

PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (<http://bmjopen.bmj.com/site/about/resources/checklist.pdf>) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

ARTICLE DETAILS

TITLE (PROVISIONAL)	Changes in body mass index and the prevalence of obesity during 1994-2008 - repeated cross-sectional surveys and longitudinal analyses: The Tromsø Study
AUTHORS	Jacobsen, Bjarne; Aars, Nils

VERSION 1 - REVIEW

REVIEWER	Sheila Barrett Northern Illinois University, USA
REVIEW RETURNED	27-Mar-2015

GENERAL COMMENTS	<p>Article is timely, but needs some work to show the significance of the study.</p> <p>General Comments: There is some research showing that the obesity epidemic is at a plateau, this study is timely as it traced the increase over a decade. The study also confirmed what others have found, the increase is higher among the younger age cohorts. It is not clear why this comparison is being made, or what is the significance of this study. There are a lot of problems with sentence construction and some grammatical errors. The introduction is weak, it needs a complete overhaul to strengthen this portion and show the significance of the current study.</p> <p>Specifics:</p> <ol style="list-style-type: none">1. Abstract- give an indication of how many decades are being compared in the first line. First sentence is awkwardly stated, re-write ... but some studies indicate that this trend is not as rapid as previously.2. Line 18- replace took part with participated.3. Lines 20-22- re-write ... surveys and 4,202 participants from the 2001 survey.4. Line 34- say the first survey rather than the first period since it was already stated that three surveys were conducted. <p>Strengths and Limitations -page 3</p> <ol style="list-style-type: none">1. Line 23- re-write- Body mass index is not a perfect measure of the proportion of body fat.2. Line 30- do you mean increase or decrease? <p>Introduction- sentences are awkwardly stated, need to be strengthened to show the significance of the current study.</p> <ol style="list-style-type: none">1. Line 9- The prevalence continues to increase worldwide 2,3 , Norway being no exception.4-62. Line 11- ... found more than 20% of the adult population was obese.3. Line 16- change rapid to rapidly4. Lines 20-22- sentence construction- re-write as " Several cross-sectional studies suggest that high BMI and prevalence of obesity in men level off and is further reduced in the elderly 5, 10-12 which seem to indicate that there is an overall decrease in obesity in recent years, however, the converse is true of the younger population where obesity is on the rise. 10, 11, 13-18
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	<p>5. Use non-pregnant instead of not pregnant women.</p> <p>6. Be specific about how subjects were selected; indicate, where and how they were selected. The authors referred to the study subjects as "attendees", what were they attending? Please refer to them as study participants or study subjects instead of attendees.</p> <p>7. Table columns can be adjusted to read BMI across and then below you'd have men versus women without repeating the word BMI. See example overleaf</p> <p>Age Groups Body Mass Index (N=) MEN WOMEN n Mean(SD) %<20 %>30 n Mean(SD) %<20 %>30 30-34</p> <p>Total</p> <p>Use small n for the subgroups for each age category, capital N refers to the total study population. Remove the excess lines after completing the table.</p> <p>8. Remove the legend from inside the graphs and put below the graph. The lines in the graph are not very distinct to differentiate each age category. Name each figure and number them on page 15 so the reader can see up front which survey or cohort the figure represents. Number each figure individually as you describe what they represent.</p> <p>9. Page 16- line 50- indicate which of the four figures are being referred to. In line 36, add 's' to table (tables 1-4)</p> <p>10. 10. Page 17- line 14- add s to table. Line 20- ... between Tromso 4 and 5, Tromso 5 and 6, remove the second "between"</p> <p>11. On pages 17 and 18 study participants are again referred to as "attendees" I am not sure if this is the term that you need here.</p> <p>12. Page 17- line 25-28-The sentence is unclear do you mean the study participants in 1974- 1979 compared to 1994-1995?</p> <p>13. Line 29- put "that in front of " the largest weight gain...</p> <p>14. Page 18 line 36- From a scientific perspective, we can't use "suspect" maybe we assume or postulate?</p> <p>15. Page 19- line 52- re-write that sentence and remove "worryingly". Possibly say something like " The increase in the younger age cohort for both genders is a cause of great concern."</p> <p>16. Page 20, replace rapid with rapidly in line 5.</p> <p>The reviewer also provided a separate marked copy with attached comments. Please contact the Publisher for full information regarding this.</p>
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REVIEWER	Wang Hong Xu School of Public Health, Fudan University
REVIEW RETURNED	28-Mar-2015

