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Appraisal

Clinimetrics: Modified Rankin Scale (mRS)

The modified Rankin Scale (mRS) is a single-item, global outcome rating scale that was developed to measure the degree of disability or dependence in the daily activities of people who have suffered from stroke or other neurological disorders.[1] The mRS is the most commonly used Patient Reported Outcome Measure (PROM) for acute stroke trials.[2] It is currently cited within the Australian Clinical Practice Guidelines for its use regarding long-term care.[3] As well as being the consensus-based core recommendations from the stroke recovery and rehabilitation roundtable,[4] it is also included in the core outcome set for patients following cardiac arrest.[5] The mRS was originally introduced in 1957 and was later modified in the 1980s as part of the United Kingdom Transient Ischaemic Attack (UK-TIA) trial. The modification was to accommodate language disorders and cognitive difficulties.[1] The mRS has a range between 0 and 6, where a score of 0 is 'no symptoms at all' and a score of 6 is 'dead'; there are no subscales. The mRS is free and does not require any specialised equipment to administer.[2] A modified Rankin Scale Structured Interview (mRS-SI) takes 5 to 15 minutes to complete.[6] A simplified modified Rankin questionnaire (smRSq) can also be used and takes 1.67 minutes; it can be used by multidisciplinary healthcare professionals, from junior staff to consultants.[7] The National Institute of Health Stroke Scales (NIHSS) has validated translations of the scale to English and 11 other languages, including Mandarin and Spanish.[8]

The mRS has been shown to have acceptable inter-rater reliability, and excellent test-retest and intra-rater reliability. The inter-rater reliability was found to be higher when using the mRS-SI compared with the mRS (k 0.78 versus 0.56).[9] Furthermore, the mRS has good criterion validity, as it has a strong correlation with multiple scales that reflect the current gold standard of scoring impairment, disability and/or handicap. For instance, excellent correlations were displayed between the Barthel Index with r = –0.81, Frenchay Activities Index (FAI) with r = –0.80 and EuroQol-5 Dimension with r = 0.68.[10] The mRS construct validity has also been confirmed by multiple studies. The relationship between severity of disability and mRS score has been defined in numerous investigations as a poor outcome with mRS $>$ 2 or $>$ 3.[9] The mRs is less sensitive to changes in disability compared with the Barthel Index;[8] as a result, stroke trials using mRS as their PROM may fail to detect a clinically significant difference between stroke treatments. It is recommended that a 'favourable outcome' be defined as an improvement in grade, rather than using a dichotomisation process.[11] However, the mRS has a stronger performance than the Barthel Index at the floor and ceiling of the scale. This is because the mRS is a more global scale that skips smaller, incremental steps of improvement in rehabilitation.[8]

One of the key strengths of the mRS is its reference to the patient's function prior to their neurological deficit. This makes the mRS a superior prognosticator to scales that do not refer to previous activities;[1] for example: a study conducted by the University of Glasgow concluded that the pre-stroke mRS is a moderately valid measure of pre-stroke disability and a robust predictor of poststroke prognosis.[12] This helps physiotherapists and other members of the healthcare team to plan for service delivery and ongoing care. In addition, a study conducted in the Interuniversity Centre for Health Economics Research used the mRS as a determinant of direct medical costs after stroke.[13] The researchers found that the mRS rating of the level of disability was a major determinant of resource use, irrespective of age, gender, atrial fibrillation and vascular risk factors.

In conclusion, the mRS has shown true value in being a global scale that reflects the interaction with and adaptation to a person's disability, particularly as it refers to the functioning prior to the disabling event. While the inter-rater reliability can be enhanced using a structured interview, there are concerns about its responsiveness. However, its strengths in content, construct, criterion validity and intra-rater reliability outweigh its weaknesses.

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