Author's response to reviews

Title: Changes in metabolic profiles after the Great East Japan Earthquake: a retrospective observational study

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Author's response to reviews: see over
To Mr. Jimmar Dizon  
Journal Editorial Office of *BMC Public Health*  
BioMed Central  

October 26\(^{th}\), 2012  

Dear Jim  

I, along with co-authors, highly appreciate your kindness to give us the opportunity to revise our manuscript entitled by ‘Changes in metabolic profiles after the Great East Japan Earthquake: a retrospective observational study (MS: 4235326087935155)’. We regret the delay in responding to your letter, but we simply would like to revise the manuscript to satisfy the criteria according to STROBE guideline. The revision is now completed and the changes were described point by point in the following pages. The modification also highlighted as red in main body.  

Please feel free to contact us as needed.  

Thanking you  

Sincerely,  

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STROBE Statement—checklist of items that should be included in reports of observational studies

<table>
<thead>
<tr>
<th>Item No</th>
<th>Recommendation</th>
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<tbody>
<tr>
<td><strong>Title and abstract</strong></td>
<td>(a) Indicate the study’s design with a commonly used term in the title or the abstract</td>
</tr>
<tr>
<td>1</td>
<td>[Reply] Yes, the study design has been shown in title as well as abstract; “a retrospective observational study” is shown in the title (Page 1) and the method section in abstract was revised as follows: “A total of 200 people who attended health screening program in September to October in both 2010 (pre-quake) and 2011 (post-quake) were retrospectively reviewed and included in this study. Results on physical examinations and metabolic tests were compared between pre- and post-quake data or tsunami and radiation group.” (Page 2)</td>
</tr>
<tr>
<td>(b) Provide in the abstract an informative and balanced summary of what was done and what was found</td>
<td></td>
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<tr>
<td></td>
<td>[Reply] In revised abstract, we clearly showed aim/hypothesis and method to give readers an informative and balanced summary. (Line 2 to 14 in Page 2)</td>
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<tr>
<td>Introduction</td>
<td></td>
</tr>
<tr>
<td><strong>Background/rationale</strong></td>
<td>Explain the scientific background and rationale for the investigation being reported</td>
</tr>
<tr>
<td>2</td>
<td>[Reply] We revised background section to show scientific meanings of our study and relevant previous reports in detail; we added the rationale to explain why this study was done in Soma city (Line 15 to 23 in Page 4) and the background of comparison between Tsunami and Radiation group. (Line 1 to 7 in Page 3)</td>
</tr>
<tr>
<td><strong>Objectives</strong></td>
<td>State specific objectives, including any prespecified hypotheses</td>
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<td>3</td>
<td>[Reply] We mentioned the objectives/hypothesis in second paragraph of Page 5 as follows; “The aim of this study is to determine the changes in metabolic status before and after the great earthquake in the evacuees who was living in temporary houses in Soma. The results were also compared between evacuees moved from coast area due to tsunami (tsunami group) and those from mountain side area due to high radiation estimated (radiation group). We hypothesized that metabolic outcomes in the evacuees were impaired post-quake as shown in previous reports [6-8].”</td>
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<tr>
<td><strong>Methods</strong></td>
<td>Present key elements of study design early in the paper</td>
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<td>4</td>
<td>[Reply] We mentioned the study design of ‘retrospective observational study’ in the first sentence in Method section and explained it in detail in the same paragraph using figure. (Line 16 in Page 5 to Line 4 in Page 6);</td>
</tr>
</tbody>
</table>
This retrospective observational study was approved by the ethical review board of the Institute of Medical Science of the University of Tokyo (Approval number: 23-11). The health screening program for the evacuees who was living at temporary houses in Soma was conducted in September 19 to 25, 2011. This program was informed to the residents by municipal government of Soma city using bulletin boards in the temporary house complex approximately a month before the screening. Any residents in temporary house complex in Soma were able to participate in the health screening program. A total of 765 people who were aged 1 to 92 years voluntarily participated in the program. The participants included people who had lived in the districts suffered from the great tsunami in Soma city (Tsunami group) and also those who had lived in the Iitate village, neighboring Soma city, that is placed in the mandatory evacuation zone due to high radiation (Radiation group) (Figure 1) [15]. To compare with the health screening data collected at pre- and post-quake, only the participants who were assessed both in September to October 2010 and 2011 (n=200) were included in this study (Figure 2). There were no additional interventions in this study.