GENERAL COMMENTS	<p>This is an interesting paper describing the changes in BMI and prevalence of obesity in adults of Norway based on repeated cross-sectional surveys and longitudinal analysis. The methodology is generally sound and the limitations (cross-sectional design) are acknowledged. There are several minor suggestions:</p> <p>1. The table 1,2 and 3 look complicated and are not convenient for the readers to make a comparison. The authors can present the mean BMI and prevalence of low weight and obesity in Tromso 4, 5 and 6 by age groups in men as table 1, and those in women as table 2. P values for trend tests are also needed to be presented in the tables.</p> <p>2. In table 4, the authors presented proportion of all BMI categories. Given that the age distribution differed in different surveys, it would be better to adjust for age.</p> <p>3. The authors should provide the IRB approval number.</p>
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VERSION 1 – AUTHOR RESPONSE

Reviewer 1. Sheila Barrett

Reviewer 1 wrote:

Article is timely, but needs some work to show the significance of the study.

General Comments: There is some research showing that the obesity epidemic is at a plateau, this study is timely as it traced the increase over a decade. The study also confirmed what others have found, the increase is higher among the younger age cohorts. It is not clear why this comparison is being made, or what is the significance of this study. There are a lot of problems with sentence construction and some grammatical errors. The introduction is weak, it needs a complete overhaul to strengthen this portion and show the significance of the current study.

Our response:

We are thankful for the many detailed comments and apologize for the mistakes in sentence construction and grammatical errors. A person who has English as his mother tongue has now scrutinized the revised manuscript. Therefore, we hope that these problems have now been rectified.

With regard to the introduction, we have corrected the mistakes pointed out by the reviewer and have also made some other changes in the text in order to amend it.

Reviewer 1 wrote:

Specifics:

1. Abstract- give an indication of how many decades are being compared in the first line. First sentence is awkwardly stated, re-write ... but some studies indicate that this trend is not as rapid as previously.
2. Line 18- replace took part with participated.
3. Lines 20-22- re-write ... surveys and 4,202 participants from the 2001 survey.
4. Line 34- say the first survey rather than the first period since it was already stated that three surveys were conducted.

Our response:

Re. 1: The abstract has been changed and the sentence has been deleted.

Re. 2: We have made the changes as suggested.

Re. 3: We have changed "individuals" to "participants" as the reviewer suggested. The last part of the sentence has been changed to "... surveys and 4 202 men and women who participated in all three surveys." as the suggested change could be misleading.

Re. 4: We do not refer to the first survey, but a period between two surveys. Therefore we have now changed "in the first period" to "from 1994-1995 to 2001-2002" and "in the last period" to "from 2001-2002 to 2007-2008" to make this clear.

Reviewer 1 wrote:

Strengths and Limitations -page 3

1. Line 23- re-write- Body mass index is not a perfect measure of the proportion of body fat.
2. Line 30- do you mean increase or decrease?

Our response:

Re. 1: The suggested change has been made.

Re. 2: There was a misprint in the sentence, "weight" instead of "height". If weight is constant and the body height is reduced (the latter is often the case with advancing age), the BMI will increase. In order to facilitate reading, we have now written the statement concerning the impact of age on the proportion of body fat and height in two different sentences.

Reviewer 1 wrote:

Introduction- sentences are awkwardly stated, need to be strengthened to show the significance of the current study.

