part and not in the discussion. P.14.

We made this change, appending the above to the end of a paragraph on page 10 of Results (p10, first para), which now reads:

... Using these reduced thresholds, obesity prevalences increased to 33.8% for men and 15.9% for women, which were not statistically significantly different from the "true" prevalences (Table 3). Put another way, application of the "reduced BMI threshold" method significantly reduced under-estimation of obesity prevalence estimates to 3.1% in men and 1.1% in women.

e. "An exceptionally high proportion (21%) of women in the TCS sample was underweight ..." This is a result. Table 3 should not be mentioned in the discussion part. P.15.

The result in the indicated statement was reported in a separate publication on BMI in the TCS population (Banwell C, Lim L, Seubsman SA et al. Body mass index and health-related behaviours in a national cohort of 87,134 Thai open university students. *J Epidemiol Community Health* 2009; **63**(5): 366-72.). We have included this reference and deleted the mention of Table 3. These sentences (p15, 3<sup>rd</sup> para) now read:

An exceptionally high proportion (21%) of women in the TCS sample were underweight (BMI <18.5kg/m<sup>2</sup>) based on self-reported data<sup>25</sup>. The underweight women in the ancillary study tended to *over*-report their weight, a finding...

3. Some discussion elements are presented in the result part, this should be corrected:

a. "...suggesting that the greater reporting discrepancy among overweight and obese individuals may be due to a greater tendency to round weight down...". This should be mentioned in the discussion part and not in the results.

We moved the above observation to the Discussion, which now has an additional paragraph on p13 (2<sup>nd</sup> para) which reads:

The proportions of persons with end-digit preference increased slightly with weight status, suggesting that the greater reporting discrepancy among overweight and obese individuals may be due to a greater tendency to round weight down and round height up.

b. "Because of the decrease in PPV, reduced thresholds are not recommended for individual weight status classification for clinical or diagnostic purposes. This is not a result. This should be mentioned in the discussion or conclusion part.

We moved the indicated sentence to the Discussion (p14, 2<sup>nd</sup> para), which now reads:

Application of the "reduced BMI threshold" method significantly reduced under-estimation of obesity prevalence estimates and decreased PPVs in our study. The decrease in PPVs implies that reduced thresholds should not be used for individual weight status classification for clinical or diagnostic purposes, which supports Dauphinot's<sup>7</sup> observation that "... the revised obesity threshold should be applied only on population data".

### Minor essential revisions

1. The study population included only students according to the description p. 5. The age of the population ranged from 21 to 62 years and mean age was around 34. Is it normal to have students of this age? It would be appreciable to have explanations of the age of the subjects. In particular because the authors explain that the difference of the obesity prevalence between the TCS sample and the ancillary sample may be due to a difference of the mean age between the two samples. P.15.

We added the following explanation on p15 (1<sup>st</sup> sentence):

Being an open university, STOU admits students of any age but the majority are under 40 years of age (87% of TCS members are under 40 years old).

2. The authors should precise what chi-squared test was used: to compare paired data (self-reported obesity prevalence based on self-report and obesity prevalence based on measures), Mac Nemar Chi-squared test should be used. To compare independent sample (men to women for example), Pearson Chi-squared is adequate.

We have indicated the particular tests used in the footnotes in Tables 1 and 2.

### Discretionary Revisions

1. The authors could test the association between the discrepancies between self-reported and measured data seemed and the proportion of end-digit preference for normal, overweight and obese subjects, except the underweight subjects. They would find and underline a significant linear trend which can be observed in the table 2.

We performed linear trend tests as suggested by the Reviewer. Only one subgroup (height in men) reached statistical significance ( $p=0.045$ ). We decided against including these results because we do not believe its addition would enhance the basic message but could detract from it.

Your sincerely,  
Lynette Lim