Author’s response to reviews

Title: Psychometric properties of the Patient Assessment of Chronic Illness Care measure (PACIC-5A) among patients with obesity

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Author’s response to reviews:

We thank the reviewers for their comments. A clear point-by-point response you will find in the attach files (BHSR-D-18-01349_Amendments_to_the_reviewers).

Editorial
Comment 1:

1. Your manuscript "Psychometric properties of the Patient Assessment of Chronic Illness Care measure (PACIC-5A) among patients with obesity" (BHSR-D-18-01349) has been assessed by our reviewers. They have raised a number of points which we believe would improve the manuscript and may allow a revised version to be published in BMC Health Services Research.

Amendments 1: We thank the editor for the comment. We have followed the advice and expanded our analyses by confirmatory factor analyses (CFA), test-retest analyses and item-total-correlation. We added a figure and tables to illustrate the analyses.
Changes made 1: For CFA, please see comments 3, 9 and 12.

For test-retest reliability, please see comments 7 and 13.

For item-total correlation, please see comment 8.

Supplemented figure and tables:

- Parallel analyses of PACIC and 5A (Fig. 2)

- Descriptive items and scale characteristics (table 3)

- Model fit of the CFA (table 5)

- Factor loadings for PACIC and 5A – four-factor model (table A1 and table A2 in supplementary material)

Technical

Comment 2: 2. Figure - please note that the figure legend should be included after the Reference list.

Amendments 2: We thank the editor for this advice and added figure legend as described.

Changes made 2: Fig 1. Flowchart of the sample selection (line 612, page 29)

Fig. 2. Parallel analyses of (A) PACIC and (B) 5A (line 613, page 29)

Reviewer 1

Comment 3: This study gives a clear and satisfactory rationale for probing the construct validity of the PACIC. Nevertheless the results given can not sufficiently give information about the factorial structure of the German version in the over-weighted PHC patients. The authors may need to run some further (detailed) psychometric analyses including CFA.
Amendment 3: We agree with the reviewer’s opinion and have expanded our psychometric analyses by confirmatory factor analyses (CFA). We have also discussed our additional results in the discussion section.

Please also see comments 7 and 8 for further psychometric analyses.

Changes made 3: “Additionally, we conducted a confirmatory factor analyses (CFA) to test the predefined factor structure with maximum likelihood estimation method. The model fit was tested using Comparative Fit Index (CFI; acceptable fit $\geq 0.95$), Root Mean Square Error of Approximation (RMSEA; acceptable fit $\leq 0.06$) and Standardized Root Mean Residual (SRMR, acceptable fit $\leq 0.08$) [28]. The CFA were performed using Stata 15.1 MP (Stata Corp LP, College Station, TX).” (methods section, line 189-195, pages 8-9)

“We tested the unidimensional structures as well as Glasgow’s five-factor structures via CFA. Results are shown in table 5. Chi-squared-tests did not reach significance levels, which indicated that perfect model fit is missing. All models had values close to the cut-off value for SRMR ($\leq 0.08$), whereby the unidimensional models reached the threshold. The model fit was not acceptable measured by the fit indices RMSEA and CFI. In summary, fit indices of CFA could confirm neither the 5-factor model nor the unidimensional model with adequate fit.” (results section, line 270-276, page 14)

Table 5 (results section, line 277, page 14)

“Moreover, two of the eight studies tested different structure models via CFA including the predefined five-factor structure but none had acceptable model fit [14,31], which is in line with present CFA results. Therefore, the authors recommended the calculation and use of the overall PACIC score” (discussion section, line 355-357, page 17)

“Overall, most of the studies suggested a one- to two-factor structure which goes in hand with the present results for EFA. However, conducted CFA could not confirm the unidimensional structure with confidence.” (discussion section, line 369-372, page 18)
“In our analysis, the five proposed subscales of the 5A construct could not be confirmed by confirmatory and exploratory factor analyses.” (discussion section, line 384-386, pages 18-19)

“It has to be mentioned that fit indices of CFA are vulnerable for small sample sizes and tend to over-reject models, thus Hu and Bentler recommended samples with more than 250 subjects [28].” (discussion section, line 390-392, page 19)

Comment 4: 4. Introduction:
The background literature information on the PACIC is well reflected in the introduction section and also the need for conducting this study is supported with satisfactory literature evidence.

Amendment 4: We thank the reviewer for this valuable comment.

Comment 5: Methods and Results:
This study may be classified as a methodological (cross-cultural validity) study on the baseline - opportunistic sample- data of an intervention trial, rather than being as a cross-sectional design.

