

## 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

<b>TITLE (PROVISIONAL)</b>	Associations between chronic diseases and choking deaths among older adults in the United States: a cross-sectional study using multiple-cause mortality data from 2009 to 2013
<b>AUTHORS</b>	Wu, Wen-Shiann; Sung, Kuan-Chin; Cheng, Tain-Junn; Lu, Tsung-Hsueh

### VERSION 1 - REVIEW

<b>REVIEWER</b>	Ellen Kramarow PhD, Health Statistician National Center for Health Statistics Centers for Disease Control and Prevention United States
<b>REVIEW RETURNED</b>	07-Aug-2015

<b>GENERAL COMMENTS</b>	<p>This paper draws attention to the relationship between chronic diseases and choking among older adults. It's an important public health issue that does not get much attention in discussions of aging. The focus is on showing that analyzing food choking (W79) only (instead of all choking: W78-W80) misses the association between choking and several important chronic diseases, especially schizophrenia, other mood disorders, and oral cancers. Also, the association of food choking and stroke is not significant while the association of stroke and all choking is significant. These findings are useful to present. However, I suggest revisions in some of the language and presentation to clarify various issues and to be more careful in the conclusions that can be drawn from U.S. mortality data.</p> <p>1) The Kramarow et al. analysis chose to analyze only food choking (W79) because of the uncertainty surrounding the W80 code ("inhalation and ingestion of other objects"). While small forensic studies suggest that the majority of choking deaths are due to food, the data presented cannot support the statement on page 9 that "...most of the cases coded as ICD-10 code W80 were actually food-related choking cases." Using mortality data alone, we really don't know what proportion of the deaths coded W80 involve food. Even if most of the "other objects" are in fact food (which is likely), there could be differences in the rates of "mis-coding" by various factors (demographic, geographic etc.) that would affect our interpretation of this misclassification. I suggest being more conservative in the language (especially on pages 9 and 11) to acknowledge the uncertainty.</p> <p>2) The labels and language used in tables 2 and 3 are somewhat confusing and should be revised. The % shown in table 2 is the percentage of deaths where choking is mentioned among the deaths where the particular chronic disease is mentioned. It should be</p>
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	<p>clarified that the “mention” can be as either an underlying cause of death or an associated cause of death.</p> <p>3) Drawing attention to the deaths from schizophrenia and mood disorders is admirable, but the reader should be reminded of the relative magnitude of these deaths. For example, schizophrenia is mentioned on death certificates for approximately 2700 deaths per year, while Alzheimer’s and dementia account for about 300,000 deaths per year. The importance and public health significance of the connection between choking and disease should be mindful of the absolute numbers as well as the relative associations.</p>
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<b>REVIEWER</b>	Mateo Cabre Hospital de Mataró. Internal Medicine Mataró Barcelona Spain
<b>REVIEW RETURNED</b>	11-Aug-2015

<b>GENERAL COMMENTS</b>	<p>Data and methods. Authors should explain more clearly the relationship between expected and observed deaths. The formula they use should have a reference.</p> <p>Discussion. It would be useful to know whether there were differences of deaths from aspiration of food or other causes among different age ( intervals) and functional status of patients who died. The dead with very old and very dependent especially in degenerative diseases with a high prevalence of dysphagia is difficult to attribute death by choking food. It is not surprising that the choking are more common in patients with psychiatric illness (schizophrenia) or Parkinson's disease with low functional dependence. These arguments may explain the low rate of death with food- related choking</p>
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### VERSION 1 – AUTHOR RESPONSE

Reviewer 1 (Ellen Kramarow)

This paper draws attention to the relationship between chronic diseases and choking among older adults. It’s an important public health issue that does not get much attention in discussions of aging. The focus is on showing that analyzing food choking (W79) only (instead of all choking: W78-W80) misses the association between choking and several important chronic diseases, especially schizophrenia, other mood disorders, and oral cancers. Also, the association of food choking and stroke is not significant while the association of stroke and all choking is significant. These findings are useful to present. However, I suggest revisions in some of the language and presentation to clarify various issues and to be more careful in the conclusions that can be drawn from U.S. mortality data.

1) The Kramarow et al. analysis chose to analyze only food choking (W79) because of the uncertainty surrounding the W80 code (“inhalation and ingestion of other objects”). While small forensic studies suggest that the majority of choking deaths are due to food, the data presented cannot support the statement on page 9 that “...most of the cases coded as ICD-10 code W80 were actually food-related choking cases.” Using mortality data alone, we really don’t know what proportion of the deaths coded W80 involve food. Even if most of the “other objects” are in fact food (which is likely), there could be

differences in the rates of “mis-coding” by various factors (demographic, geographic etc.) that would affect our interpretation of this misclassification. I suggest being more conservative in the language (especially on pages 9 and 11) to acknowledge the uncertainty.

