PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Development and internal validation of the Edmonton Obesity Staging System-2 Risk screening Tool (EOSS-2 Risk Tool) for weight related health complications: a case-control study in a representative sample of Australian adults with overweight and obesity
AUTHORS	Atlantis, Evan; John, James Rufus; Hocking, SL; Peters, Kath; Williams, Kathryn; Dugdale, Paul; Fahey, P

VERSION 1 – REVIEW

REVIEWER	John Cursio The University of Chicago, Public Health Sciences
REVIEW RETURNED	04-Mar-2022

GENERAL COMMENTS	Thank you for this important and meaningful research. A few comments: 1. The details are unclear on why the scoring system was used. The process is outlined in the paper, and given a footnote, (#18), however, a few more details would clarify the process and logic. 2. More description on why the coefficient for depression is set to 10. The authors state that is was set to 10 "for practical reasons", but I feel more quantitative details are needed. 3. It would be good to see the paper version of EOSS-2 Risk Tool included in the manuscript. Researchers may want to apply it practice.

REVIEWER	Sigrid Gribsholt Aarhus Universitetshospital
REVIEW RETURNED	21-Apr-2022

GENERAL COMMENTS	The idea and topic of the paper in interesting and relevant. However, I am concerned on the purpose and use of the EOSS-2 Risk Tool in a clinical setting. Please describe the EOSS more thoroughly as this is the golden standard for the EOSS-2 Risk Tool. Please present the original dataset briefly, how was the response rate and how was missing data handled? The section on the EOSS classification must be elaborated. Please clarify how you defined the EOSS stages and which parameters and thresholds you used for the definition. You refer to a previous paper, but it must be explained in the present paper as well. - Please clarify how you defined the EOSS-categories and which information you included in the staging. - Please add this information in a table at least in the appendix. -

	The PPV was 60% and 86% for high risk and very high risk. Please discuss the implications of this further. How should a GP handle a patient with a score < 7/"high risk"? The purpose of the EOSS-2 Risk Tool is a bit unclear. In a clinical setting, I would assume it would be relevant to have a tool to identify patients at high risk of complications and thus discriminate between those patients who should have further tests including blood samples etc. and those who do not require further examinations. But 40% of patients in the "lowest" risk category have EOSS ≥2 and thus require examinations and possibly treatment. Therefore, I am not sure how to use the EOSS-2 risk tool in a clinical setting – as a clinician I would not feel comfortable with not examining the patients with EOSS-2 risk tool score of <7. Please explain this issue. You argue that the EOSS-2 risk tool may help initiating discussions on weight loss and set clinical targets for the patients. How would the tool help setting clinical targets? As age and history of anxiety and depression not are modifiable, I do not see how a clinical could be set based on them. The self-rated health may be improved, but it may be difficult to base weight loss treatment only on a target on improving self-rated health – please explain this.

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1
Dr. John Cursio, The University of Chicago
Comments to the Author: Thank you for this important and meaningful research. A few comments:
1. The details are unclear on why the scoring system was used. The process is outlined in the paper, and given a footnote, (#18), however, a few more details would clarify the process and logic.

We acknowledge this and have provided more details about our method accordingly (pages 10,11, and 14).

2. More description on why the coefficient for depression is set to 10. The authors state that is was set to 10 "for practical reasons", but I feel more quantitative details are needed.

The actual score for history of depression or anxiety is 49 as per the calculation which is obtained by dividing the regression (β) coefficient for each variable in the final model by the lowest β coefficient, then multiplying by 2 and rounding to the nearest integer [(21.7/0.89) x 2 = 49].

In addition, the following changes were made (page 11):
'We capped the maximum score at 10 which we believed was sufficient to convey the substantially increased risk of weight related complications for those groups (five times larger than the smallest odds ratio)'

3. It would be good to see the paper version of EOSS-2 Risk Tool included in the manuscript. Researchers may want to apply it practice.
We appreciate this suggestion and have highlighted the availability of a 'paper-based version' of the EOSS-2 Risk Tool in the discussion accordingly (page 16).

