Reviewer's report

Title: The prevalence of diabetic complications and multimorbidity in the population with Type 2 Diabetes Mellitus in the Basque Country

Version: 1 Date: 18 August 2014

Reviewer: Conor Teljeur

Reviewer's report:

This is a good quality study on a large population that gives useful information of the prevalence of multimorbidity in a population with Type 2 Diabetes Mellitus.

Major compulsory revisions:

1. Overall, the main issue with the article is the quality of the English. There are numerous instances of unusual phrasing which may render the meaning of the text ambiguous. Rather than list all of them, I will refer to ones that are particularly problematic. However, they should all still be dealt with. I would advise the authors to have the manuscript checked by someone with English as a first language to improve the text.

2. The article would benefit from an additional paragraph in the Discussion section highlighting the potential policy implications of the findings. What preventive care or service delivery changes could be implemented with the results of this study? What needs to be done next, now that we have good information on multimorbidity?

While I have marked these as major compulsory revisions, I do not believe they are particularly onerous. The quality of English must be of a certain standard. Inclusion of text on policy implications should not be difficult to prepare and it will increase the value of the study and make it more citable.

Minor Essential Revisions:

Abstract

3. First sentence - "divers'? Perhaps "...associated with a diverse range of pathologies."

4. Second sentence - "The aim of the study was..." - past tense should be used.

5. Second paragraph - "...compared with those of an adjusted age and sex [matched?] population."

6. Third paragraph - "unrelated" rather than "non-related"

Background

7. The first paragraph needs to be rewritten for clarity. The language is clumsy.

8. Second paragraph - spell out "vs." instead of using the abbreviation.
9. Third paragraph - say "subjects without diabetes" rather than "nondiabetic subjects."

10. Third paragraph - the second sentence repeats what is already stated in the second paragraph - is this repetition necessary?

11. Fifth paragraph - perhaps clarify with "... and many have limited themselves to examining a short pre-defined list of the most common chronic diseases." Reference 17 did not restrict itself to a short list.

Methods

12. Second paragraph - what are "electronic medical record models"? Is 'model' necessary?

13. Second/third paragraph - are records available for every primary care visit and hospital discharge? Is there any information on how many diagnoses codes are recorded for a visit? Are ICD9 codes used for both primary and secondary care visits? Referring to another publication isn't enough when this describes the data used in your study.

14. Fourth paragraph - Why only 35+ - was type II diabetes really that rare in the 30-34 age group? Perhaps give some indication of evidence to support the chosen cut-off point. Also, might be clearer to state that patients aged less than 35 years were excluded rather than referring to 34 as the threshold, as the text is slightly confusing.

15. Fifth paragraph - should the last year end on 31-08-2011 rather than 21-08-2011?

16. Fifth paragraph - what is the "established cut-off point"? Do you mean the last date in the study period (i.e., 2011)? It should be clearly stated what is meant.

17. Fifth paragraph - the inclusion criterion of living in the Basque Country is already stated in the previous paragraph.

18. Sixth paragraph - it states that the hospital admission due to specified diagnoses were "determined independently". What does that mean? Do you mean separately for each observation period or does it refer to how the records were identified?

19. Sixth paragraph - can you reference the "related comorbidities" or clearly indicate how you decided on that list?

20. Sixth paragraph - no harm in explicitly listing the sources in the last sentence rather than forcing the reader to figure out from the previous pages.

21. Seventh paragraph - again, it is not enough to state that something was done previously and give a reference. You should give the reader at least some information about the 'database' rather than requiring them to read another paper.

22. Seventh paragraph - you mention 52 health problems which reduced to 43 after excluding T2DM and the associated comorbidities, of which you list seven in the previous paragraph. Forthy three plus one plus seven = 51. What is missing?
23. Eighth paragraph - perhaps it would help to clearly state that you set the alpha level at 0.05 in the analyses.

24. Eighth paragraph - there is no mention of whether or not you considered adjusting for multiple hypothesis testing. Given that you do not mention any prior expectations about gender and age differences it may have been justified.

Results

25. First paragraph - one decimal place is sufficient.

26. Second paragraph - the text uses the phrase "renal failure" while Table 2 uses "kidney failure" - it would be better to have consistent terminology.

27. Second paragraph - rather than listing those for which the difference was not statistically significant (which is four out of eleven), maybe list those for which the gender difference was highly significant. One reason is that the p-value for gender difference in major amputations is 0.0519 which, whilst not achieving statistical significance in the strict application of 0.05, still shows evidence of a difference.

28. Third paragraph - again, terminology needs to be consistent - ictus/stroke.

29. Third paragraph - can you include in brackets the p-value for 32% lower probability of suffering avoidable hospitalisation.

30. Third paragraph - the results here contradict some of those presented in the previous paragraph/Table 2. It begs the question of why present the Table 2 data when age is clearly important? Also, why not extend Table 3 to include the incident outcomes?

31. Fourth paragraph - the word 'significant' has quite specific connotations when describing a statistical analysis. Do you mean the number of heart attacks and amputations was not substantial? If you carried out a test that produced a significance value then you should describe it.

32. Sixth paragraph - data on the general population are introduced here for the first time. Perhaps it is alluded to in the Methods with reference to previous publications, but that is not sufficient. The Methods section should clearly state that this will be used in the analysis. Also, why is the comparison restricted to the chronic conditions rather than also including the incident events?

33. Eighth paragraph - the choice of conditions to highlight lower prevalence in the T2DM population is curious. Migraine, for example, has a low prevalence in either population. No test for significant difference is presented. Incidentally, the higher prevalence of substance abuse in T2DM patients is curious.

Discussion

34. Second paragraph - the greatest value is in how the T2DM population compares to the general population and to other similar studies, so this should come up front. Paragraphs 2 and 3 should probably be swapped around.

35. Fourth paragraph - should be amalgamated with the fifth paragraph.

36. Fifth paragraph - the first sentence should state "In our analysis of gender
differences in multimorbidity, men presented...

37. Fifth paragraph - are there plausible reasons for the observed gender differences or is this something that requires further study? Think of how these differences might feed into policy for health promotion or service delivery.

38. Sixth paragraph - "population with diabetes" rather than "diabetic population".

39. Sixth paragraph - reference 17 was not limited to complications and found 189 conditions. Perhaps rephrase the last sentence.

Conclusions

40. First paragraph - include acronym (CPG) after Clinical Practice Guidelines as it appears later in the paragraph.

41. First paragraph - perhaps clarify that "90.36% of T2DM patients aged 35 years and over". It's a pity that the equivalent figure for the non-T2DM population isn't available.

42. Table 1
The title could change to "Incidence of complications of diabetes over the study period"
The label "Incidence (%)" needs to go above columns "Year 1" to "Year 4"
The label above the first column should be "Complication" or similar
The final column should read "Percentage increase from year 1 to 4"

43. Table 2
The label above the first column should be "Complication" or similar
The "Prevalence (%)" and "Incidence (%)" labels need to go above columns "Total" to "Females"
For Retinopathy, the p-value is 0.836 but the values for males and females are virtually identical, so I would expect a p-value close to 1. Do the subsequent decimal places make such a difference?

44. Table 3
It probably makes sense to put the two parts side by side and present the table in landscape.

45. Table 4
Were these figures not also available for the population without T2DM?

46. Table 5
Was it not possible to do statistical tests for difference between T2DM and No T2DM?

**Level of interest:** An article whose findings are important to those with closely related research interests
Quality of written English: Needs some language corrections before being published

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:
I declare that I have no competing interests