

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	The effects of changes in eating speed on obesity in patients with diabetes: a secondary analysis of longitudinal health checkup data
AUTHORS	Hurst, Yumi; Fukuda , H

VERSION 1 – REVIEW

REVIEWER	Daisuke Ekuni Okayama University, Japan
REVIEW RETURNED	28-Sep-2017

GENERAL COMMENTS	<p>The paper shows that there were significant association between eating speed and BMI among type 2 diabetes participants using panel data.</p> <p>This is an interesting study. However, I would like to make some points regarding the manuscript. The article needs to be revised. Comments in detail:</p> <p>TITLE 1) The authors used the words, “changes in eating speed”. However, I can’t find any comments about “changes in eating speed”. If they checked the change in eating speed from baseline to re-examination, there are 9 patterns in the changes (3 x 3 tables); ex) fast to fast, fast to normal, fast to slow, etc. If yes, they should add the tables and clearly state some comments in the model analyses. If no, they should change the title, abstract and text appropriately.</p> <p>INTRODUCTION 1) Please add the hypothesis (P4).</p> <p>MATERIALS AND METHODS 1) Why did the authors choose only type 2 diabetes participants? Please clarify it in the text. 2) How did the authors use only BMI but not waist circumference? BMI has some limitations. 3) Did the authors checked other questionnaires associated with obesity? Did they investigate all data or not? Please clarify this point. 4) The authors should include sex as the covariate. They should also consider categorized age group as it (P7).</p> <p>RESULTS SECTION 1) Please change the references in the Table 2 and 3 because the risk should not be a reference.</p>
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	<p>DISCUSSION SECTION</p> <p>1) The discussion and conclusion may be changed by new results (see above).</p> <p>2) Please add the comments about other limitation in this study; i.e., no data of waist circumference and other important confounders.</p> <p>3) This is a longitudinal study. Thus, the authors can't state "changes in eating habits have a causal relationship with obesity and BMI" (P12).</p> <p>4) There is no reference #41 (P11)</p>
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REVIEWER	Satsue Nagahama All Japan Labor Welfare Foundation, Tokyo, Japan
REVIEW RETURNED	04-Oct-2017

GENERAL COMMENTS	<p>The study examined the association between life style factors including eating speed and obesity, using panel data from Japanese health-checkup system (n=59,717).</p> <p>Major comment</p> <ol style="list-style-type: none"> 1. It is better to clarify the reason why you focus on participants with type 2 diabetes in the study. 2. Please describe the criteria of type 2 diabetes. 3. Why you choose two analysis, GEE model and Fixed-effect model? 4. In table2, odds ratio of obese is extremely large. Did you check multicollinearity or others? Can you explain why the odds ratio is extremely large? 5. Please describe the results of the Hausman test. 6. Please be careful to conclude the causal relationship. This paper describe the association between eating speed and obesity, rather than the effect of changes in eating speed on obesity. <p>Minor comment</p> <ol style="list-style-type: none"> 1. In tables, It is better to list the covariates in the footnote. 2. Line206 (This indicated that slower eating speeds may lead to the alleviation of obesity), this sentences should be written in discussion. 3. Add the strength of your study in discussion. 4. Line 298 to 302, I can't understand meaning of these sentences in before and after "in addition". 5. Please mention ethics approval.
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VERSION 1 – AUTHOR RESPONSE

Response #1.

As advised, we have modified the title as follows:

“The effects of changes in eating speed on obesity: a secondary analysis of longitudinal health checkup data”

Modification #1.

- Title

Comment #2

Please complete and include a STROBE checklist, ensuring that all points are included and state the page numbers where each item can be found. The checklist can be downloaded from here: <http://www.strobe-statement.org/?id=available-checklists>.

Response #2.

We have completed and included a STROBE checklist in this resubmission.

Comment #3

The Strengths and Limitations section should just contain points on the strengths and limitations of the study and study design. It should not provide an article summary.

Response #3.

Thank you for pointing this out. This section has been modified as advised. The first 2 points are strengths, and the next 2 points are limitations.

