Reviewer's report

Title: Evaluation and refinement of the PRESTARt tool for identifying 12-14 year olds at high lifetime risk of developing type 2 diabetes compared to a clinicians assessment of risk: a cross-sectional study

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Reviewer: Junguk Hur

Reviewer's report:

Gary et al presented a straightforward questionnaire-based risk assessment tool for identifying adolescents at high risk of developing type 2 diabetes mellitus (T2DM) in future. Being able to identify youths at such risk is important in many ways; therefore, the study addresses an important issue in the society. The authors recruited over 636 adolescents aged 12-14 years from five European countries. The risk assessment tool (questionnaire) determined the risk of developing future T2DM for these participants, which were claimed to be validated by clinicians who had accesses to extensive data including the participants and their families' family history, diet and life style, anthropometric, puberty stage and biochemical measures. Based on the clinicians' assessment of 'being high risk', the tool's performance was evaluated. Of those found to be at high risk by the clinicians, 93% were also deemed high risk by the tool. The specificity shows that 67% of those deemed at low risk by the clinicians were also found to be a low risk by the tool. The authors also revised their tool based on the feedback of the study steering committee to include/exclude certain risk factors in the questionnaire, which is claimed to have improved in terms of overall accuracy.

There is some potential of this pool to be useful; however, there are fundamental issues in the perspective of predictive model development.

Major comments:

1. There is no clear definition of developing T2DM given. The lifetime incidence of T2DM is high and increasing rapidly. Is the tool trying to predict the development of T2DM during participants' lifetime? And I wonder what timeframe the clinicians used and if there were all consistent among the clinicians in the study.

2. Without longitudinal assessments, it is practically impossible to properly evaluate the performance of a predictive tool for T2DM development. As the authors noted, the approach they took is not a typical way to evaluate a predictive assessment tool.
Clinicians' judgement on the risk of developing T2DM for the study cohort cannot be objective gold-standard in such a prediction model development/evaluation. To me, the study examined how well the questionnaire-based tool could recapture what human experts, clinicians, judged on the risk of developing T2DM. Therefore, using 'validation' in this study should be avoided and the overall theme needs to be changed to the revising the tool and the examination of how well the tool's results agreed with clinicians' judgement.

3. I wonder if clinicians reported the rationales of their judgements for each participant. Compiling these rationales into rules would probably lead to a better or more accurate or representative of the clinicians' risk assessment.

4. I wonder how well the clinicians agreed or used the same judgement criteria. As the assignment of clinicians was done in a country-based cluster, there could have been region-based biases. Did the authors examine how well all the clinicians in the study generally agree? This could be assessed by having all the clinicians evaluate the same subset of participants, if not all.

5. The refinement of the tool improved the overall performance in the current evaluation scheme. However, it is not clear why the core risk factors were separated, and the authors 'sequentially' removed risk factors for evaluation (Table 4). Did the authors also check the tool using only the overweight/obese (single factor)?

Minor comments:

1. The % of the participants required the third assessment needs to be disclosed.

2. It would be useful to include a table, like Table 1, showing the numbers of participants for each risk factor in the tool.

3. Was there any participant who was not obese/overweight but determined to be at high risk by clinicians?

4. A table like Table 2 would be needed for the refined tool.

5. A CONSORT chart would be useful.

6. The final model is Figure 1 should be indicated in Table 4.
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?
If not, please specify which controls are required in your comments to the authors.

Unable to assess

Are the conclusions drawn adequately supported by the data shown?
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No

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