Reviewer's report

Title: Type 2 diabetes prevalence varies by socio-economic status within and between migrant ethnic groups: analysis and implications for Australia

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Reviewer: Maximilian de Courten

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The manuscript by Abouzeid at al reports on the diagnosed type 2 diabetes prevalence in Victoria amongst people registered in the NDSS scheme and having information on their country of birth.

The researchers set out to investigate variations in (diagnosed) diabetes prevalence according to ethnic, socio economic and other demographic variables amongst the population in Victoria. The title of this manuscript is using the term migrant ethnic groups indicating that ethnicity was defined in this research according to the country of birth as listed in the NDSS database. Furthermore, countries of birth were re-categorised based on geographic proximity to result in nine very different regional groups. For instance it can be argued that the group of North West Europe, which has been traditionally one of the strongest regions for immigrants in Australia could be made up of people having the same ethnic origin than those in the group entitled Australia which includes residents born in Australia regardless their ethnicity. This highlights a problematic intersection between the various dimensions or aspects one can define ethnicity: along geographic origins, cultural or linguistic characteristic's, or genetic concepts. All of these are mentioned at various places in the manuscript.

Therefore, the research findings and their interpretation need to be carefully examined and structured according to the (dimension of) definition used - because of the overlap in definitions. From the method section it appears that the key characteristics for the research was whether members of the NDSS were born in Australia or overseas. Hence the focus should be on immigrant status and the research centred around region of immigration, lengths of stay in Australia, acculturation, access to health services, and other factors which could determine disease prevalence amongst immigrants. And the discussion hence should focus around those factors. As comparison population then features those born in Australia; and those not having the information on their country of birth available have to be excluded from the analysis: around a third of the data, which needs to be investigated whether that could constitute a selection bias.

The other approach to ethnicity could come from analysing the language speaking at home is indicated amongst the NDSS registrants: correctly the researchers point out however that over 70% of individuals in that database do not indicate what language is being spoken at home, rendering this approach probably useless.
And underlying as well as intersecting with these different concepts of ethnicity are factors such as age, sex, and other determinants of diabetes including socio-economic status, which by itself is another composite and proxy variable. The second paragraph on page 6 is mentioning that "some facets of social economic status" are influencing the prevalence of diabetes, without specifying what facets the researchers had in mind. These should be listed and included in the logic model (see below).

Given these complex and ill-defined concepts it would be beneficial for the reader to learn more about the logic model underlying this research illustrating how the different variables in their various definitions putatively relate to each other. With that a clear description of the definitions used in the pragmatic application to the available data should be formulated much clearer in the method section of this paper.

Great care also has to be given to the fact that only people with diagnosed diabetes made it into the dataset, and the rate of diagnosis might very well be different amongst the different ethnicities. This should be flowing into the discussion of the findings. The researchers indicate in the first paragraph of the method section that approximately 80 to 90% of Australians with diagnosed diabetes are member of the registry, a number which might be much lower amongst immigrants as it is lower amongst the ATSI population (as correctly highlighted by the authors on page 18 of the discussion section).

The last sentence of the background section on page 7 is summarising the research approach is to say "we investigated ethnic, socio-economic and other demographic variations in Victorian T2DM prevalence..." Given the above, the reviewer would prefer the use of more narrow defined terms: the ethnicity for instance means immigrant status and diabetes prevalence is limited to those having the disease diagnosed and accessing the registry.

Minor essential revisions:

1. Throughout the abstract the word “diagnosed” should be inserted in front of diabetes where it is actually meant.

2. The background section introduces the concept of ethnicity with the help of the thrifty genotype hypothesis which is not only out-dated but has even been refuted by its original author. A more current and complex definition of ethnicity needs to be given.

3. The last sentence of the first paragraph on page 6 is stating that the diabetes prevalence amongst migrants may differ from that in the country of origin. This is central to the research presented and therefore the underlying factors need to be spelled out and discussed how they apply to this analysis.

4. The statistical analysis section describes in italic contrasts having been used without the reviewer being quite sure what it means.

5. The fact that on a third of registrants the information on country of birth was unknown (methods section) needs to be analysed in terms of how this could bias
the findings.

6. Results: the crude prevalence data amongst ATSI with 1 % seems to be surprisingly low and warrants explanation/discussion.

7. Discussion: the statements that earlier screening for diabetes would be warranted for some ethnic groups has to be seen in the light of differences in risk factors amongst them. It is well-known that obesity rates are much higher in people from the Pacific, and obesity is already one factor within the screening approach. Once taken into account is the then still needs to single out certain ethnicities?

8. Recommendations: given the inherent difficulty in defining ethnicity, the researchers should include from their experience some recommendations as to how to improve research in this field.

**Level of interest:** An article of limited interest

**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