Reviewer's report

Title: A Cross-Sectional Comparison of Cancer Risk Behaviors and Screening Utilization Among Women Caregivers and Non-Caregivers

Version: 1 Date: 30 April 2012

Reviewer: Geoffrey J Hoffman

Reviewer's report:

Review of “A Cross-Sectional Comparison of Cancer Risk Behaviors and Screening Utilization Among Women Caregivers and Non-Caregivers”

This is a cross-sectional study using 2009 BRFFS data for a subset of women ages 41 and older from four states. The study examines whether caregiver status is associated with cancer risk health behaviors and screening practices among these women. The topic of health behaviors among caregivers is underrepresented in the literature, so this is an important research topic. The data are sound and the writing is generally clear and concise. The authors cite relevant literature (although more literature may be available for the authors’ use). This study’s research findings could be of interest to caregiver or cancer researchers and those interested in preventive public health efforts. On the other hand, the study could benefit from use of alternative methodological strategies that may better identify and control for biases that can frequently occur in cross-sectional studies.

Major compulsory revisions:

1. The study can benefit from a conceptual model to undergird the research question and the discussion of the findings and potential study limitations. Presently, the study has a number of outcomes under examination each of which can have different causal mechanisms. Stress, chronic stress, distress (depression), and lack of time are listed as potential causal factors of poor cancer risk behaviors. It is important that the causal pathways are discussed in greater detail and that literature is cited linking these independent factors to poor health behaviors or screening practices. A substantive discussion in the introduction of the pathways from caregiving (through stress, distress, time limitations, or others) can improve the readability of the manuscript and also provide for clearer understandings of the study results, including potential biases. Using a conceptual model, it may be easier to justify the variable selection and to determine whether there are biases due to missing variables or how exclusion of the income variable could affect parameter estimates.

2. The study employs backwards elimination to select covariates for each of the separate model estimates. While other studies have employed this methodological technique, it may suffer from several important drawbacks and the authors could benefit from utilization of alternative covariate selection
methods. This statistical method is prone to bias due to problems with multiple inference, which can affect significance levels generated during hypothesis testing. Also, the results section presents point estimates and confidence intervals using models that include different covariate sets, meaning that the point estimates are not comparable across models. But the estimates are presented as being comparable. This should be addressed in the manuscript. The set of variables included in the models would be most useful if they were based on theoretical and conceptual understandings rather than a computer-generated method. I would therefore recommend using an alternative method to justify covariate selection.

3. The study relies upon breast and cervical cancer screening guidelines proposed by the American Cancer Society (ACS). It would be useful to discuss recent changes to the ACS guidelines in the discussion section and not just in the introduction, as well as to incorporate those changes into the analysis. Accordingly, in the discussion section, the sentence, “Our definition of meeting guidelines as having a Pap test within the previous three years is likely to be overly conservative,” is not necessarily correct. Also, 21% of the study sample of caregivers was over age 65 and the ACS guidelines for women in this age range recommend no cervical cancer screening for women with regular testing and normal results. 84% of caregivers received cervical cancer screening within guidelines, suggesting that potentially most caregivers were screened according to guidelines. Perhaps presentation of information regarding the proportion of women #65 could clear up this issue. Finally, it might be useful to present information regarding guidelines presented by the U.S. Preventive Services Task Force (USPSTF), which recommends biennial mammography for women #50 (including what percentage of caregivers in this study would have followed guidelines), or justify why ACS guidelines were chosen for this study.

Minor Essential Revisions:

Introduction:

1. In the first paragraph, citation #5 is incorrect—it does not refer to caregivers. I think you may perhaps be citing a report by the National Alliance for Caregiving? And, if so, is there possibly a factual error with the figures listed in the first sentence of the second paragraph?

2. Second sentence: the “health effects of caregiving are…”

3. In the second sentence of the fourth paragraph, it is preferable not to have such a precise number (209,060) with the modifier, “approximately”.

Methods:

4. The manuscript would improve if unweighted estimates (reported in Table 1 and elsewhere) of the study sample were provided. The study would also benefit from clearly identifying the analytic sample size for each logistic model and indicating whether complete-case analysis was used in each model.
Results:

5. The statement about 30% more likely across several outcomes (in the 2nd paragraph under Cancer Risk Behaviors) could be misleading due to the fact that different adjustments were made across the models.

6. It is advisable to avoid use of the word “likely” (throughout the results section) when using logistic regression output, unless you computed relative risks from the ORs.

7. In the second paragraph of the Cancer Risk Behaviors section, the reference to the interaction term (age x body mass index) was unclear—which of the models is referred to?

8. Under Cancer Screening Behaviors, what does “trend” refer to? Is this a ptrend? If so, that is not referenced in the results or methods sections.

Discussion:

9. In the last paragraph of Cancer Screening Behaviors) the associations of obesity, smoking, and physical activity are described as varying by age and race. However, in Tables 3 and 5 there appear to be sizeable overlaps of the CIs for a number of the age- and race- stratified models.

10. The third sentence of the fourth paragraph is not clear (“…by the health and the relationship…”)

Conclusion:

11. In the 2nd sentence, there appears to be a typo—it should probably read, “approximately one-third of caregivers had not been screened for breast cancer…”

Discretionary Revisions:

Introduction:

1. Citations #9 and #10 were listed as being limited for not being stratified by gender, but those studies were not focused on cancer prevention, but rather general preventive health behaviors—so it is not clear if stratification would have been beneficial in the manner the authors suggest.

2. It may be useful to indicate hypotheses for the stratified analyses.

3. The study may benefit from defining the terms stress, psychological distress, chronic stress, and chronically high stress in the first and second paragraphs.

4. It might be useful to have a uniform set of either positive or negative health behaviors to provide consistency in interpretation of parameter estimates. For instance, one could use the terms smoking, alcohol use, obesity, sedentary behaviors, insufficient fruit/vegetable consumption, and code accordingly.
Methods:

5. Clarification of the coding of the alcohol use covariate may be useful. Is alcohol use defined as the number of drinks each day (the text indicates per time) that a subject drank, and did you assess consumption per day as \( [(\text{days drank in past month}) \times (\text{drinks per day during days with drinking})]^* ] / [\text{days per month}] \)?

6. It may be useful to explain in the body of the manuscript that the study’s health behavior variables, which were outcome variables, were also used as predictors in the models with cancer screening as the outcome.

7. In the statistical analysis, it could be beneficial to run a sub-analysis including the income covariate (for a limited study population) and compare the results to the other models. Not using income could create residual confounding (if income is related to caregiver status and to a predictor of screening such as insurance or to health knowledge).

8. It could be useful to describe how vegetable/fruit consumption was measured (was it based upon a portion size conversion, for instance).

Results:

9. It may be unnecessary to use the word significant when describing associations in this section. If you are reporting an association, then the reader can infer that the association is significant (unless you specify otherwise).

10. Under Cancer Risk Behaviors, rather than stating that caregivers were more likely to be obese, it could be more accurate to state that they had greater odds compared to non-caregivers of “reporting being obese”.

Discussion:

11. It may be beneficial to include additional references to literature on caregiver health behavior—there are at least 10 or 15 additional studies not cited in this manuscript—although those studies do not exclusively examine cancer risk behaviors.

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.