1. This is the first panel data analysis to verify the effects of changes in eating habits on obesity.
2. Long-term large-scale longitudinal data were used.
3. Lifestyle habits were self-assessed and may be vulnerable to reporting bias.
4. The sample comprised relatively health-conscious individuals who voluntarily participated in health checkups, and the findings may therefore have limited applicability to less health-conscious people.

Modification #3.

- Strengths and Limitations

Comment #4

Please include a data sharing statement at the end of your paper.

Response #4.

Thank you for your comment. We have added the following:
"No additional data are available."

Modification #4.

- Page 14 Line 329: Data sharing statement

Comment #5

Please include an ethical approval statement in your paper.

Response #5.

This study was approved by the ethics committee of the Japan Medical Data Center (JMDC). We have added the following sentence to the end of the Data Source subsection in the Methods:
"Approval for this study was obtained from the ethics committee of the JMDC."

In addition, the following statement has been added to the end of the paper:

"This study was approved by the ethics committee of the Japan Medical Data Center."

Modification #5.

- Page 5 Line 98: Methods, Data Source
- Page 14 Line 326: Ethics approval statement

For Reviewer 1

Comment #1

TITLE

1) The authors used the words, “changes in eating speed”. However, I can’t find any comments about “changes in eating speed”. If they checked the change in eating speed from baseline to re-examination, there are 9 patterns in the changes (3 x 3 tables); ex) fast to fast, fast to normal, fast to slow, etc. If yes, they should add the tables and clearly state some comments in the model analyses. If no, they should change the title, abstract and text appropriately.

Response #1

We thank the reviewer for their meticulous review of our manuscript. We would like to confirm that “changes in eating speed” is correct, and accurately reflects the analysis.

While the reviewer has advised the inclusion of a cross table that summarizes the changes in eating speed, it would actually be difficult to generate an appropriate and meaningful table for these changes. As shown in Table 1, each subject participated in an average of approximately 4 checkups. In addition, the subjects varied in their year of participation, year of withdrawal, and frequency of health checkups. Furthermore, subjects may shift through various eating speeds throughout the course of these checkups. These variations therefore make it difficult to monitor the changes in each subject across the observation period.

In this study, we statistically analyzed the effects of changes in eating speed using a generalized estimating equation model and a fixed-effects model. By applying these models to panel data, we were able to estimate the effects of changes in eating speed on the respective dependent variables (obesity and BMI) over a 6-year period. In other words, these models calculated the changes in the dependent variables according to changes in eating speed (e.g., fast to fast, fast to normal, fast to slow, etc.) at the individual level across the observation period; using fast eating speed as the reference, the models estimated the possible effects of slow and normal eating speeds.

We recognize that this was unclear in our explanation of the statistical analysis, and apologize for the oversight. We have included the following explanation regarding the use of the generalized estimating equation model and fixed-effects model to estimate the effects of changes in eating speed on the dependent variables:

“Patient-level panel data were generated using repeated estimates from multiple health checkups. This study used longitudinal data from annual health checkups collected over approximately 6 years. The application of panel data enables the estimation of changes in the dependent variables that result from changes in eating speed (e.g., fast to fast, fast to normal, fast to slow, and so on) in individual subjects. We first constructed a generalized estimating equation model to elucidate the effects of changes in eating speed on obesity.”

Modification #1

- Page 7 Lines 152-155: Methods, Statistical Analysis

Comment #2

INTRODUCTION

- 1) Please add the hypothesis (P4).

Response #2

Thank you for the suggestion. As advised, we have included the following hypothesis in the final paragraph of the Introduction:

“For this analysis, we hypothesized that slower eating speeds would reduce obesity.”

Modification #2

- Page 5 Lines 81-82: Introduction

Comment #3

MATERIALS AND METHODS

1) Why did the authors choose only type 2 diabetes participants? Please clarify it in the text.

Response #3

Thank you for pointing this out. We have included the following explanation to clarify our focus on type 2 diabetes participants in the final paragraph of the Introduction:

“Although many studies have addressed the associations between lifestyle habits and obesity, few have examined the causal effects of changes in lifestyle habits on obesity. In addition, studies from Japan have shown that the number of persons with type 2 diabetes has increased with increasing BMI¹³, and that BMI is an independent risk factor for this condition.¹⁴ This study focuses on persons with type 2 diabetes as they are likely to benefit directly from health improvements arising from the alleviation of obesity. The main objective of this study was to utilize panel data to analyze the effects of changes in eating speed and other lifestyle habits on obesity.”