Response: We have deleted the sentence “...most of the cases coded as ICD-10 code W80 were actually food-related choking cases.” We have added your points in the discussion. Please see the second paragraph on page 10 in the revised manuscript.

2) The labels and language used in tables 2 and 3 are somewhat confusing and should be revised. The % shown in table 2 is the percentage of deaths where choking is mentioned among the deaths where the particular chronic disease is mentioned. It should be clarified that the “mention” can be as either an underlying cause of death or an associated cause of death.

Response: We have revised the wording as you suggested.

3) Drawing attention to the deaths from schizophrenia and mood disorders is admirable, but the reader should be reminded of the relative magnitude of these deaths. For example, schizophrenia is mentioned on death certificates for approximately 2700 deaths per year, while Alzheimer’s and dementia account for about 300,000 deaths per year. The importance and public health significance of the connection between choking and disease should be mindful of the absolute numbers as well as the relative associations.

Response: Thank you for this thoughtful comment. I have quoted your words in the revised manuscript assuming that you agreed the quotation. Please see the last two sentences in the second paragraph on page 11 in the revised manuscript.

Reviewer: 2 (Mateo Cabre)

Data and methods.

Authors should explain more clearly the relationship between expected and observed deaths. The formula they use should have a reference.

Response: We have rephrased the descriptions on the relationship between expected and observed deaths. We have added five references. Please see the second paragraph on page 6 in revised manuscript.

Discussion.

It would be useful to know whether there were differences of deaths from aspiration of food or other causes among different age (intervals) and functional status of patients who died. The dead with very old and very dependent especially in degenerative diseases with a high prevalence of dysphagia is difficult to attribute death by choking food. It is not surprising that the choking are more common in patients with psychiatric illness (schizophrenia) or Parkinson’s disease with low functional dependence. These arguments may explain the low rate of death with food- related choking.

Response: Thank you for this thoughtful comment. I have added this point as one of the limitations of this study. Please see the last two sentences in the second paragraph on page 12 in the revised manuscript.

### VERSION 2 – REVIEW

<b>REVIEWER</b>	Ellen Kramarow National Center for Health Statistics USA
<b>REVIEW RETURNED</b>	22-Sep-2015

<b>GENERAL COMMENTS</b>	I appreciate that the authors accepted the reviewers' comments about limitations and clarification, but it is not appropriate to quote directly from the reviews and just insert the words verbatim into the
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	<p>manuscript. This is not acceptable practice and does not fit with the language of the paper.</p> <p>The titles of figures 2-3 still need some work to be understandable and should be revised in accordance with the guidelines of the journal.</p>
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## VERSION 2 – AUTHOR RESPONSE

Reviewer 1 (Ellen Kramarow)

I appreciate that the authors accepted the reviewers' comments about limitations and clarification, but it is not appropriate to quote directly from the reviews and just insert the words verbatim into the manuscript. This is not acceptable practice and does not fit with the language of the paper.

Response: We are sorry for directly quoting your words. We have rewritten the sentences in the revised manuscript. Please see the following changes.

Revised: We did not have autopsy data to determine the proportion of choking deaths been classified as ICD-10 code W80. However, according to previous forensic studies, 16-20 many of deaths been classified as ICD-10 code W80 were in actually involving food. Furthermore, the misclassification would vary by characteristics of the deceased and certifiers.

Original: However, using mortality data alone, we really don't know what proportion of the deaths coded W80 involve food. Even if most of the "other objects" are in fact food (which is likely), there could be differences in the rates of "mis-coding" by various factors (demographic, geographic etc.) that would affect our interpretation of this misclassification. (Last paragraph on page 10)

Revised: However, we should not concern only the relative associations but also the absolute number of deaths, as number of deaths with mention Alzheimer's disease were 100 times more than the number of deaths with mention schizophrenia, in which the public health implications are quite different.

Original: However, caution should be noted on the relative magnitude of these deaths. For example, schizophrenia was mentioned on death certificates for approximately 2700 deaths per year, while Alzheimer's and dementia account for about 300,000 deaths per year. The importance and public health significance of the connection between particular chronic disease and choking should be mindful of the absolute numbers as well as the relative associations. (Last paragraph on page 11)

Reviewer 1 (Ellen Kramarow)

The titles of figures 2-3 still need some work to be understandable and should be revised in accordance with the guidelines of the journal.

Response: We have revised the titles of table 2-3 accordance with the guidelines of the journal.