Reviewer's report

Title: Development of the interRAI Pressure Ulcer Risk Scale (PURS) for use in Long-Term Care and Home Care Settings

Version: 1 Date: 16 July 2010

Reviewer: Jan Kottner

Reviewer's report:

- Major Compulsory Revisions

(1) The Background/Introduction section is not well structured. I would suggest providing some few introductionary statements first and then leading the reader to the problem (including findings from previous research). End the Introduction part with your own research question. The lengthy descriptions of the RAI and the Braden scale should be placed somewhere in the Methods part under the heading "Instruments" or the like.

(2) Background, The Braden scale: Detailed Braden scale score properties should be explained in the Methods section (see above). Additionally I would suggest being more precise: The Braden scale is one instrument among many others and there is no empirical evidence, that the Braden scale application improves patient care. Braden scale scores (like many others) have serious validity and reliability problems. Please provide a more balanced literature review and refer to respective papers (e.g. Pancorbo-Hidalgo et al.: Risk assessment scales for pressure ulcer prevention: a systematic review. Journal of Advanced Nursing 2006;54(1):94-110; Moore, Cowman: Risk assessment tools for the prevention of pressure ulcers. Cochrane Database of Systematic Reviews 2008;16;(3):CD006471).

(3) Background, Related studies & purpose: In my view you address a very important question: How to reduce paperwork and decrease pressure ulcer occurrence? Therefore I would urgently recommend to put the whole study into a broader context. Pressure ulcer risk scale scores are related to poor health and high levels of care dependency in general. Therefore it does not only make sense to look for the association between Braden scale and MDS scores. It should also be mentioned that Braden scales scores in general are related to several other health status measurements (e.g. Capon et al: Pressure ulcer risk in long-term units: prevalence and associated factors. Journal of Advanced Nursing 200;58(3):263-72; Maida et al.: Correlation between Braden Scale and Palliative Performance Scale in advanced illness. International Wound Journal 2008;5(4):585-90; Tannen et al.: Diagnostic accuracy of two pressure ulcer risk scales and a generic nursing assessment tool. A psychometric comparison. Journal of Clinical Nursing 2010;19(11-12):1510-8).

(4) Background, study aim: Please make your study aim more precise. Your
methods and results do not entirely fit to your questions. I feel your main question is: Is it possible to measure pressure ulcer risk based on MDS scores? If this was true, then you could focus your whole analysis and discussion. I would NOT create a new scale. There are over 40 instruments available and we do not need the 41st. Since there are structural problems in these kinds of instruments this would not justify your effort and it would not improve practice.

(5) Background, Related studies, 3rd sentence: The comparison belongs to the Methods.

(6) Methods, Setting and subjects, 3rd paragraph: What do you mean with validation data? What kind of validation for what?

(7) Methods, Analysis: This part is hard to read and understand. I would suggest describing and explaining all methods in logical order step by step. Who matched how the items? What decision trees were used? How were they developed? What exactly happened then? Please provide the statistics used; how they were interpreted (alpha-levels, strength of correlation …).

Again, become clear of your research question and aim. In the second paragraph is written "… with the goal of a predictive scale that could be calculated using an existing MDS assessment …". Given, that this is the overall aim (see above) you must use appropriate methods, e.g. calculation of predictive values, ROC-curves to find appropriate cut scores. Please also note, it is not recommended to develop and validate tools using the same data set (STARD). Maybe you could randomly split your large sample randomly in two halves, one for development, and one for validation. Also important is the question, why do you deal with Braden scale scores in your study at all. There is no conceptual linkage between building an alternative prediction rule based on your MDS data set and Braden scale scores. Furthermore, you have no incidence data for the Braden scale sample. Therefore you can't calculate the predictive performance of the Braden scores in your sample.

(8) Results: Please clearly distinguish between results description and interpretation.

(9) Results, second paragraph: As you mentioned, few MDS item scores were highly correlated with nearly all Braden scale items. While it makes sense to focus on pairs with highest correlations, it is questionable to use items that are poorly correlated. Furthermore, you can’t operationalize Braden scale constructs like "Sensory perception" with cognitive skills or "Moisture" with incontinence, because they are conceptually distinct. Again, to solve this problem I would recommend to focus on the MDS items only and to investigate their predictive validity only. Then you could pick the "best" items only. There is no rationale to build a six-item model when there are strong reasons to create a five or seven item model.

(10) Results, 3rd paragraph: I can’t follow this paragraph. What c-statistic? Where are the results of the logistic regression models? Why did you use multivariate models when you were interested in the independent relation of the
item scores? Why were the variables changed again?

(11) Results, 4th paragraph: Here, there is a conceptual break in your analysis. Why did you consider additional items? I do agree that this makes sense, but it is completely unrelated to the Braden scale. Again, I would recommend leaving the Braden scale completely out.

Please clearly distinguish between Methods, Results and Interpretation.

(12) Results, 4th paragraph, performance in Table 4 and Figure 1: Table and figure do not display performance. Relations between scores and incidence tell nothing about predictive performance. ROC-curves are required. Do not develop and validate a tool within the same data set.

(13) Results, 5th paragraph, first sentence: I feel there is something wrong with the first sentence. What exactly do you mean with modeling new pressure ulcer... Where are the results for the CCC data set?

(14) Results, last paragraph: The role of this paragraph including table 5 is not entirely clear. Consider ROC-curves for different settings.

(15) Discussion: After the revisions have done, I think the Discussion needs some rewriting. Additionally, please discuss only things that follow from your aim, methods and results.

(16) Discussion: Please add limitations: use of routine data sets, secondary data analysis, measurement errors in scores and pressure ulcer diagnoses, time between risk assessment and pressure ulcer development (risks may change, ulcers may heal)...

(17) Conclusions: You can't conclude that your model based on MDS data supports preventive interventions or reduces costs, because you did not investigated these issues.

(18) Abstract: The description of Methods and Results is unclear and needs more precision. Please provide only Conclusions that do follow from your results.

- Minor Essential Revisions

Background, first paragraph, 3rd sentence: While I agree with the list of risk factors (although there are many more) I would recommend to update the references and to provide key references (e.g. validation of subscales does not support this statement). Perhaps you could refer to up to date systematic reviews or the latest EPUAP NPUAP guideline.

- Discretionary Revisions

Please provide full names of all abbreviations when they first appear in the text.

**Level of interest:** An article whose findings are important to those with closely related research interests
Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:
I declare that I have no competing interests.