13. Yoshiike N, Nishi N, Matsushima S, et al. Relationship between the severity of obesity based on body mass index and the risk factors for diabetes, hypertension, and hyperglycemia: a multicenter epidemiological study. *Obesity Research* 2000; 6: 4-17. [in Japanese]

14. Waki K, Noda M, Sasaki S, et al. Alcohol consumption and other risk factors for self-reported diabetes among middle-aged Japanese: a population-based prospective study in the JPHC study cohort I. *Diabetic Medicine* 2005; 22(3): 323-31.

Modification #3

• Page 4 Lines 76-80: Introduction

Comment #4

2) How did the authors use only BMI but not waist circumference? BMI has some limitations.

Response #4

Thank you for your comment. The Evidence-based Practice Guideline for the Treatment for Diabetes in Japan 2013 published by the Japan Diabetes Society (http://www.jds.or.jp/modules/en/index.php?content_id=44) advocates the use of BMI, not waist circumference, as an indicator of obesity. Furthermore, studies from Japan have shown that the number of persons with type 2 diabetes has increased with increasing BMI [Yoshiike et al., 2000], and that BMI is an independent risk factor for this condition [Waki et al., 2005]. For these reasons, we selected BMI as an outcome measure of this study.

However, we have also conducted a supplementary analysis of waist circumference, and have included it in the Discussion to provide additional information for readers.

“In addition to BMI-based definitions of obesity, waist circumference–based definitions of abdominal obesity have also become increasingly important in recent years.

Cerhan et al. proposed that assessments of waist circumference should accompany assessments of BMI.³² As a supplementary analysis, we employed a fixed-effects model to examine the effects of changes in eating speed on waist circumference in our subjects. The results showed that when compared with fast eaters, normal-speed eaters and slow eaters had reductions in waist circumference of 0.21 cm and 0.41 cm, respectively ($P < 0.001$). These results support our findings of the effects of changes in eating speed on obesity.”

32. Cerhan JR, Moore SC, Jacobs EJ, et al. A pooled analysis of waist circumference and mortality in 650,000 adults. *Mayo Clinic Proceedings* 2014; 89(3): 335-45.

Modification #4

• Page 10 Lines 242-250: Discussion

Comment #5

3) Did the authors checked other questionnaires associated with obesity? Did they investigate all data or not? Please clarify this point.

Response #5

Thank you for these questions. While we had used specific health checkup data from health insurance societies, BMI-based obesity was set as the main outcome measure in our research protocol. As this study was designed to test a hypothesis (and was not exploratory research), we focused on data that was directly related to our objective.

With regard to other data such as waist circumference, we have included a supplementary analysis as described in our response to Comment #4.

Comment #6

4) The authors should include sex as the covariate. They should also consider categorized age group as it (P7).

Response #6

Thank you for your comment. As advised, we have included sex as a covariate in the generalized estimating equation model analysis of obesity status. However, in the estimates of the fixed-effects model with BMI as the dependent variable, sex and other covariates that remained unchanged throughout the observation period were adjusted as fixed effects.

For the same reason, we felt that even if age was categorized into groups, there would be few changes to this covariate over the 6-year observation period. In addition, the use of age categories may result in some subjects changing categories over the observation period, and others remaining in the same categories. As these changes would be inconsistent and statistically irrelevant, they would not be appropriate for a fixed-effects model. We have included the following sentence to explain that sex did not have to be included as a covariate in the fixed-effects model.

“The exposure variables were the 7 lifestyle habit items, and the covariates were the use of anti-diabetic medication, age, and obesity status in the previous checkup. Sex and other covariates that remained unchanged throughout the observation period were adjusted as fixed effects.”

Modification #6

• Page 8 Lines 163-164: Methods, Statistical Analysis

Comment #7

RESULTS SECTION

1) Please change the references in the Table 2 and 3 because the risk should not be a reference.

