



Letters to the Editor

SCIM—Spinal Cord Independence Measure: a new disability scale for patients with spinal cord lesions. Catz *et al.* *Spinal Cord* 1998; 35: 850–856

Catz *et al* appear to believe that apples and oranges are the same fruit. The FIM is an ordinal scale measuring function in at least two major domains, motor and cognition.¹ From inspection, the SCIM measures function in at least the domains of motor function and respiratory management. Comparison between these two scales in a sample population in which Catz *et al* consider that the probability for change in the domain of respiratory management is higher than that for the domain of cognition is therefore very likely to produce the conclusion that the SCIM is more 'sensitive' than the FIM.

As the weightings differ between the scales in the various categories that are similar, and as the scales are also measuring different functions, it is quite obvious that consecutive total scores between the two scales are likely to differ, even given identical changes in function. However, these numerical differences between the two scales are meaningless from the point of view of measurement. The scales are ordinal, and a common unit of measurement does not exist between them. The mean difference between scores therefore cannot be validly compared by *t*-tests in the manner described by Catz *et al*, even with the so-called 'normalisation' of the FIM score. For a valid comparison between the two scales, their respective predictive ability should have been tested against the same outcome measure such as cost of care, or attendant time required.

The use of the Pearson product-moment correlation coefficient requires variables which represent measurement in at least equal interval scales. One cannot assume that a one point change in a 'normalised' FIM is equivalent to a one point change in the SCIM, let alone assume that equal intervals are present between or within categories in the SCIM. The labelling of categories by numerals in ordinal scales such as the FIM and SCIM represents rank order, and not a numerical value in the mathematical sense, though the assumption of mathematical properties is often made on empirical grounds. The Spearman rank-order correlation coefficient would be a more appropriate statistic if seeking a correlation between FIM and SCIM.

Many of the categories in SCIM appear to be capable of providing an identical score for people with quite different problems. It would be imprudent to use the SCIM until its utility has been demonstrated, and as the authors suggest, a few of the scoring criteria are rephrased.

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References

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In reply to Prof Dickson's letter

SCIM should be used without delay—

We read with interest the letter of Prof Dickson and thank him for his remarks. We believe, however, that Prof Dickson, who knows that a test is valid if it measures what it is intended to measure, is missing an important point in our article.¹ Our main interest as clinicians is the achievements of the patients with spinal cord lesions and not necessarily the burden of care or attendant time required. Therefore, our scale was designed to measure the success of rehabilitation from the patients' point of view. The numerical differences between the SCIM and the FIM reflect different approaches to the evaluation of patient achievements. If improvement in a certain function, such as sphincter management, is meaningful to our population and is apparent when scored by the SCIM but not when scored by the FIM, then the numerical difference in the scores is also meaningful.

As mentioned in our article,¹ we planned to rephrase a few of the scoring criteria, and we indeed have done so in the second version of the SCIM. We also plan further studies to establish the predictive criterion-related validity of the scale,¹ as suggested by Prof Dickson. This method of establishing validity, however, has its built-in drawbacks,² as Prof Dickson is certainly aware, and we need not wait for it in order to use the SCIM. The more the SCIM is used, the more extensive our information about its advantages and disadvantages.

Scorings of different rating scales are frequently compared.^{3–5} Considering the sample size and the wide range of the total FIM and SCIM scores, the use of the *t*-test and Pearson's correlation was appropriate in our study. In any case, the results of Spearman's correlation coefficient are very close to those of the Pearson's correlation, which were published. We hope the SCIM will be widely applied and we welcome additional comments that will guide us in improving it.

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- 1 Catz A *et al.* SCIM—Spinal cord independence measure: a new disability scale for patients with spinal cord lesions. *Spinal Cord* 1997; 35: 850–856.
- 2 McDowell I, Newell C. *Measuring Health: a guide to rating scales and questionnaires*. Oxford University Press 1996, p 31.
- 3 Roth E, Davidoff G, Haughton J, Ardner M. Functional assessment in spinal cord injury: a comparison of the Modified Barthel Index and the 'adapted' Functional Independence Measure. *Clinical Rehabilitation* 1990; 4: 277–285.

4 Marino RJ *et al.* Assessing selfcare status in quadriplegia: comparison of the Quadriplegia Index of Function (QIF) and the Functional Independence Measure (FIM). *Paraplegia*. 1993; **31**: 225–233.

5 Ottenbacher KJ *et al.* Inter-rater agreement and stability of functional assessment in the community-based elderly. *Arch Phys Med Rehabil* 1994; **75**: 1297–1301.