Reviewer’s report

Title: Factors Associated with Type 2 Diabetes in Patients with Vascular Dementia: A Population-Based Cross-Sectional Study

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Reviewer: Andrew Smyth

Reviewer's report:

1. You state that this is a cross-sectional study but in the abstract describe incident dementia - this is not possible in a cross sectional study. You also describe that you 'retrospectively investigated the factors associated with type 2 diabetes'. Is this a cross-sectional study or retrospective cohort study? In the background you then discuss 'prevalence of DM-related complications. Which is it - incidence or prevalence?

2. Do you think that it is adequate to base the presence/absence of diagnoses of diabetes and mellitus on administrative data? Just because a random sample of administrative data are checked each years and false reports are associated with a penalty - who does this check? Would it not be better to have actual clinical criteria to make these diagnoses?

3. What is the primary research question - prevalence of diabetes in those with dementia? Why not the prevalence of dementia in those with diabetes? I'm not sure I understand why it is important to look at the prevalence of diabetes in those with dementia. Surely it would be more relevant to see what the rate of dementia is in all of those with diabetes - if the contention is that dementia is a potential complication of diabetes?

4. Please explain and justify why chronic pulmonary disease is considered a cardiovascular disease?

5. Please justify the appropriateness of combining renal disease and an abnormal lipid profile.

6. Is there any data on how reliable the Charlson comorbidity index is, when calculated based on administrative data? Given the distribution of the Charlson Comorbidity Score in participants in this cohort, it is not appropriate to compare with t-test, suggest that you review this.

7. What is meant by 'multivariable logistic regressions’? What was adjusted for?

8. Is the opening line of the results meant to convey that 22.5% of patients with dementia have diabetes? If so, then say so.
9. Are the factors that are linked to DM in dementia similar to those linked to DM in the general population without DM?

10. What is meant by the phrase 'and younger (range of admitted OR: 0.55-1.13)’? Is this one OR with a confidence interval or to represent a number of different variables?

11. Explain what is the difference between an association between DM and comorbidities etc, and then stating that you 'also analysed the associations of DM with income, etc'.

12. Is it surprising that DM prevalence was higher in those with more comorbidity? How many of those are established complications of diabetes?

13. Explain the validity of the statement 'a greater number of renal/metabolic system related diseases' when there are only 2 disease included in that 'group'.

14. Your statement that screening for dementia in patients with diabetes doesn't make sense - the way your paper is designed suggests that you should screen for diabetes in patients with dementia as 1/5 of them will have it. You have no estimate of the proportion of people with diabetes that will develop dementia.

15. Is it new information that lower income status is associated with diabetes? Surely not, as low socioeconomic status has been linked with higher rates of many chronic diseases. Your argument after the statement 'low income level to be associated with a higher prevalence of DM' is actually explaining the association between low income level and dementia, not diabetes.

16. The grouping of comorbidities with similar pathophysiologies speaks more to the fact that those conditions are established complications of diabetes, rather than new mediators of the association between diabetes and dementia. Treatment of those disorders is primarily aimed at preventing worsening of those conditions, which may as a by product reduce the future risk of dementia, but to state that the reason for treating hypertension in diabetes is to prevent dementia is excessive.

17. I don't understand Table 3 - how can CVD yes vs no have an OR or 3.93 but the number of CVD shows 1-3 is only 2.28 and 4-6 is only 2.33? This doesn't make sense. It also doesn't makes sense to group the digestive disorders if there are only 2, and the renal/metabolic if there are only two. It looks like it doesn't matter if you have 2 vs 1 GI disease, but that there is an interaction between renal disease and hyperlipidemia. That analysis would be more interesting and appropriate. Also explain how the estimate for cancer in Table 2 and Table 3 are different? Is it not a single predictor variable?
Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

No

Does the work include the necessary controls?
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No

Are the conclusions drawn adequately supported by the data shown?
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