Setting

Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection

[Reply] As described in the former section (No. 4: Study design—Method), this study is a retrospective observational study and was informed through local government. The subjects voluntarily join this screening program. The screening was held in September 19 to 25, 2011 in Soma, Fukushima, Japan. Any additional interventions were not performed for this screening. This study was approved by the Institute of Medical Science, the University of Tokyo (Approval # 23-11) and data on blood laboratory and physical examination were retrospectively collected without identifiable information.

Participants

(a) Cohort study—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up

[Reply] Any residents in temporary house complex were able to participate in the health screening program. Among the participants, those who completed the health screening in September to October 2010 were included in this study to compare the results between 2 years. This is a retrospective study and no patients were followed up by this study. We described as follows;

“The health screening program for the evacuees who was living at temporary houses in Soma was conducted in September 19 to 25, 2011. This program was informed to the residents by municipal government of Soma city using bulletin boards in the temporary house complex approximately a month before the screening. Any residents in temporary house complex in Soma were able to participate in the health screening program. A total of 765 people who were aged 1 to 92 years voluntarily participated in the program.” (Line 17 to 22 in Page 5)

“To compare with the health screening data collected at pre- and post-quake, only the participants who were assessed both in September to October 2010 and 2011 (n=200) were included in this study (Figure 2).” (Line 1 to 3 in Page 6)

Variables

Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable

[Reply] We described as follows; (Line 6 to 20 in Page 6)

“Variables in health screening

The height, body weight, waist size, blood pressure and blood test as glucose level, hemoglobin A1c (HbA1c) and lipid panel were examined according to the national guideline that defines comparability and quality of the sample measurement [16]. Body mass index (BMI) was calculated as weight (kg) divided by height squared (meter2). The value for HbA1c (%) is estimated as the
National Glycohemoglobin Standardization Program (NGSP) equivalent value (%) calculated by the formula HbA1c (%) = 1.02 × HbA1c defined by Japan Diabetes Society (%) + 0.25%, considering the relational expression of HbA1c measured by the previous Japanese standard substance and measurement methods of NGSP HbA1c [17].

Reference values were defined based on the previous manuscripts or current guidelines for Japanese population as follows; high BMI: ≥ 27 kg/m2 [18], high waist circumstance: ≥ 85 cm (men) or 90 cm (women) [19], high systolic/diastolic blood pressure: ≥ 130/85 mmHg [19], high HbA1c: ≥ 5.7 % [20], low high-density lipoprotein (HDL) cholesterol: ≤ 1.03 mmol/L (40 mg/dL) [21], high low-density lipoprotein (LDL) cholesterol: ≥ 3.62 mmol/L (140 mg/dL) [21] and high triglyceride: ≥ 1.69 mmol/L (150 mg/dL) [21].

Also, the potential predictors for the elevation in HbA1c were defined as follows;
“The following variables at baseline were considered for potential predictors and examined by univariate analysis; age, gender, residence, regular clinic visit, smoking, body weight, BMI, waist circumstance, systemic and diastolic blood pressure, HDL and LDL cholesterol and triglyceride.”