Amendment 5: We agree with the reviewer’s opinion and have made the suggested changes.

Changes made 5: “This methodological study used data (…)” (methods section, line 115, page 5)

Comment 6: There is no clue about how the 160 patients (further decreased to 117) were recruited from the 39 general practices in Central Germany.

Amendment 6: We thank the reviewer for this advice. We have added further information on patient recruitment in the methods section.

Please see also Fig. 1 that describes the sample selection process.

Changes made 6: “Patients were recruited via GPs within their practices during consultation following specific inclusion criteria: (1) Body Mass Index (BMI) equal or greater than 30 kg/m², (2) age between 18 and 60 years and (3) German as native language.” (methods section, line 123-126, page 6)
“Following the given criteria for inclusion and exclusion, the patients were selected by GPs and asked to take part in the study. Written informed consent and basic patient information was obtained from participants and sent back to the research staff. After receiving the documents, standardized, self-rating questionnaires were sent to patients by postal mail. The patients were asked to complete all questionnaires at home and sent it back to the study center. The collection of data covered sociodemographic variables including age, gender, weight/height, and education (low, middle, high) according to the new CASMIN educational classification.” (methods section, line 139-146, pages 6-7)

“More detailed information of the INTERACT study has been reported elsewhere [24].” (methods section, line 128-129, page 6)

Comment 7: Reliability analyses are limited to Alpha values for each of the pre-reported subscales and found satisfactory internal consistency figures.

Amendment 7:

We have expanded our analyses and conducted analyses on test-retest reliability.

Please also see comment 13 from reviewer 2.

Changes made 7: “In order to assess aspects of reliability, test-retest reliability by using Intraclass Correlation Coefficient (ICC) and Cronbach’s alpha was calculated for the total scores and the subscales.” (methods section, line 179-181, page 8)

“To assess test-retest reliability, ICCs were measured in a sample of 56 patients six month after baseline survey. ICC for overall PACIC Score was 0.58 and ranged from 0.30 to 0.60 for the subscales. Test-retest reliability for the 5A scales reached higher values with 0.63 for 5A summary score and 0.50 to 0.69 for the subscales.” (results section, line 244-248, page 11)

Table 3 (results section, line 249, pages 11-12)

“PACIC’s test-retest reliability over a six-month interval was moderate and comparable to results of Glasgow’s validation study (3-month test-retest reliability = 0.58) [5]. 5A scores demonstrated higher ICC values in our analyses and were slightly lower than in the study of Rosemann et al. (2-weeks test-retest reliability = 0.88) [10]. Differences could be explained by variations in the retest intervals, whereby the three-month interval is more comparable to our interval.” (discussion section, line 337-342, page 17)
Comment 8: Although floor and ceiling effects are given in the study (as a measurement competency of the instrument) no item item analyses were done. For example item-total correlation analyses and also "if item deleted Cronbach alpha" values are lacking.

Amendment 8: We have made the suggested changes and added the values of item-total-correlation and reported Chronbach’s alpha if item deleted.

Changes made 8: “The correlation between individual items and the total scores (item-total-correlation) was in almost all items over 0.4. Only item 16 had values below 0.3 for overall PACIC score and 5A summary score. Cronbach’s alpha if item 16 deleted changed marginally from 0.925 to 0.927 for overall PACIC score and from 0.944 to 0.946 for 5A summary score.” (results section, line 240-244, page 11)

Table 3 (results section, line 249, pages 11-12)

“Similar results were shown for the correlation between the total scores and the items. Overall, the item-total correlations were acceptable except for item 16. However, Cronbach’s alpha did not change notably if item deleted, thus we decided to keep the item in the scales. The item is already known to not fit well into the structure like mentioned in Glasgow’s validation study [5]. Indeed, it was considered as important item for follow-up scale and retained according to Glasgow et al. [5].” (discussion section, line 328-334, page 16)

Comment 9: PACIC was originally developed with a 5 factor model. So -since the authors aim to explore the factorial structure of the PACIC 5A- they are expected to give both EFA results explicitly with a separate table and also run a confirmatory factor analyses (They did not run CFA, although they discussed CFA results of different studies in the discussion section).

Amendment 9: We agree with the reviewer’s opinion and have expanded our psychometric analyses by a confirmatory factor analyses (CFA). We have also discussed our additional results in the discussion section.

Changes made 9: Please see comment 2 for changes made.

Comment 10: They reported that they identified 4 factor structure by EFA in the results section. Reader needs to see the results of this this EFA and also Scree Plot. As for their claim of one
factor solution, we need to see the loadings for the other possible factors. On the other hand, the first factor only explains 43%-44% of the variances and this percentages may not be sufficient for the one factor solutions.

