Reviewer's report

Title: Dietary patterns associated with fall related fracture in elderly Japanese: a population based prospective study

Version: 1 Date: 7 September 2009

Reviewer: Marie-Jeanne Kergoat

Reviewer's report:

Re:

BMC Geriatrics
Dietary patterns associated with fall related fracture in elderly Japanese: a population based prospective study

GENERAL COMMENTS

The authors aimed to evaluate the statistical association of baseline dietary patterns characterized by principal component factor analysis with fall-related fractures among elderly Japanese subjects based on 4-year follow-up and insurance claim records.

The article deals with an interesting issue and seems well conducted, despite some not insurmountable shortcomings. Available information on a posteriori dietary pattern analysis (multiple dietary components operationalized as a single exposure) and fall-related fractures is still sparse.

However, the article is too brief; several important details are missing in order to adequately assess the quality of the study. The background and discussion sections are based on few references and should be improved. Are there previous studies published to date that identified similar dietary patterns in other elderly Japanese? Are there any other papers that have identified dietary patterns according to other existing approaches and have assessed their association with fall-related fractures?

- Major Compulsory Revisions (which the author must respond to before a decision on publication can be reached)

The initial argument justifying the study is uncertain and the statistical analysis itself requires a better argumentation. Principal component analysis is a popular exploratory method of dietary pattern analysis and is burgeoning in nutrition and epidemiologic research. Dietary pattern analysis examines all foods consumed concurrently and, for this reason, is thought to be a more meaningful way of
assessing dietary exposure than considering individual nutrients. The authors should further explain how their study may adequately account for “cumulative effects” and address the issue of reproducibility of dietary patterns over time in elderly participants. The dietary patterns identified in the study can equally well reflect patterns of important nutrients or particular intake levels of important nutrients, which are statistically associated with outcome. A meaningful assessment of the association between dietary patterns and fall-related fractures calls for extra effort to refine the statistical techniques by taking into account the food items and the exact nutrient component involved.

To conclude in any epidemiologic study that an observed association between an exposure and outcome is valid, the possibility that some aspect of the design or conduct of a study has introduced a bias into the results or that the observed association is in fact due to a confounding variable must be considered and discussed. The authors should discuss the validity of the information collected about exposure and outcome, the effects of non participation and losses to follow-up. As well, who has collected the data and, what is their experience and skills?

Since the study is conducted on a particular sample of persons with certain characteristics (people with health-care insurance in a specific region), it is necessary to ask whether the findings are generalizable, that is, whether the results are applicable to other populations.

SPECIFIC COMMENTS

- Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

Background

p. 3, 1st paragraph, 4th line: specify or remove the “etc.”

p. 3, 2nd paragraph, and 2nd line: The word “elucidate” seems too strong for what the authors have really done.

p. 3, 2nd paragraph, 2nd line: Tucker “and colleagues”.

p. 3, 2nd paragraph, 7th line: Specify what the word “their” refers to, the last cited study or the last two?

p. 3, 2nd paragraph, 12th line: Is the qualifier “animal” required?

Methods

- Understanding of the study could be greatly facilitated by adding a section explaining the general course and procedure used.

Methods/Study population

p. 3, 1st paragraph: Indicate that it is a “convenience sample”.

p. 4, 2nd line: “Participated” or “provided written consent and agreed for a
baseline assessment”?

p. 4, 2nd paragraph, 5th line: The word “follow-up” suggests that authors have evaluated the issues at different times while data on the outcome have simply been registered from administrative records.

p. 4, 2nd paragraph, 5th line: What does “their health condition” mean? Is that only the presence of “fall-related fractures” or more than that?

- Who has done baseline examinations? What are the skills of these professionals?

In Figure 1, what does « assigned » mean? The word seems inappropriate to the context of the study.

Methods/Diagnosis of fracture

p. 4: What is the validity of information on causes of fractures from “insurance claim records” or “clinical records” of patients?

- All participants started the study at the same time? Are the dates of enrolment the same? Were all really followed until the end of the study, for 49 months? There was no loss to follow-up?

- The sentence “cut-off date for participants alive at the time of closure of the dataset” in the “Methodology” section suggests that there have been deaths.

- Is the outcome of interest the “first” fall-related fracture?

Methods/Assessment of dietary intake

p. 4: Please, specify the type of diet assessment method used. Is it an interviewer-administered diet history or a self-administered food frequency questionnaire (as the reference #16 indicates)?

- The authors mention that “the mean daily intake of nutrients was calculated”. Have they considered other nutrients than energy? If so, could they present information on at least protein, calcium and vitamins K and D content?

- What is the unit of measure that was used for statistical analyses? Grams of consumed food items? Percent of energy provided from each food items? Number of servings/food group/day?

- Reference #16 indicates that the FFQ was validated against a 3-day diet record in women, designed to give an accurate description of short-term intake information rather than long-term dietary habits. As well, the questionnaire probably gathers less valid intake estimation for men.