<table>
<thead>
<tr>
<th>Data sources/ measurement</th>
<th>8*</th>
<th>For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group</th>
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<tbody>
<tr>
<td>Bias</td>
<td>9</td>
<td>Describe any efforts to address potential sources of bias</td>
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<td>[Reply] We used multivariate logistic analysis to avoid potential bias to find predictive variables for the elevation in HbA1c;</td>
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<td>“A multivariate logistic regression analysis was used to identify the independent predictive variables in baseline data associated with the change of HbA1c between 2010 and 2011 defined by above 75% percentile of the distribution. Before multivariate analysis, univariate logistic analysis was performed to select the candidates for multivariate analysis. The variables with p value less than 0.10 in univariate models entered multivariate analysis with backward stepwise technique. Model fit was assessed using the Hosmer-Lemeshow goodness-of-fit test. All statistical significance in this report was considered when p &lt; 0.05.”</td>
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<tr>
<td>Study size</td>
<td>10</td>
<td>Explain how the study size was arrived at</td>
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<td>[Reply] We explained the sample size in the first paragraph in Method section using flow chart as follows;</td>
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<td>“A total of 765 people who were aged 1 to 92 years voluntarily participated in the program.” (Line 21 in Page 5)</td>
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<td></td>
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<td>“To compare with the health screening data collected at pre- and post-quake, only the participants who were assessed both in September to October 2010 and 2011 (n=200) were included in this study (Figure 2).”</td>
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<td>Quantitative variables</td>
<td>11</td>
<td>Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why</td>
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<td></td>
<td></td>
<td>[Reply] We explained as follows; (Line 6 to 20 in Page 6)</td>
</tr>
<tr>
<td></td>
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<td>“Variables in health screening</td>
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The height, body weight, waist size, blood pressure and blood test as glucose level, hemoglobin A1c (HbA1c) and lipid panel were examined according to the national guideline that defines comparability and quality of the sample measurement [16]. Body mass index (BMI) was calculated as weight (kg) divided by height squared (meter²). The value for HbA1c (%) is estimated as the National Glycohemoglobin Standardization Program (NGSP) equivalent value (%) calculated by the formula HbA1c (%) = 1.02 × HbA1c defined by Japan Diabetes Society (%) + 0.25%, considering the relational expression of HbA1c measured by the previous Japanese standard substance and measurement methods of NGSP HbA1c [17].

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Statistical methods

(a) Describe all statistical methods, including those used to control for confounding

[Reply] We described as follows; (Line 7 to 11 in Page 7)

“Statistical analysis was employed with IBM SPSS Statistics version 20 (IBM Corporation, Armonk, NY). Data collected in 2010 were used for baseline. Mann-Whitney U or Pearson Chi-square tests were performed to compare numerical data or ratios data between tsunami and radiation group, respectively. Wilcoxon matched-pair signed rank or McNemar test was employed to compare numerical data or proportions between the two years.”

And multivariate logistic regression analysis was also employed in this study;

“A multivariate logistic regression analysis was used to identify the independent predictive variables in baseline data associated with the change of HbA1c between 2010 and 2011 defined by above 75% percentile of the distribution. Before multivariate analysis, univariate logistic analysis was performed to select the candidates for multivariate analysis.” (Line 13 to 16 in Page 7)

(b) Describe any methods used to examine subgroups and interactions

[Reply] We included district information as a subgroup, defined as follows;

“Districts suffered from the great tsunami in Soma

Tsunami evacuees were divided into three areas according to administrative districts; Area 1: northeastern area where majority of houses or buildings were completely damaged and the residents were mainly company employees of the neighbor factories or managed guest houses before the earthquake, Area 2: eastern area where houses or buildings were partially damaged and the majority of residents were fishing families, and Area 3: southern area where the majority of houses were completely destroyed and the residents had lived on fishing and farming (Supplemental figure 1).”

(Line 22 in Page 6 to Line 4 in Page 7)

This factor was included in univariate regression analysis followed by multivariate analysis (Line 13 in Page 7)

(c) Explain how missing data were addressed

[Reply] We explained as follows; (Line 11 in Page 7)

“The subjects were excluded from individual evaluations if they had missing data.”

(d) Cohort study—If applicable, explain how loss to follow-up was addressed

[Reply] This is a retrospective study and no follow-up was performed.