Response #7

Thank you for your comment. Statistically, there is no issue in using any category as the reference. Rather, the reference should be chosen with consideration to the best method that reflects how the results are designed to be presented. For example, our approach was not to show if fast eating would increase obesity, but instead to show if slow eating could reduce obesity, which we felt was more important given the rising prevalence of obesity in Japan. Therefore, we elected to use the risk factor of fast eating as the reference. Similarly, we also analyzed the other exposure variables using the same approach, where we examined if the cessation or reduction of poor lifestyle habits (e.g., eating soon before sleeping or daily alcohol consumption) could help to reduce obesity.

Comment #8

DISCUSSION SECTION

1) The discussion and conclusion may be changed by new results (see above).

Response #8

Thank you for your comment. We have added the new supplementary analysis results of waist circumference to the Discussion.

“In addition to BMI-based definitions of obesity, waist circumference–based definitions of abdominal obesity have also become increasingly important in recent years. Cerhan et al. proposed that assessments of waist circumference should accompany assessments of BMI.³² As a supplementary analysis, we employed a fixed-effects model to examine the effects of changes in eating speed on waist circumference in our subjects. The results showed that when compared with fast eaters, normal-speed eaters and slow eaters had reductions in waist circumference of 0.21 cm and 0.41 cm, respectively ($P < 0.001$). These results support our findings of the effects of changes in eating speed on obesity.”

Modification #4

- Page 10 Lines 242-250: Discussion

Comment #9

2) Please add the comments about other limitation in this study; i.e., no data of waist circumference and other important confounders.

Response #9

As advised by the reviewer, we have included a supplementary analysis of waist circumference to the Discussion. (Because this supplementary analysis was not within the main scope of our study, we did not include it in the Methods and Results). Other confounders that may have been useful in this study include energy intake and physical exercise, and their non-inclusion could be considered a study limitation. As physical exercise was already included as a limitation, we have added energy intake and a further clarification of these points. Other factors that did not change throughout the observation period were adjusted as fixed effects in the fixed-effects model.

“Thirdly, we did not include an analysis of physical exercise and energy intake, which may be potential confounders. Nevertheless, a previous analysis has reported that eating speed was associated with obesity regardless of the level of physical activity.²⁴ In addition, other studies have reported similar associations between eating speed and BMI given similar overall food intake, which corroborates our findings.^{22,23} Therefore, these 2 factors are unlikely to be confounders in this study despite their association with BMI.”

Modification #9

- Page 12 Lines 292-297: Discussion, Limitation

Comment #10

3) This is a longitudinal study. Thus, the authors can't state “changes in eating habits have a causal relationship with obesity and BMI” (P12).

Response #10

Thank you for your comment. As advised, we have revised the sentence as follows:

“However, this study utilized panel data to show that changes in eating habits have a strong relationship with obesity and BMI.”

Modification #10

- Page 13 Lines 303: Discussion

Comment #11

4) There is no reference #41 (P11).

Response #11

We apologize for the error, and thank the reviewer for pointing this out. The citation has been corrected to reference #43.

“However, while the differences in perceptions of eating and sleeping habits in standardized questionnaires have been described,43...”

Modification #11

- Reference number

For Reviewer 2

Comment #1

Major comment

1. It is better to clarify the reason why you focus on participants with type 2 diabetes in the study.

Response #1

Thank you for your comment. We have included the following explanation to clarify our focus on type 2 diabetes participants:

“Although many studies have addressed the associations between lifestyle habits and obesity, few have examined the causal effects of changes in lifestyle habits on obesity. In addition, studies from Japan have shown that the number of persons with type 2 diabetes has increased with increasing BMI¹³, and that BMI is an independent risk factor for this condition.¹⁴ This study focuses on persons with type 2 diabetes as they are likely to benefit directly from health improvements arising from the alleviation of obesity. The main objective of this study was to utilize panel data to analyze the effects of changes in eating speed and other lifestyle habits on obesity.”

13. Yoshiike N, Nishi N, Matsushima S, et al. Relationship between the severity of obesity based on body mass index and the risk factors for diabetes, hypertension, and hyperglycemia: a multicenter epidemiological study. *Obesity Research* 2000; 6: 4-17. [in Japanese]

14. Waki K, Noda M, Sasaki S, et al. Alcohol consumption and other risk factors for self-reported diabetes among middle-aged Japanese: a population-based prospective study in the JPHC study cohort I. *Diabetic Medicine* 2005; 22(3): 323-31.

