Author's response to reviews

Title: Diagnostic performance of the Minimal Eating Observation and Nutrition Form - Version II (MEONF-II) and Nutritional Risk Screening 2002 (NRS 2002) among hospital inpatients - a cross-sectional study

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Author's response to reviews: see over
Thank you for valuable comments. We have now made every effort to fully address the concerns highlighted by the reviewers.

**Referee 2:**
All my previous comments have been address and along with the corrections suggested by the other reviewer I would now recommend that this paper can be published.

**Referee 1:**
The authors have revised their manuscript extensively based on the comments. A few items need clarification and one result (user friendliness,...) may need statistical review. The user friendliness is important for the conclusions and thus the method and results need clarification.

1. **time to perform the assessment:** Was there a specific order in the three assessments.
   Since several items are present/shares between scores the time needed will be lower in those scores done as second and third. Please specify and if necessary discuss. Ideally the order of scores should have been chosen randomly.

   *Response:* In the Methods section, under Procedure (page 8), we now clarify that “The order of the nutritional assessments in the protocol was, first MEONF-II, thereafter NRS 2002, and finally MNA.” In addition, in the Discussion (page 14) we now state “It should be noticed that time consumption was low when using MEONF-II, despite the fact that this assessment was done before NRS 2002 and MNA. It could otherwise be expected that the time needed would be lower for tools used as second and third since several items are shared between the tools.”

2. **"easy to understand......":** If understand correctly than the same question was asked 87 times to one of the 4 nurses collecting data. thus there are no 87 independent observations. In addition there may be a learning curve for each nurse ? Was there an intention to check difficulty related to an individual patient? I feel that asking 4 persons about user-friendliness is a severe limitation that needs to be addressed, more over statistics appear over-optimistic. I recalculated the "easy to understand" and found in a chi-square test P=0.01 and P=0.0009. Please get statistical advice on this issue. If this issue cannot be improved (small sample remains) please concentrate your conclusion on time to be performed and similar or superior performance compared to other instruments.

   *Response:* Yes, it’s correct. As you say, there were no independent observations. We had no intention to check difficulty related to individual patients, it could be a topic for future studies. We agree that it’s a limitation that only four nurses were asked about user-friendliness, and this is now addressed in the Discussion (page 14) “One should, however, be careful in the interpretation of these findings since it was only four nurses that rated user-friendliness and there may be a learning curve for each of these nurses, affecting rating of user-friendliness and time needed for completing forms.” In addition, we have toned down this in conclusions (page 14) “With respect to user-friendliness and sensitivity the MEONF-II appears to perform well compared to the NRS 2002, although larger studies are needed for firm conclusions.” We are grateful that you drew attention to the analyses, as we realized that we had used analysis for ordinal instead of nominal data. Thus, new analysis have been made using Cochran Q test followed by post-hoc McNemar tests. It gave essentially the same results with one exception. Before there was a significant difference regarding “Items easy to answer” between MNA and
NRS, which disappeared after the new analysis. Corrections have been made in Table 4, as well as under Analysis in the Methods section (page 9):
“Time to complete the three screening tools was analyzed by Friedman’s two-way analysis of variance by ranks followed by post-hoc Wilcoxon signed ranks tests. Other user-friendliness data, and undernutrition risk according to the three tools were analyzed using Cochran’s Q test followed by post-hoc analyses (McNemar).”

3.
   a. new Table 2 is well done. Could you address the issue that MEONF (High risk for UN), NRS (Risk for UN) and MNA (UN) may mean the same as these numbers rarely differ by more than one individual. You should discuss that the grouping may affect your result.

Response: Thank you for the advice about table 2. We checked this issue and included a sentence about this in results and mention it in discussion as well.

Results (pages 9-10): Out of 18 undernourished patients according to MNA 13 were considered being at high risk according to MEONF-II, and 12 as at risk of undernutrition according to NRS 2002. Out of 22 patients at high risk according to MEONF-II, 13 were considered undernourished according to MNA, and 12 as at risk according to NRS 2002.

Discussion (page 13): Further on, a majority of those being undernourished according to MNA were correctly classified as at high risk by MEONF-II (13 out of 18 patients) or at risk by NRS 2002 (12 out of 18 patients).

   b. You address correctly that NRS has been tested with RCT but this study was also a post development of the score evaluation that is not a real validation and that the evaluation was based in the fact whether there was an effect of an intervention (usually artificial nutrition) in the groups with different cutoffs. Moreover the experts categorised the populations for each study globally into the score categories and thus it is not a validation study.

Response: This is now addressed in methods and in the discussion.

Methods (page 6): “retrospective classification, and application of cut-off scores in randomized controlled trials identifying the effect of nutritional intervention (typically artificial nutrition)”

Discussion (page 12): “However, the classification of patients in that study was done retrospectively and the authors were not blinded to outcome (usually artificial nutrition) when estimating the degree of undernutrition and severity of disease [4].”

4. in the discussion para 2 "one strength ..... and albumin levels are still normal." This sentence is really not in agreement with the fact that the cutoff for malnutrition was defined based on albumin values. I would erase the sentence if you agree.

Response: This sentence has now been erased.

5. in the discussion page 12 line 4 ("and possibly the age of the sample") it is "the age of the patients in the sample".

Response: This sentence has now been corrected.

6.
a. In the discussion, if you state lower/higher this needs to be supported by a significant statistical test (.... NRS 2002 identified a lower percentage....) page 12. Consider the issue of different terminology for risk/high risk/UN.

Response: This statement is now supported with a statistical analyses presented in Analyses (Methods, page 9: “undernutrition risk according to the three tools were analyzed using Cochran’s Q test followed by post-hoc analyses (McNemar).”) and Results (page 9: “The proportion of people classified as at risk for undernutrition according to NRS 2002 (29%) was significantly lower than found using MEONF-II (45% at moderate/high risk, $p = 0.007$) and MNA (60% at risk for undernutrition/undernourished, $p <0.0005$). There was no significant difference ($p = 0.021$) in proportions found using the MEONF-II and MNA following Bonferroni correction ($p = 0.063$) (Table 2).”)

b. You could state that a clear vocabulary and uniform definitions would be helpful.

Response: This issue is now mentioned in the Discussion (page 13): “In addition, efforts are needed to develop a clear vocabulary and uniform definitions of risk (low/high) and manifest undernutrition.”