(e) Describe any sensitivity analyses

[Reply] This study does not include sensitive analysis.
Results

Participants 13*

(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed

[Reply] We described number of subjects as follows;
“...This program was informed to the residents (n = 2,407) by municipal government of Soma city using bulletin boards in the temporary house complex approximately a month before the screening. Any residents in temporary house complex in Soma were able to participate in the health screening program. A total of 765 people who were aged 1 to 92 years voluntarily participated in the program.” (Line 19 to 22 in Page 5)
“...To compare with the health screening data collected at pre- and post-quake, only the participants who were assessed both in September to October 2010 and 2011 (n=200) were included in this study (Figure 2).”

(b) Give reasons for non-participation at each stage
[Reply] As shown in the former section (No. 13; Participants-Results), the residents were able to participate in the screening voluntarily and no exclusion criteria were defined. We discussed as follows;
“...only 32% of residents at temporary house complex (765 of 2407 residents) participated in the health screening in 2011 although no exclusion criteria were defined, suggesting low interest in health problems in the evacuees.” (Line 11 to 13 in Page 11)

(c) Consider use of a flow diagram
[Reply] Figure 2 was prepared to show a flow diagram; (Line 11 in Page 16)
“Figure 2. Flow diagram of subjects.
Data collected in the post-quake health screening were retrospectively analyzed after matching those with pre-quake data.”

Descriptive data 14*

(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
[Reply] We described participants’ characteristics as follows in main body as well as in Table 1 (Page 17);
“Participants’ characteristics at pre-quake
The total cohort (n = 200) had an age of 64 (57–71) (median [interquartile interval]) years in 2010 and gender (men/women) of 81 (40.5%)/ 119 (59.5%). The results of health screening were summarized by group (Table 1). Median ages in tsunami and radiation evacuees were 64 (58–69) and 64 (55–73), respectively and gender distributions were 70 of female (64.8%) in tsunami group and 49 (53.3%) in radiation group. No significant differences in age and gender ratio were found between the two groups.”

(b) Indicate number of participants with missing data for each variable of interest
[Reply] Supplemental table 1 was prepared to show number of subjects with missing data for individual measurements; (Line 8 in Page 8)
“The number of subjects who have missing data was summarized by year and by group (Supplemental table 1).”

(c) Cohort study—Summarise follow-up time (eg, average and total amount)
[Reply] This study is a retrospective study and no follow-up was performed.

Outcome data 15*

Cohort study—Report numbers of outcome events or summary measures over time
[Reply] Report on summary measures over time was created in Table 3 (Page 20) and supplemental table 2;
“Changes in screening data before and after the earthquake
Changes in health screening variables between pre- and post-quake were summarized in Table 3. Significant increase were observed in body weight, BMI, waist circumstance and HbA1c levels for total cohort after the earthquake when compared to pre-quake values (p = 0.004, 0.03, 0.008 and < 0.001, respectively) while
HDL cholesterol level was significantly decreased (p = 0.03) (Supplemental table 2). When compared these changes between tsunami and radiation groups, we found significant differences in waist circumstance, systolic blood pressure, diastolic pressure and HbA1c (p = 0.03, 0.03, < 0.001 and < 0.001, respectively, table 3)."

Main results 16 (a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included

[Reply] We described the results from univariate and multivariate logistic regression models for the prediction of elevated HbA1c as follows;

“Variables predicting change in HbA1c in tsunami group
We determined predictive variables for deteriorating HbA1c in tsunami group. After univariate analysis using baseline variables (Supplemental table 3), pre-quake residence of Area 2, regular clinic visit and waist circumstance were identified as significant factors in the multivariate model (p= 0.02, 0.02 and 0.008, respectively) (Table 4).” (Line 8 to 12 in Page 9)

(b) Report category boundaries when continuous variables were categorized

[Reply] We described category boundaries as follows;