Modification #3

- Page 4 Lines 76-80: Introduction

Comment #2

2. Please describe the criteria of type 2 diabetes.

Response #2

Thank you for the suggestion. We have included the identification criteria as follows:

“We first identified subjects with at least one recorded diagnosis of type 2 diabetes in their claims data from January 2005 to June 2013 using the corresponding International Classification of Diseases, 10th revision codes (E10–E14).”

Modification #2

- Page 5 Lines 102-103: Methods, Study Design

Comment #3

3. Why you choose two analysis, GEE model and Fixed-effect model?

Response #3

Thank you for your question. While we utilized a fixed-effects model to analyze BMI (a continuous variable) as the dependent variable, an overly low BMI may also be indicative of other health problems. As a result, this study focused on obesity status (which we defined as a BMI ≥ 25). However, a preliminary analysis found that a large number of patients maintained the same obesity status (obese or non-obese) throughout the observation period. If we were to use a fixed-effects model to analyze obesity (a categorical variable), these subjects with unchanging obesity statuses would be excluded from analysis and cause a substantial reduction in sample size. For this reason, we employed a GEE model to examine obesity. In response to a suggestion by another reviewer, we have also included a supplementary analysis of waist circumference using a fixed-effects model.

Modification #3

- Page 10 Lines 242-250: Discussion

Comment #4

4. In table2, odds ratio of obese is extremely large. Did you check multicollinearity or others? Can you explain why the odds ratio is extremely large?

Response #4

Thank you for your comment.

The OR for “obesity status in the previous checkup” represents the OR for a person who was obese (BMI ≥ 25) during the previous health checkup (generally one year prior) to be assessed (again) as obese in the present health checkup. As the present obesity status is likely to be very strongly associated with the previous obesity status (barring cases of significant weight loss), we would also expect the OR for this factor to be high even without any multicollinearity. If there were multicollinearity, we would also expect to see an extremely high coefficient for BMI even though it is a continuous variable. However, the coefficient for BMI was not inordinately high (Table 3), and multicollinearity is therefore unlikely to be an issue.

Comment #5

5. Please describe the results of the Hausman test.

Response #5

Thank you for your comment. We have added the following as advised:

“The Hausman test was employed for model selection; the P-value was below 0.001, which confirmed that the use of the fixed-effects model was appropriate.”

Modification #5

- Page 8 Lines 165-166: Methods, Statistical Analysis

Comment #6

6. Please be careful to conclude the causal relationship. This paper describe the association between eating speed and obesity, rather than the effect of changes in eating speed on obesity.

Response #6

Thank you for your comment. We would like to confirm that “changes in eating speed” is correct, and accurately reflects the analysis. In this study, we statistically analyzed the effects of changes in eating speed using a generalized estimating equation model and a fixed-effects model. By applying these models to panel data, we were able to estimate the effects of changes in eating speed on the

respective dependent variables (obesity and BMI) over a 6-year period. In other words, these models calculated the changes in the dependent variables according to changes in eating speed (e.g., fast to fast, fast to normal, fast to slow, etc.) at the individual level over the observation period; using fast eating speed as the reference, the models estimated the possible effects of slow and normal eating speeds.

We recognize that this was unclear in our explanation of the statistical analysis, and apologize for this oversight. We have included the following explanation regarding the use of the generalized estimating equation model and fixed-effects model to estimate the effects of changes in eating speed on the dependent variables:

“Patient-level panel data were generated using repeated estimates from multiple health checkups. This study used longitudinal data from annual health checkups collected over approximately 9 years. The use of panel data enables the estimation of changes in the dependent variables that result from changes in eating speed (e.g., fast to fast, fast to normal, fast to slow, and so on) in individual subjects.”

In addition, we have revised the sentence about the causal relationship as follows:

“However, this study utilized panel data to show that changes in eating habits have a strong relationship with obesity and BMI.”