Amendment 10: We thank the reviewer for this comment and added a figure to make the analysis clearer. Factor loadings of the four factor loadings are displayed in the supplementary material.

Changes made 10: Please see Fig. 2 Parallel analyses of PACIC and 5A (results section, line 269, page 14)

Please see tables A1 and A2 (supplementary material)

Reviewer 2

Comment 11: This was an interesting study. The Review was comprehensive and discussions were widely and relatively through.

Amendment 11: We thank the reviewer for this valuable comment.

Comment 12: I suspect the one factor structure of this original 5 factor structure was reported by this study. It is obvious that the number of factor structure is a controversial topic based on the authors' review. However, different number of factors achieved by different studies mainly due to different statistical methods used from the information provided by the authors. This highlights the importance of methods.

The best instrument development or confirmation should use several methods, such as EFA, CFA, scree plot, eigenvalue and interpretation criteria together. We did not see the CFA and interpretation application in this study. We also did not see the scree plot. We are not clear if the raw score (not average score) was used in the analysis.

Amendment 12: We thank the reviewer for this advice and agree with the reviewer’s opinion. We have expanded our psychometric analyses and discussion including CFA. We added a figure to illustrate parallel analyses including scree plot. For factor analyses raw score was used.

Please also see comment 2 from reviewer 1.

Changes made 12: “Additionally, we conducted a confirmatory factor analyses (CFA) to test the predefined factor structure with maximum likelihood estimation method. The model fit was tested using Comparative Fit Index (CFI; acceptable fit ≥ 0.95), Root Mean Square Error of Approximation (RMSEA; acceptable fit ≤ 0.06) and Standardized Root Mean Residual (SRMR,
acceptable fit ≤ 0.08) [28]. The CFA were performed using Stata 15.1 MP (Stata Corp LP, College Station, TX).” (methods section, line 189-195, pages 8-9)

“We tested the unidimensional structures as well as Glasgow’s five-factor structures via CFA. Results are shown in table 5. Chi-squared-tests did not reach significance levels, which indicated that perfect model fit is missing. All models had values close to the cut-off value for SRMR (≤ 0.08), whereby the unidimensional models reached the threshold. The model fit was not acceptable measured by the fit indices RMSEA and CFI. In summary, fit indices of CFA could confirm neither the five-factor model nor the unidimensional model with adequate fit.” (results section, line 270-276, page 14)

Table 5 (results section, line 277, page 14)

“Moreover, two of the eight studies tested different structure models via CFA including the predefined five-factor structure but none had acceptable model fit [14,31], which is in line with present CFA results. Therefore, the authors recommended the calculation and use of the overall PACIC score.” (discussion section, line 355-358, page 17)

“Overall, most of the studies suggested a one- to two-factor structure which goes in hand with the present results for EFA. However, conducted CFA could not confirm the unidimensional structure with confidence.” (discussion section, line 369-372, page 18)

“In our analysis, the five proposed subscales of the 5A construct could not be confirmed by confirmatory and exploratory factor analyses.” (discussion section, line 384-386, pages 18-19)

“It has to be mentioned that fit indices of CFA are vulnerable for small sample sizes and tend to over-reject models, thus Hu and Bentler recommended samples with more than 250 subjects [28].” (discussion section, line 390-392, page 19)

“Fig. 2 Parallel analyses of PACIC and 5A” (results section, line 269, page 14)

Comment 13: Since this is longitudinal study, test-retest should be used.

Amendment 13: We agree with the reviewer’s opinion and have expanded our analyses and conducted analyses on test-retest reliability.

Changes made 13: “In order to assess aspects of reliability, test-retest reliability by using Intraclass Correlation Coefficient (ICC) and Cronbach’s alpha was calculated for the total scores and the subscales.” (methods section, line 179-181, page 8)

“To assess test-retest reliability, ICCs were measured in a sample of 56 patients six month after baseline survey. ICC for overall PACIC Score was 0.58 and ranged from 0.30 to 0.60 for the
subscales. Test-retest reliability for the 5A scales reached higher values with 0.63 for 5A summary score and 0.50 to 0.69 for the subscales.” (results section, line 244-248, page 11)

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Comment 14: For detecting association between outcome or patient characteristics and instrument scores, the regression analysis is better than simple correlation analysis. We suggest the authors do a repeated

Amendment 14: We thank the reviewer for this comment. However, the correlation between patient characteristics and PACIC-5A has a descriptive character and is used to compare with other validation studies. Regression analyses would go beyond the scope of the paper’s content.