“Reference values were defined based on the previous manuscripts or current guidelines for Japanese population as follows; high BMI: ≥ 27 kg/m2 [18], high waist circumstance: ≥ 85 cm (men) or 90 cm (women) [19], high systolic/diastolic blood pressure: ≥ 130/85 mmHg [19], high HbA1c: ≥ 5.7 % [20], low high-density lipoprotein (HDL) cholesterol: ≤ 1.03 mmol/L (40 mg/dL) [21], high low-density lipoprotein (LDL) cholesterol: ≥ 3.62 mmol/L (140 mg/dL) [21] and high triglyceride: ≥ 1.69 mmol/L (150 mg/dL) [21].” (Line 15 to 20 in Page 6)

Other analyses 17 Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses

[Reply] Post-quake screening results were compared between tsunami and radiation group;

“Screening results at post-quake
There was significant difference in diastolic blood pressure between tsunami and radiation group (p = 0.002, Table 2). For laboratory variables, significant lower HDL cholesterol level and the ratio of low-HDL population were found in radiation group compared to tsunami group. The other variables did not show any significant differences between the two groups.” (Line 16 to 20 in Page 8)

Discussion Key results 18 Summarise key results with reference to study objectives

[Reply] We summarized key results in the first paragraph of Discussion section;

“In this article, it is revealed that metabolic variables of body weight, BMI, waist circumstance, HbA1c and HDL cholesterol were deteriorated in the evacuees living at temporary houses in Soma city, Fukushima, compared to the pre-quake records. This finding suggests that metabolic health problem such as diabetes and hypercholesterolemia should be carefully monitored and treated in the disaster area where over one year have passed since the quake although acute disease of infection or psychological issues were concern in the wellness for survivors in early phase of disaster relief [3, 22].” (Line 15 to 20 in Page 9)

Limitations 19 Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias

[Reply] We discussed limitations of our study as follows;

“There are several limitations in this study; small cohort with limited age-range, retrospective analysis, and the lack of social background information may cause unknown bias. The cohort in this study might have high concern for health wellness, which suggests that the risk of developing metabolic diseases shown in this
study might be lower than actual population. Actually, only 32% of residents at temporary house complex (765 of 2407 residents) participated in the health screening in 2011 although no exclusion criteria were defined, suggesting low interest in health problems in the evacuees.” (Line 9 to 14 in Page 11)

**Interpretation**

Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence

[Reply] We described limitation in our study as shown in former section (No. 19 Limitations-Discussion). In addition, we put our interpretations on physical examination using results from previous reports; “Variables in physical examination such as body weight, BMI, waist circumstance and blood pressure have not been largely changed before and after the earthquake although statistical significances were found in body weight, BMI and waist circumstance in total cohort. A previous report showed that blood pressure could be elevated for one or two weeks after a major quake but returned to pre-quake levels at one month post-quake[25], being consistent with our results in total cohorts since the post-quake health screening was conducted 6 months after the earthquake. Though, in radiation group, significant elevation of systolic and diastolic blood pressure was observed at post-quake screening. Mental stress triggered by the nuclear accident can be a cause of the alternations in radiation group as the psychological stress could affect blood pressure [26]. Meanwhile, glycemic control was worsened in total cohort and tsunami group after quake in our study. Inui A. et al demonstrated that HbA1c was elevated with the peak 3 to 4 months after the Hanshin-Awaji earthquake in January 1995 and changes in psychological status and life styles possibly influenced the metabolic disease[27].” (Line 5 to 16 in Page 10)

**Generalisability**

Discuss the generalisability (external validity) of the study results

[Reply] We described a caution when considering generalisability as follows; “Actually, only 32% of residents at temporary house complex in Soma (765 of 2407 residents) participated in the health screening in 2011 although no exclusion criteria were defined, suggesting low interest in health problems in the evacuees. Also caution is needed when the results from this study are extended to the other disaster since a portion of evacuees were examined in this study. Further and long-term investigation with large cohort should be planned in the future.” (Line 12 to 17 in Page 11)

**Other information**

**Funding**

Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

[Reply] We explained as follows; (Line 17 to 19 in Page 12/Acknowledgement section) “This study was done on a voluntary basis and there is no funding support; however, the health screening program was partially supported by Novartis Holding Japan K.K.”

This report is original and there is no other papers on this study that were submitted to the other journals.

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.