



Analysis of the inter-rater reliability of the Motor Assessment Scale and the Fugl-Meyer Scale



Caroline O'Connell, Rose Galvin, AC Varghese, Jorunn Lamson, Emma Stokes
ALLADIN project

Division of Physiotherapy, Faculty of Health Sciences, Trinity College Dublin

BACKGROUND:

- ✦ The purpose of the study was to examine the inter-rater reliability of the four individual assessors when performing the Motor Assessment Scale and Fugl-Meyer (Lindmark Adaptation) measurements
- ✦ Reliability refers to the consistency, reproducibility and repeatability of the instrument or measurement procedure
- ✦ It is also a measure of the degree to which the outcome measure is free of random or variable errors
- ✦ Confidence in the reliability of the assessment instrument and the raters must exist for researchers to draw valid conclusions from clinical studies (Loewen & Anderson 1988)
- ✦ Inter-rater reliability is determined by the same group of patients being measured at the same time by a number of raters.
- ✦ The Fugl-Meyer (FM) is a disease-specific performance based measure of recovery following a stroke. It quantifies motor recovery, balance, sensation, joint motion and pain (Lindmark *et al.* 1988)
- ✦ The Motor Assessment Scale (MAS) is a stroke-specific instrument to measure functional ability, developed by Carr & Shepard (1985)

METHODS:

Participants

- ✦ People with a diagnosis of stroke, as defined by the World Health Organisation (WHO).
- ✦ The sample group comprised of five people, two inpatients in the age related health care unit, and three outpatients who were receiving treatment in the *stroke service* in St. James's Hospital.

Methodology

- ✦ Ethical approval was obtained from the relevant committee. Each participant gave informed consent. An assessment area was created, with the required the following structures: plinth, chair, table, along with the props required for the MAS and FM specifically
- ✦ Four chairs were then assembled each with a clear view of the assessment area
- ✦ An experienced clinician (physiotherapist with > 20 years experience) administered each scale and four other physiotherapists independently scored each scale

Table 2 Score for Fugl-Meyer Scale (paretic side)

	Average % agreement	Range % agreement	Range Weighted Kappa
Active Movement	87.8	81.3-94.0	0.802-0.939
Rapid Movement Changes	75.8	63.5-83.2	0.357-0.792
Mobility	90.0	85.1-90.1	0.600-0.818
Balance	92.3	89.4-98.9	0.731-0.937
Sensation	93.2	87.0-96.8	0.822-0.934
Joint Pain	90.8	89.1-96.8	-0.296-0.259
Joint Motion	90.4	86.7-95.8	0.377-0.374
Mean	92.1	87.5-94.8	0.693-0.891

Data Analysis

- ✦ Percentage level of agreement between the raters was calculated
- ✦ Weighted kappa coefficients were utilised to consider the amount of observed agreement between raters which could be attributed to chance
- ✦ Weighted kappa coefficients ranges from 0 for no agreement beyond chance to 1 for perfect agreement (Daly & Bourke 2000)

Table 3 Scores for Fugl-Meyer scale (non-paretic)

	Average % agreement	Range % agreement	Range Weighted Kappa
Active Movement	97.2	95.5-99.2	0.740-0.934
Rapid Movement Changes	91.4	84.1-96.0	0.046-0.902
Mobility	90.0	85.1-90.1	0.600-0.818
Balance	92.3	89.4-98.9	0.731-0.937
Sensation	91.1	86.1-95.8	0.076-0.777
Joint Pain	96.0	94.3-98.9	0.118-0.839
Joint Motion	96.0	94.3-98.9	0.118-0.839
Mean	96.9	94.9-99.1	0.716-0.924

RESULTS

- ✦ The following tables summarise the statistical values obtained in the study

Table 1 Scores for Motor Assessment Scale

	Average % agreement	Range % agreement	Range Weighted Kappa
Supine to side lying on the intact side	74	49-93	0.063-0.833
Supine to sitting over the side of the bed	96	92-100	0.933-1
Balanced sitting	100	100	1
Sitting to standing	100	100	1
Walking	100	100	1
Upper arm function	87	80-100	0.909-1
Hand Movements	83	65-100	0.917-1
Advanced Hand Activities	100	100	1
General Tonus	91	83-100	0-1
Mean	96	94-99	0.84-0.957

CONCLUSIONS:

- The MAS and FM demonstrate inter-rater reliability however to optimise this reliability, training and familiarisation should take place so that all users agree on the instructions and interpretation of scores to be applied to performance
- This is consistent with the recommendations of Carr & Shepherd who suggest that physiotherapists intending to use the Motor Assessment Scale should become familiar with the criteria for scoring by testing at least six subjects before formally using it in clinical practice (Carr & Shepherd 1985)
- Given the results of this study, such training should also be applied for the Fugl-Meyer
- Small reliability studies, such as this, are easily completed and optimise the use of such standardised outcome measures in practice

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