Methods/Assessment of other variables

- This section requires clarification. The authors should justify the reasons why these variables were measured? Some variables seem more associated to a fall than a fracture (e.g. use of hypnotic medication).

- The authors should specify the tools and procedure used. Provide appropriate
references and specify the units of measure used in statistical analysis.

- What do “experience of smoking”, “experience of drinking” mean?
- What are stabilizers: antidepressant, benzodiazepine?
- Why not include other medications or conditions associated with osteoporosis as heparin, anticonvulsive therapy, or early menopause?

- Major Compulsory Revisions (which the author must respond to before a decision on publication can be reached)

Methods/Statistical analysis

p. 5: Understanding of the overall statistical process would be facilitated by first adding a section explaining in simple current language (not technical jargon) what the authors try to do by the used statistical techniques.

- The principal component factor analysis and the Cox proportional-hazards regression are based on a number of important assumptions which need to be assessed before the statistical techniques can be safely applied. The authors must inform the readers about this.

p. 5, 1st paragraph, 4th line: Factors to be retained were identified by eigenvalues greater than 2.5. The magnitude of the cut-off point directly influences the observed findings and must be justified.

p. 5, 1st paragraph, 5th line: The percent of explained variance by each factor must be placed in the “Results” section. These values (15.5%, 7.3% and 7.2%) seem low and question the validity of the patterns identified.

p. 5, 1st paragraph, 10th line: I understand that individuals were classified according to tertiles of adherence based on dietary pattern scores. The qualifiers “unconfirmed”, “moderately confirmed” and “confirmed” needs to be explained to the readers and discussed in the light of the obtained results (e.g. moderately confirmed group in the meat pattern).

p. 5, 2nd paragraph, 1st line: It is not clear why the authors have used the Cox regression rather than a simple logistic regression technique.

p. 5, 2nd paragraph, 3rd line: Why have the authors used the Kruskal-Wallis test rather than a parametric test and why have they compared only the T1 and T3 groups?

p. 5, 2nd paragraph, 3rd line: Specify what the modifiable factors are. Why were these modifiable factors considered? Why were they adjusted for the BMI and energy? Aren’t BMI and energy variables also modifiable factors?

p. 5, 2nd paragraph, 3rd line: What does the Kaplan-Meier product-limit analysis add to the study?

p. 6, 1st paragraph: The authors have written “The study was not registered to any clinical trial registration websites because the study started in 2001 and the recruitment of participants was completed in 2002.” What does this sentence
- On what basis have the variables been introduced in Cox analyses?

Results/Study population

p. 6, 1st paragraph, and 1st line: The outcome of interest is fall-related fractures. Why are cases involving fractures from other causes not included with the group of “not fall-related fracture”? This issue seems problematic.

- The title “Age-sex adjusted” is not appropriate for all of the variables in Table 1: Age and sex have not been adjusted for age and sex!

- What do the values in the Table 2 represent: factor scores or correlation coefficients? To what does the term “simplicity” at the bottom of Table 2 refer? Is this value used in the statistical process or used only for the presentation of results?

- One should read tertile and not quartile in the title of Table 3.

- The values in parentheses in Tables 1 and 3 (quartiles) could be confused with those of the Table 4 (confidence intervals).

- What statistical test was used to compare the Kaplan-Meier survival curves in Figures 2 and 3? Is this the log-rank (Mantel–Cox) test?

- Figure 2 and 3 results presented in the text add nothing to what has already been said. Their usefulness is questionable.

- Major Compulsory Revisions (which the author must respond to before a decision on publication can be reached)

Discussion

- See general comments mentioned above. The authors should considerably improve their discussion of methods and results and their treatment on the limitations of the study.

- p. 8: Even if the authors have great respect for that person, the reference to “the greatest naturalist in Chinese history Li Zizhen” seems anecdotal and does not belong in a scientific article.

- p. 9, 1st paragraph: The article identified the food patterns and not the quality of intakes. Consequently, the affirmation “dietary patterns containing an adequate amount of meat may reduce the risk of fall-related fracture” is not supported by the current study. It is the same for the affirmation “An adequate intake of meat has the possibility of reducing fall-related fracture risk in elderly Japanese” in the abstract.

- One might wonder if people have fallen and were injured due to the diet or because of repeated falls. It would be interesting and important to consider the number of falls occurred in the follow-up. Prior overall falls increase the risk of subsequent overall falls (see Leclerc et al., Chronic Dis. Can. 2008; 28(4):111-20, available to http://www.phac-aspc.gc.ca/publicat/cdic-mcc/28-4/pdf/cdic28-4-1eng.pdf and
Leclerc et al., Can. J. Public Health 2009;100(4):263-7). People can have a fracture because of a repeated number of falls caused by factors other than food or bone health. Failure to monitor the participants for the new falls occurred after enrolment, the authors could have indirectly examined the association between dietary patterns and fall-related fractures by controlling for the influence of “history of falling in the past six months”.

References

The bibliography contains a few typographical problems and spelling mistakes. It will have to be reviewed carefully.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests