Author’s response to reviews

Title: Preventing Type 2 Diabetes Mellitus in Qatar by Reducing Obesity, Smoking, and Physical Inactivity: Mathematical Modeling Analyses

Authors:

Susanne F. Awad (awadsusanne1@gmail.com)

Martin O’Flaherty (moflaher@liverpool.ac.uk)

Katie G. El-Nahas (knahas@qf.org.qa)

Abdulla O. Al-Hamaq (aalhamaq@qf.org.qa)

Julia A. Critchley (jcritchl@sgul.ac.uk)

Laith Abu-Raddad (lja2002@qatar-med.cornell.edu)

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REPLY TO REVIEWERS’ COMMENTS

We would like to thank the reviewers for assessing our work and for their valuable feedback and suggestions. Please find below a point-by-point reply addressing each of the reviewers’ comments. We have also incorporated these suggestions in the revised manuscript as noted below. We would be pleased to address any further points that the editor or reviewers may find unsatisfactory. Note: All references to the revised manuscript pertain to the marked copy of this file including changes implemented through “track changes”.

Reviewer 1

General Comments:

1) A novel well written paper with implications on health policy in Qatar.

Comment: We thank the reviewer for assessing our work and for the constructive feedback on our manuscript that enriched the article and improved its readability. Please find below a point-by-point reply addressing each of the reviewer’s comments.

2) Rephrase “what if” intervention—" in the text.

Answer: This has now been incorporated as suggested in the revised manuscript (page 6, paragraph 1 of Introduction, page 6, paragraph 2 of Methods, and Table 1).

Abstract:

3) Page 2, Background: I suggest modifying the background to "The aim of this study was to estimate the impact of reducing the prevalence of obesity, smoking, and physical inactivity, and introducing physical activity as an explicit intervention, on the burden of type 2 diabetes mellitus (T2DM)" using Qatar as an example.

Answer: This has now been incorporated as suggested in the revised manuscript (page 3, paragraph 1 of Abstract).

4) Page 4, lines 65-66: "(defined as BMI>30 kg per m2". No need for this.

Answer: This has now been deleted from the Introduction of the revised manuscript (page 5, paragraph 1 of Introduction).

5) Page 5: lines 86-89. The objective of the study is not clearly written.

Answer: We have now rephrased the objective in the
Introduction of the revised manuscript to clarify it better (page 6, paragraph 1 of Introduction). 6) Page 5: lines 93-95. I find this can be rewritten and moved to the discussion section. You can't guarantee having an immediate public-health impact. Answer: As suggested, we have now moved (and rephrased) the indicated text to the Discussion of the revised manuscript (page 15, paragraph 1 of Discussion). Results: 7) Page 9, para 1 in results should be part of methods. Answer: We thank the reviewer for the consideration but we would prefer keeping this paragraph in the Results. In our view, this paragraph fits better in the Results than in the Methods, as it includes specific baseline estimates from our model output. Discussion: 8) Page 13, lines 277-278: "Using an analytical approach, we investigated the epidemiological impact of several population-based intervention for prevention scenarios for T2DM in Qatar. " Better if written this way "Using an analytical approach, we investigated the impact of several population-based interventions on reducing the burden of T2DM in Qatar". Answer: This has now been incorporated as suggested in the revised manuscript (page 14, paragraph 5 of Discussion). 9) Page 13, line 306: "(in relative terms)", no need for this. Answer: This has now been deleted as suggested (page 16, paragraph 1 of Discussion). 10) Page 14, line 310-312: "but there is uncertainty over whether such rapid scale up of reductions in risk factors are feasible, given the lack of wide scale population-based examples globally. " Not clear. Answer: We have now rephrased this text to clarify it better (page 16, paragraph 1 of Discussion). 11) Page 14, line 323: "may also prove promising"? needs to be restructured. Answer: We have now rephrased this text to clarify it better (page 16, paragraph 2 of Discussion). 12) Page 15, line 350-351: "Obesity in this study was defined as BMI>30 kg/m2 across all age groups", should be in methods. Answer: As suggested, we have now moved this statement to the Methods and rephrased the original statement in the Discussion (page 6, paragraph 2 of Methods, and page 18, paragraph 2 of Discussion). Tables and Figures: 13) The figures are not clearly presented. Better copies are needed. Answer: We have now included/uploaded higher resolution figures.

Reviewer #2: 1) The authors present the results of a mathematical model of diabetes incidence and mortality in function of obesity, smoking, and physical activity. The model has been published before (Awad et al., 2018; https://doi.org/10.1016/j.diabres.2017.11.015). The current manuscript complements the earlier manuscript by exploring the impact of reductions in smoking, obesity, and physical inactivity. Overall the manuscript is well written and appropriate. I only have some minor comments. Comment: We thank the reviewer for assessing our work and for the constructive feedback on our manuscript that enriched the article and improved its readability. Please find below a point-by-point reply addressing each of the reviewer’s comments. Major comments: 2) L67: "caused"; perhaps better, "was estimated to cause". Answer: This has now been incorporated as suggested in the revised manuscript (page 5, paragraph 1 of Introduction). 3) L97: please make explicit what exactly the extensions were compared to the original model. Answer: We have now clarified this issue in the Methods of the revised manuscript (page 6, paragraph 2 of Methods). 4) L131: please explain how the model captures changes in demographic structure. Answer: We have now explained this issue in the Methods of the revised manuscript (page 8, paragraph 1 of Methods). 5) L145: please also describe how the annual change was calculated (compared to the overall change between 2016 and 2031). Answer: We assumed a linear change in the prevalence of risk factors to reach the overall change by 2031. To address the reviewer’s comment, we have now clarified this point in the Methods of the revised manuscript (page 8, paragraph 4 of Methods). 6) L177: how was the RR for developing T2DM combined with that of other risk factors? eg, was independence of risk factors assumed? Answer: Indeed, independence of risk factors was assumed. To address the reviewer’s comment, we have now clarified this point in