Reviewer: 2
Dr. Sigrid Gribsholt, Aarhus Universitetshospital
Comments to the Author: The idea and topic of the paper in interesting and relevant. However, I am concerned on the purpose and use of the EOSS-2 Risk Tool in a clinical setting.
Please describe the EOSS more thoroughly as this is the golden standard for the EOSS-2 Risk Tool.

We appreciate the suggestion and have added more information about this in the methods section (pages 6) and in the online supplementary material accordingly.

Please present the original dataset briefly, how was the response rate and how was missing data handled?
We appreciate the suggestion and have added more information in the methods section, subheading 'Bias' (page 7).
Please note that with an 85% response rate and corrections with sample weighting, we believe that we have enough reliable information in the data sets to support the subjective descriptors of 'extreme', 'very high', and 'high' risk which the GPs could confidently apply in practice.

The section on the EOSS classification must be elaborated. Please clarify how you defined the EOSS stages and which parameters and thresholds you used for the definition. You refer to a previous paper, but it must be explained in the present paper as well.
- Please clarify how you defined the EOSS-categories and which information you included in the staging.
- Please add this information in a table at least in the appendix.
We appreciate the suggestion and have added more information about this in the methods section (page 6) and in the online supplementary material accordingly.

The PPV was 60% and 86% for high risk and very high risk. Please discuss the implications of this further. How should a GP handle a patient with a score < 7/"high risk"?
We appreciate this suggestion and have made the following changes for clarity (page 15):
We recommend that GPs use the EOSS-2 Risk Tool as a screening tool in all patients with suspected overweight and obesity, regardless of their lowest risk score ('high risk'), to warrant further investigations and confirm the presence and severity of weight related complications and diagnostic criteria for EOSS staging. This is because all three risk categories reflect increasing degrees of risk for weight related complications according to our diagnostic criteria for EOSS stages 2-4.
We have also revised the legend and subheadings in Table 4 for clarity.
We have shown in our pilot study that false positive case detection is extremely unlikely (0%) when the EOSS-2 Risk Tool is applied to primary care patients with overweight and obesity, "as was expected for such a 'high risk' patient population group purposely targeted by their GPs".
The purpose of the EOSS-2 Risk Tool is a bit unclear. In a clinical setting, I would assume it would be relevant to have a tool to identify patients at high risk of complications and thus discriminate between those patients who should have further tests including blood samples etc. and those who do not require further examinations. But 40% of patients in the "lowest" risk category have EOSS ≥2 and thus require examinations and possibly treatment. Therefore, I am not sure how to use the EOSS-2 risk tool in a clinical setting – as a clinician I would not feel comfortable with not examining the patients with EOSS-2 risk tool score of <7. Please explain this issue.
We developed the EOSS-2 Risk Tool to help GPs initiate conversations about weight management in all patients potentially at risk of having unknown weight related health complications. As described above, we found in our pilot study that it yielded an extremely low rate of 0% for the lowest 'high risk' category when applied to primary care patients with overweight and obesity.
For clarity, we removed the sentence in the study limitations about 'false positive results' which distracts from the main messaging in the discussion, as described above.
We trust that our response and revised sections in our manuscript clarifies the purpose of the tool and would be happy to consider any suggestions the reviewer has for improvement.

You argue that the EOSS-2 risk tool may help initiating discussions on weight loss and set clinical targets for the patients. How would the tool help setting clinical targets? As age and history of anxiety and depression not are modifiable, I do not see how a clinical could be set based on them. The self-

rated health may be improved, but it may be difficult to base weight loss treatment only on a target on improving self-rated health – please explain this.

Please note that we were referring to diagnostic criteria for EOSS stages rather than the EOSS-2 Risk Tool questions and have revised this sentence for clarity (page 15).

We acknowledge the positive comments from the reviewers which have helped us improve the readability of our manuscript. Please do let us know if there is anything amiss.

VERSION 2 – REVIEW

REVIEWER	John Cursio The University of Chicago, Public Health Sciences
REVIEW RETURNED	26-May-2022

GENERAL COMMENTS	Thank you for addressing the comments from the reviewers. I accept the manuscript.

REVIEWER	Sigrid Gribsholt Aarhus Universitetshospital
REVIEW RETURNED	30-May-2022

GENERAL COMMENTS	The authors have improved the manuscript. No further changes.