1. Line 9- The prevalence continues to increase worldwide 2,3 , Norway being no exception.4-6
2. Line 11- ... found more than 20% of the adult population was obese.
3. Line 16- change rapid to rapidly
4. Lines 20-22- sentence construction- re-write as " Several cross-sectional studies suggest that high

BMI and prevalence of obesity in men level off and is further reduced in the elderly 5, 10-12 which seem to indicate that there is an overall decrease in obesity in recent years, however, the converse is true of the younger population where obesity is on the rise. 10, 11, 13-18

Our response:

Re. 1: The suggested change has been made.

Re. 2: The suggested change has been made.

Re. 3: The suggested change has been made.

Re. 4: We understand that we have awkwardly described the difference between results from cross-sectional and longitudinal studies concerning the relationship between age and mean BMI/prevalence of obesity in men. The text now reads: "Several cross-sectional studies suggest that in men, mean BMI and the prevalence of obesity increases with age in young and middle-aged men, then levels off, and is reduced in the elderly 5, 10-12. This relationship seems not to hold in longitudinal analyses of men. The highest increase takes place in the younger age groups 10, 11, 13-18. Thus, cross-sectional studies may give a misleading picture about the relationships between age and BMI."

Reviewer 1 wrote:

5. Use non-pregnant instead of not pregnant women.

6. Be specific about how subjects were selected; indicate, where and how they were selected. The authors referred to the study subjects as "attendees", what were they attending? Please refer to them as study participants or study subjects instead of attendees.

Our response:

Re. 5: The suggested change has been made.

Re. 6: The analyses are based on data from 29 688 different participants who participated in ("attended") one or more of the three surveys of the Tromsø Study conducted in 1994-1995, 2001-2002, and 2007-2008. A detailed description of the age groups invited to the surveys is given in two publications (reference 19 and 20). However, to clarify, we have now included in the manuscript a paragraph that gives the details about how the subjects in the relevant surveys in the Tromsø Study were selected. All surveys are population-based. We have now removed the word "attend" and "attender" from the entire manuscript and instead used "participants" and similar words.

Reviewer 1 wrote:

7. Table columns can be adjusted to read BMI across and then below you'd have men versus women without repeating the word BMI. See example overleaf

Age Groups Body Mass Index (N=)

MEN WOMEN

n Mean(SD) %<20 %>30 n Mean(SD) %<20 %>30
30-34

Total

Use small n for the subgroups for each age category, capital N refers to the total study population. Remove the excess lines after completing the table.

Our response:

Re. 7: The layout of the relevant tables (Tables 1-3, 5 & 6) is now as suggested by the reviewer. We have removed excess lines where possible, but prefer that all lines of a table are on the same page of the manuscript.

Reviewer 1 wrote:

8. Remove the legend from inside the graphs and put below the graph. The lines in the graph are not very distinct to differentiate each age category. Name each figure and number them on page 15 so the reader can see up front which survey or cohort the figure represents. Number each figure individually as you describe what they represent.

Our response:

Re. 8: This objection is partly based on a misunderstanding. There was only one figure in our manuscript. The upper panel of the figure was (as indicated on the figure) for men, the lower panel is for

women. Because the figures were uploaded separately, the reviewer has seen them as three figures. We have now included the information in two figures (Figure 1 and Figure 2). Figure 1 is for men and figure 2 for women. In order to facilitate reading, we prefer to have the legends (the lines indicating the birth cohort) inside the graph. However, if the editor prefers to have the legend below the graph, we are of course willing to do so. Furthermore, we have now changed the colors of the lines that indicate the birth cohort, and believe that lines in the graph now distinctly differentiate between each birth cohort.

Reviewer 1 wrote:

9. Page 16- line 50- indicate which of the four figures are being referred to. In line 36, add 's' to table (tables 1-4)
10. Page 17- line 14- add s to table. Line 20- ... between Tromsø 4 and 5, Tromsø 5 and 6, remove the second "between"
11. On pages 17 and 18 study participants are again referred to as "attendees" I am not sure if this is the term that you need here.
12. Page 17- line 25-28-The sentence is unclear do you mean the study participants in 1974- 1979 compared to 1994-1995?
13. Line 29- put "that in front of " the largest weight gain...
14. Page 18 line 36- From a scientific perspective, we can't use "suspect" maybe we assume or postulate?
15. Page 19- line 52- re-write that sentence and remove "worryingly". Possibly say something like " The increase in the younger age cohort for both genders is a cause of great concern."
16. Page 20, replace rapid with rapidly in line 5.