Modification #6

- Page 7 Lines 152-155: Methods, Statistical Analysis
- Page 13 Line 303: Discussion

Comment #7

Minor comment

1. In tables, It is better to list the covariates in the footnote.

Response #7

Thank you for your comment. In the previous version of the manuscript, sex was not included as a covariate in the GEE model. It is now included as a covariate in the revised manuscript, as shown in Table 2. (Sex was not added in the fixed-effect model in Table 3 as it was adjusted as a fixed effect). All variables analyzed in the models are included in Tables 2 and 3 themselves, and therefore do not need to be listed in the footnotes.

Modification #7

- Table 2

Comment #8

2. Line206 (This indicated that slower eating speeds may lead to the alleviation of obesity), this sentences should be written in discussion.

Response #8

Thank you for your comment. We agree that the sentence is more suited for the Discussion than the Results. As there are similar sentences already in the Discussion (“The main results indicated that decreases in eating speeds can lead to reductions in obesity and BMI after controlling for the covariates” in the first paragraph and “The major finding of this study is that changes in eating speed can affect obesity and BMI” in the third paragraph), we have simply deleted that sentence from the Results without shifting it to the Discussion, and thank the reviewer for pointing this out.

Modification #8

- Results

Comment #9

3. Add the strength of your study in discussion.

Response #9

Thank you for your comment. We have revised the second paragraph of the Discussion to emphasize the study's strengths.

"A strength of this study is the utilization of large-scale panel data from approximately 60,000 diabetes patients spanning a 6-year observation period. The use of long-term panel data increases the accuracy of estimates when compared with conventional cross-sectional and time series data.¹⁵ Panel data also enable adjustments of the unobservable differences between study subpopulations, thereby facilitating analyses of the effects of behavioral changes in subjects. Another strength of this study is the incorporation of data on lifestyle habits, such as eating, sleeping, and smoking. By analyzing the associations between these habits and obesity, our study was able to quantify the possible effects of changes in these habits on obesity."

Modification #9

• Page 10 Lines 219-227: Discussion

Comment #10

4. Line 298 to 302, I can't understand meaning of these sentences in before and after "in addition".

Response #10

Thank you for the comment. These sentences were included to explain that even though our analysis did not include physical exercise and energy intake as covariates, previous studies that have included these variables still produced similar results to ours. In other words, these previous results support our findings even with the lack of the 2 variables. However, we realize that this is unclear as we had not included the lack of energy intake as a limitation. We have added this to the revised manuscript, and also provided an additional explanation for clarity.

"Thirdly, we did not include an analysis of physical exercise and energy intake, which may be potential confounders. Nevertheless, a previous analysis has reported that eating speed was associated with obesity regardless of the level of physical activity.²⁴ In addition, other studies have reported similar associations between eating speed and BMI given similar overall food intake, which corroborates our findings.^{22,23} Therefore, these 2 factors are unlikely to be confounders in this study despite their association with BMI."

Modification #10

• Page 12 Lines 291-297: Discussion, Limitation

Comment #11

5. Please mention ethics approval.

Response #11

Thank you for your comment. This study was approved by the ethics committee of the Japan Medical Data Center (JMDC). We have added the following sentence to the end of the Data Source subsection in the Methods to clarify this:

"Approval for this study was obtained from the ethics committee of the JMDC."

In addition, the following statement has been added to the end of the paper:

"This study was approved by the ethics committee of the Japan Medical Data Center."

Modification #11

- Page 5 Line 98: Methods, Data Source
- Page 14 Line 326: Ethics approval statement

VERSION 2 – REVIEW

REVIEWER	Daisuke Ekuni Okayama University, Japan
REVIEW RETURNED	15-Nov-2017

GENERAL COMMENTS	<p>The paper was overall improved. However, there is some issues. The article needs to be revised. Comments in detail:</p> <p>INTRODUCTION 1) Please add the comments about type 2 diabetes in the aim. The title should be also considered.</p> <p>MATERIALS AND METHODS 1) The authors should show the all results about the association between waist circumference and eating speed if the hypothesis is “slower eating speeds would reduce obesity.” 2) The authors should add a table to show the change in eating speed and which data used in the models. It’s still complicated. 3) Please add the approval number of ethical committee.</p> <p>RESULTS SECTION 1) Please unify the references in the Table 2 and 3. In the obtain adequate sleep, “Yes” (a good lifestyle) is the reference, but in the habitual smoker, “Yes” (a bad one) is it.</p>
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VERSION 2 – AUTHOR RESPONSE

For Reviewer 1

Comment #1

INTRODUCTION

- 1) Please add the comments about type 2 diabetes in the aim. The title should be also considered.

