

Functional Independence Measure

Description

General description: The Functional Independence Measure (FIM[®]) is an outcome measure of the severity of disability for an inpatient rehabilitation setting. It rates 18 activities of daily living on a 7- point scale ranging from fully dependent (1) to independent with no aids (7). The maximum total score is 126, indicating functional independence, and the lowest score 18, suggesting complete functional dependence. The items are grouped into two themes; 13 motor items (personal care, sphincter control, mobility, and locomotion), and five cognitive items (communication and social cognition).

Information about the FIM[®] is available from the Uniform Data Set for Medical Rehabilitation (UDS-MR) in the USA (www.udsmr.org) and in Australia, information and training in the use of the FIM[®] is available through the University of Wollongong at <http://chsd.uow.edu.au/aroc/>. In addition to the original FIM[®], the UDS-MR have developed variations specifically for paediatric populations (WEEFIM[®]), acute settings (AlphaFIM[®]), and outpatient settings (LIFewareSM System).

Scoring and administration: For inpatient rehabilitation settings, assessment is designed to be performed by a multidisciplinary team over 72 hours. A patient's ability to perform everyday tasks is observed and team input across

all disciplines is used to rate the FIM[®]. Each task has an operational definition and no special equipment is required.

Validity, reliability and sensitivity to change: Good construct and concurrent validity has been established. FIM[®] scores discriminate between disabilities and levels of severity of impairment (Heinemann et al 1994); correlate with the time taken for care (Disler et al 1993); and correlate highly with Barthel Index scores in people with stroke (Fricke and Unsworth 1996). High internal consistency has been reported (Cronbach's $\alpha = 0.93-0.95$, Ravaud et al 1999).

Ottenbacher et al (1996) performed a meta-analysis of 11 papers investigating reliability of the FIM[®] and reported median correlations coefficients between total scores equal to 0.95 for inter-rater reliability, 0.95 for test retest reliability, and 0.92 for equivalence reliability. The minimum detectable change score of 90% has been reported to be 23 points (Stineman et al 1996).

Predictive usefulness: An admission FIM[®] score > 70 has been associated with achieving non-dependence by discharge whereas those with an admission score < 50 remained dependent (Ween et al 2000).

Commentary

The FIM[®] is used widely in rehabilitation settings. However, there are some limitations to the FIM[®]. Ceiling effects have been reported (Cohen and Marino 2000) suggesting the FIM[®] may be more useful in an inpatient setting than an outpatient setting. Questions have been raised about bias in clinical judgement affecting accuracy (Wolfson et al 2000), as there was a tendency to overestimate ratings if other domains have high scores and underestimate ratings if they were low. Variations in reliability have been reported with different rater groups. People with spinal cord injury rated themselves lower than staff ratings, nurses score patients lower than physiotherapists or occupational therapists, and differences have been noted between institutions (Cohen and Marino 2000).

The main competitor to the FIM[®] has been the Barthel Index. Both measures have literature to support their use but at this stage the FIM[®] appears to have the edge, mainly because it includes communication and social cognition issues (Cohen and Marino 2000). The Australasian Rehabilitation Outcomes Centre (AROC), a joint initiative of the Australian rehabilitation sector, has chosen to use the FIM as one of its suite of measures and increasingly this is becoming the common benchmark measure in rehabilitation settings.

The mode of testing for the FIM[®] also needs to be considered. In an inpatient setting, the mode is usually by observation over a 72-hour period, however, in outpatient settings this may change to self report (either in person or over the telephone), one off observation, or reports from carers. One study has reported good intermodal agreement between in-person and telephone methods of data collection (Smith et al 1996), so this may not be an issue of major concern.

Concerns have been raised about the validity of using a total FIM[®] score to represent a single concept, functional independence, after FIM data have been subjected to multidimensional statistical analyses (Ravaud et al 1999). However, the high levels of internal consistency reported for the FIM suggests that the FIM[®] does represent a single concept. The debate continues unresolved.

Despite these limitations or precautions, at this stage, the FIM[®] represents the most robust global outcome measure of disability.

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The Walking Index for Spinal Cord Injury

Description

The Walking Index for Spinal Cord Injury (WISCI) is a gait assessment for people with spinal cord injury (SCI) developed primarily for clinical trials. It broadly categorises the ability to walk 10 m using a 21-item hierarchical scale which takes into account need for physical assistance, braces, and walking aids. The lowest score of 0/20 reflects an inability to stand or walk; the highest score of 20/20 represents an ability to walk 10 m without walking aids, braces, or physical assistance. The WISCI was developed in 2000 using a Delphi technique to reach consensus among an international group of experts (Ditunno et al 2000). This provides it with face validity. The appropriateness of the hierarchical order of the WISCI had been verified in a study of 77 patients undergoing rehabilitation following initial injury. Over the course of rehabilitation, 80% of patients demonstrated progression upwards through the WISCI scores (Ditunno et al 2007). However, considerable redundancy in the 21 items was noted with the majority of patients just moving between one of five scores (0, 8, 14, 17, and 20) (Ditunno et al 2008). The WISCI has excellent intra-rater and inter-rater reliability. In addition it has criterion validity. For example, it correlates reasonably well with the 6-Minute walk, Timed Up and Go, and 10 m walk tests (van Hedel et al 2005). It also correlates with lower extremity motor scores, although not so well shortly after injury (Ditunno et al 2007, Ditunno et al 2008). Reports vary of

the correlation of the WISCI with more global measures of disability such as the Spinal Cord Independence Measure (SCIM), Functional Independence Measure (FIM®), Barthel Index, and the Rivermead Mobility Index. Although statistically it often appears that the WISCI correlates well with some of these measures, this is accounted for in part by clustering of WISCI scores at the two extremes (ie, at 0/20 or 20/20). Closer examination reveals anomalies such as patients with scores of 5/7 on the locomotor item of the FIM® attaining 7 quite different WISCI scores ranging from 0/20 to 20/20. This mainly reflects the different emphasis of the different scales.

Instructions to the client and scoring: Scoring is simple and therapists do not require extensive training to administer the WISCI, although they do need to be familiar with the definitions of devices, braces, and assistance and there is some ambiguity with respect to how hard therapists should push patients.

There is no real alternative to the WISCI which focuses on capacity for ambulation. The closest alternatives measure disability and include the four gait-related items of the SCIM and the Spinal Cord Injury Functional Ambulation Inventory (SCI-FAI). The main advantage of the WISCI over these alternatives is its simplicity.

Commentary

The WISCI is a convenient and simple way of summarising ability to walk with one score providing an overall picture of gait. It does not, however, provide the full picture: the scoring does not take into account quality of movement, nor does it consider factors such as the energy cost, speed, or cosmesis of gait. It is also limited because it only considers the ability to walk 10 m on the flat. This gives the WISCI a ceiling effect because patients able to independently walk 10 m get a top score even though they may not be able to negotiate curbs or stairs, or walk outside. There are also a few other anomalies with the scoring system. For instance, not all combinations of physical assistance, braces, and walking aids are covered within the 21 items and there are some combinations of these elements which therapists would rarely use. However, the biggest problem with the WISCI is the clumping of all braces as one. For example a simple ankle orthosis is given the same weighting as a reciprocal gait orthosis (RGO). Consequently, someone with extensive paralysis of the lower limbs walking with an RGO

and two Canadian crutches receives the same score (12/20) as someone requiring a single ankle-foot orthosis for toe clearance and Canadian crutches for stability. Nonetheless, the WISCI is increasingly popular and used routinely in a number of spinal injury units around the world. It has also been used in a few notable and large multicentered SCI trials.

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