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Letter to the Editor

Commentary on the article by Swanenburg et al. 'Validity and reliability of a German version of the Neck Disability Index (NDI-G)' [Man Ther Articles in Press http://dx.doi.org/10.1016/j.math.2013.07.004]

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Dear Editor

We commend Swanenburg et al. (2013) on translation, development, and clinimetric analysis of the NDI-G. However, the dual-factor structure with factor analysis and the high level of internal consistency (IC) highlighted in their discussion were not emphasized in the abstract or conclusion. These points may imply some inconsistencies with the final conclusions since determination of stable point estimates with the study's small sample are exceedingly difficult.

Patient-reported outcome (PRO) tools provide the research evidence of an intervention's effectiveness which can, subsequently, influence health management and decision makers on treatment, policy, and recommendations for funding and service provisions (Lamb et al., 2013). Consequently, it is critical to analyze the clinimetric properties, to determine that they are within the accepted boundaries, then reflect on the implications of these findings, particularly when a cultural and linguistic adaptation has taken place (Cuesta-Vargas and Gabel, 2013).

Factor structure guarantees validity in the presence of high item diversity (Cattell, 1982). Dual-factors should be reported independently (Doward and McKenna, 2004) as in recent papers supporting modifications to the NDI (van der Velde et al., 2009; Johansen et al., 2013; Walton and MacDermid, 2013) or alternatives (Gabel et al., submitted for publication). A single factor is essential if a single summated-score is used and ensures all items reflect the same domain (Luce and Tukey, 1964). Factor analysis is initially exploratory and ideally uses orthogonal rotation, a minimum subject:item ratio of 20:1 to ensure strong factor structures are replicated reliably, and either maximum likelihood extraction or principal axis factoring. These methods produce 'generalizable and reproducible results without inflating the variance estimates' (Costello and Osborne, 2005). The NDI-G study used principal component analysis, 'a common error by many researchers' as principal component analysis is less desirable and normally only used when assumptions of multivariate normality are 'severely violated' (Fabrigar et al., 1999) as there are no inherent advantages over maximum likelihood extraction or principal axis factoring. Subsequent, confirmatory factor analysis minimizes 'noise' often present among PRO-items in tools where IC is maximized (Boyle, 1991).

The authors found the IC coefficient-alpha (α) of 0.96 'might be a slight limitation' as it exceeded the 'acceptable range … 0.75–0.95 (Terwee et al., 2007)' and 'scored above results from other studies (Vernon, 2008)'. This consideration is important as IC values outside this 'window' question the measures' validity. Low IC indicates a lack of item-correlation, meaning analysis is not justified, whereas high IC indicates 'item-redundancy', where too many items are too similar (Boyle, 1991). The accepted IC 'window' ensures the essential construct is represented and the complex balance retained between the items and the laws of psychometric analysis (Cattell, 1982). It is well-recognized that misestimated alpha values are commonly due to small samples and multi-factor measures assessed as a single factor, both present in this study.

Clinimetrics are the foundation that underlies PRO-validity. This study performed an analysis where the number of parameters estimated is not much smaller than the sample size itself. Consequently, there is limited expectation that an analysis such as this would replicate. For both the conclusion and abstract, it may be more appropriate to state that in addition to the recommendations proposed, use of the NDI-G in German-speaking countries should be guarded until further studies are completed that reassess and clarify the clinimetric properties, particularly the factor structure, in a larger population. This additional recommendation would be more consistent with the study findings and recent research on the original NDI and proposed modified-NDI versions.

Yours sincerely

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