Our response:

- Re. 9: The suggested changes have been made.
- Re. 10: The suggested changes have been made.
- Re. 11: As discussed above, we have not used the word attenders (or attendees) in the revised manuscript.
- Re. 12: We refer here to the previous publication from the Tromsø Study that described the changes mean BMI and prevalence of obesity in the same population (and many of the same study participants) in cross-sectional and longitudinal analyses from 1974 (in men) and 1979 (in women) to 1994-1995.
- Re. 13: The suggested changes have been made.
- Re. 14: We are thankful for this comment and have changed the word to "assume".
- Re. 15: The suggested change has been made.
- Re. 16: The suggested change has been made.

Reviewer 2. Wang Hong Xu

Reviewer 2 wrote:

This is an interesting paper describing the changes in BMI and prevalence of obesity in adults of Norway based on repeated cross-sectional surveys and longitudinal analysis. The methodology is generally sound and the limitations (cross-sectional design) are acknowledged.

There are several minor suggestions:

1. The table 1,2 and 3 look complicated and are not convenient for the readers to make a comparison. The authors can present the mean BMI and prevalence of low weight and obesity in Tromsø 4, 5 and 6 by age groups in men as table 1, and those in women as table 2. P values for trend tests are also needed to be presented in the tables.

Our response:

Re. 1: The objection raised by the reviewer is easy to understand. We understand that it may be difficult to make a comparison of the changes in BMI and prevalence of obesity for men and women from the three cross-sectional studies when the results are included in three different tables. However, it is our opinion that with two tables as the reviewer suggests, it will be equally difficult to compare the cross-sectional findings for men and women in each survey.

However, Table 4 shows how the mean BMI and the distribution of BMI over commonly used cut-off points change from Tromsø 4 to Tromsø 6 for men and women in the same table. This makes it possible to easily spot the changes in both unadjusted and age-adjusted mean BMI and the prevalence of obesity in the three surveys from Tromsø 4 to Tromsø 6 in men and women separately. Thus, in this way, we present in one table the most important results as the reviewer suggested that we should have

presented in two tables.

Furthermore, the presentation of the longitudinal changes in mean BMI and prevalence of low weight and obesity in Tromsø 4, 5 and 6 are described in detail and better in Table 5 (men) and Table 6 (women).

We therefore prefer to keep Tables 1-3 as they are. We also notice that the reviewer has written that this is a "minor suggestion" and that the other reviewer only suggested a change in the lay-out of Tables 1-3.

We have not included p-values for linear trend in descriptive Tables 1-3. An important finding was that for BMI and % with BMI ≥ 30 there were inverse U-formed relationships in men, whereas for women more linear relationships were found. Regarding the more analytical tables (Tables 5 and 6), we have included p-value for linear trend in change in BMI over birth cohorts.

Reviewer 2 wrote:

2. In table 4, the authors presented proportion of all BMI categories. Given that the age distribution differed in different surveys, it would be better to adjust for age.

Our response:

We also understand this objection. However, then we have to restrict the samples from the three surveys to subjects aged 30-84, i.e., not giving data for the entire population. Furthermore, we have, in the lower part of the table, presented both unadjusted and age-adjusted mean BMI and the prevalence of obesity in the three surveys from Tromsø 4, 5 and 6 in men and women. Thus, we have presented the most important age-adjusted values for men and women from the three surveys. We also noticed that the reviewer has written that this is a "minor suggestion" and that the other reviewer did not have a similar suggestion.

Reviewer 2 wrote:

3. The authors should provide the IRB approval number.

Our response:

The suggested change has been made.

VERSION 2 – REVIEW

REVIEWER	Sheila Barrett Northern Illinois University, DeKalb, Illinois
REVIEW RETURNED	04-May-2015
GENERAL COMMENTS	Corrections have been done as suggested. Manuscript reads better this time around.