Response #1

Thank you for the advice. As suggested, we have included diabetes in the study aim and title.

Modification #1

- Title
- Page 2 Line 24: Abstract:
- Page 5 Lines 93: Introduction

Comment #2

MATERIALS AND METHODS

1) The authors should show the all results about the association between waist circumference and eating speed if the hypothesis is “slower eating speeds would reduce obesity.”

Response #2

Thank you for the suggestion. We have included all analytical results on the association between waist circumference and eating speed in Table 5 of the revised manuscript. Waist circumference was also included in the Methods, Results, Discussion, and Conclusions as appropriate.

Modification #2

- Page 6 Lines 131-132: Methods
- Page 7 Lines 162-163: Statistical Analysis
- Page 7 Lines 174-177: Statistical Analysis
- Page 8 Line 195: Results
- Page 9 Lines 200-201: Results
- Page 10 Lines 236-239: Results
- Page 13 Line 338: Discussion
- Page 14 Line 344: Conclusion
- Table 5

Comment #3

MATERIALS AND METHODS

2) The authors should add a table to show the change in eating speed and which data used in the models. It's still complicated.

Response #3

For further clarification, we have included the paragraph below in the Results of the revised manuscript. In addition, the changes in eating speed are presented in Table 2. However, the patterns of changes in eating speed vary among the 59,171 subjects. In addition, the subjects have also undergone different numbers of checkups (1-6) over the study period. Depending on the subjects, these patterns include simple changes from fast to slow over 2 checkups, as well as more complex patterns where subjects cycle through all three eating speeds throughout 6 checkups. As a result, it is prohibitively difficult to present a table that shows all possible combinations of changes in eating speed.

Therefore, for subjects who underwent a higher number of checkups (4-6 checkups), we have included an “intermediate phase” comprising the 2nd to 5th checkups. If a subject reported different eating speeds during this intermediate phase, we selected the eating speed from the following order of priority: slow, normal, and fast. For example, a subject with a mixture of slow and fast eating speeds reported in the 2nd to 5th checkups would be reflected as having a slow eating speed during the intermediate phase.

“The mean number (and standard deviation) of health checkups among the 59,171 subjects used in the panel data analysis was 1.9 (1.1). The distribution of subjects (and percentage of all subjects) according to the number of health checkups undergone during the study period was as follows: 21,805 subjects (36.5%) with 1 checkup, 17,694 (29.6%) subjects with 2 checkups, 12,075 (20.2%) subjects with 3 checkups, 4,524 (7.6%) subjects with 4 checkups, 3,248 (5.4%) subjects with 5 checkups, and 371 (0.6%) subjects with 6 checkups. Table 2 shows the changes in eating speed across these checkups according to the different baseline eating speeds. Approximately half (51.9%) of the subjects exhibited changes in eating speed from baseline during the study period. The results showed that 171 subjects (0.29%) changed from being fast eaters to slow eaters, whereas 92 subjects (0.15%) changed from being slow eaters to fast eaters.”

Modification #3

- Page 9 Lines 202-213: Results
- Table 2

Comment #4

3) Please add the approval number of ethical committee.

Response #4

Thank you for your comment. We have added the number (18-09-2014) to the revised manuscript.

Modification #4

- Page 5 Line 110: Methods

Comment #5

RESULTS SECTION

1) Please unify the references in the Table 2 and 3. In the obtain adequate sleep, "Yes" (a good lifestyle) is the reference, but in the habitual smoker, "Yes" (a bad one) is it.

Response #5

Thank you for your suggestion. As pointed out, the reference for sleep was different from those of the other determinants. In order to standardize the references to the "undesirable" habit, we have changed "Adequate sleep" to "Inadequate sleep", and have re-performed the analysis as appropriate. We are grateful to the reviewer for pointing this out.

Modification #5

- Page 9 Lines 221-222: Results
- Table 1
- Table 3
- Table 4