Reliability and validity of the Canadian Occupational Performance Measure in stroke patients

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Objective: To research test–retest reliability and discriminant validity of the Canadian Occupational Performance Measure (COPM), a client-centred outcome measure, in stroke patients.

Design: The COPM was administered twice with a mean interval of eight days (SD 2.5, range 5–16). On both occasions the patient identified a maximum of five problems in daily activities. The problems of both interviews were compared. The problems identified during the first COPM were rated by the patient on a performance and satisfaction rating scale on both occasions. The individually identified items with use of the client-centred COPM were compared with the fixed items of standardized measures (Barthel Index, Frenchay Activities Index, Stroke Adapted Sickness Impact Profile-30, Euroqol 5D and Rankin Scale).

Setting: Patients were interviewed at their place of residence.

Subjects: Twenty-six stroke patients participated, 11 men and 15 women, aged from 26 to 83 years (mean 68, SD 15). Twenty-four patients were six months, two patients were two months post stroke.

Results: Of the 115 problems identified during the first COPM, 64 (56%) were also identified the second time. Correlation coefficients for the scores were 0.89 (p < 0.001) for performance and 0.88 (p < 0.001) for satisfaction. Of the individual problems identified with the COPM, 25% or less were present in the standardized measures. Correlations between the scores on the COPM and the standardized measures were low and nonsignificant, while all standardized measures correlated significantly with each other.

Conclusions: Test–retest reliability of the COPM was moderate for the item pool but was good for the performance and satisfaction scores. Discriminant validity was confirmed. Many patient-unique problems identified with the COPM were not evaluated by standardized measures.
Introduction

Occupational performance refers to the ability to choose, organize and satisfactorily perform meaningful daily activities that are culturally defined and age appropriate for looking after one’s self (self-care), enjoying life (leisure), and contributing to the social and economic fabric of a community (productivity). Occupational performance is unique to the person. In rehabilitation it should therefore be assessed by individualized measures, which are sensitive to varying needs and situations. However, most outcome measures used in rehabilitation are society-perceived and focus on independence in fixed activities, not on the needs or problem-experience of individual patients. This is also the case for frequently used functional outcome measures in stroke such as the Barthel Index, Frenchay Activities Index, Stroke Adapted Sickness Impact Profile-30 and Rankin Scale. In client-centred rehabilitation, patients and therapists work together to define problems in occupational performance and to decide on the focus of and need for intervention and the preferred outcomes. Studies have found that motivation, participation and functional recovery are enhanced when patients’ choice and self-evaluation are incorporated in the assessment and treatment process.

An example of a client-centred outcome measure is the Canadian Occupational Performance Measure (COPM). The COPM is designed for use by occupational therapists to detect change in patients’ self-perception of their occupational performance over time. The COPM is based on the occupational therapy guidelines for client-centred practice and the Canadian Model of Occupational Performance. The COPM is a generic measure, meaning that it is not diagnosis-specific. With a semi-structured interview the patient is encouraged to identify problems in self-care, productivity or leisure activities. It concerns those activities the patient wants, needs or is expected to do, but cannot do, or those in which the patient is not satisfied with current performance. Then the patient rates importance of the problems on a 10-point scale from ‘not important at all’ (score 1) to ‘extremely important’ (score 10). Rating of importance helps to prioritize the problems. For the five most pressing or important problems, the patient is asked to rate current performance of each of these activities on a 10-point scale from ‘not able to do it’ to ‘able to do it very well’. The patient is also asked to rate satisfaction with performance on a 10-point scale from ‘not satisfied at all’ to ‘extremely satisfied’. These scores range from 0 to 10, higher scores reflect better performance and satisfaction with performance as perceived by the patient. The performance and satisfaction can be reassessed following a period of treatment. The average change scores of performance and satisfaction can be used as outcome measures in rehabilitation.

Although the COPM is widely known and often used in rehabilitation research, evidence for its reliability and validity is limited. Regarding the reliability, the manual refers to three unpublished studies that showed acceptable test–retest reliability scores. In another study with seven adults with traumatic brain injury, Spearman rank order correlations were moderate for both performance and satisfaction. Until now, only the reproducibility of the scores for performance and satisfaction has been researched. No studies have researched whether patients identify the same problems and priorities when interviewed twice.

Regarding validity, convergent validity of the COPM has shown to be moderate or low. This is not surprising because COPM differs from other health care measures in that the item pool is not fixed, but defined by the patient. Evaluation of the discriminant validity, which provides evidence that instruments measure different constructs, would therefore be more appropriate.

Responsiveness of the COPM has been researched by Wressle et al., who found that 79 of 108 patients had change scores of two or more on the COPM before and after the intervention. There was no criterion measure used to confirm this improvement. In another study among patients with hand trauma, the change scores of the COPM exceeded change scores in other measures (Action Research Arm test and Sequential Occupational Dexterity Assessment), supporting the responsiveness of the COPM.

In the present study test–retest reliability of the COPM is researched for
• the item pool, defined as the type of problems identified by the patient, and
• the scores for performance and satisfaction with performance.

The discriminant validity of the COPM is evaluated in two ways:
• by comparing the individual problems identified with the COPM with the fixed items on four standardized functional measures and
• by correlating the COPM performance scores with the performance scores on the standardized functional measures.

To demonstrate discriminant validity, we expect that the item pool of the COPM differs from the item pool of the standardized functional measures and that the COPM performance scores will be unrelated to scores on the standardized functional measures.

**Methods**

Patients were recruited from a multicentre study to evaluate stroke services in the Netherlands. In this study patients were included during their hospital stay and followed through the stroke service. Their health status was measured two and six months following stroke. From February 2000 until June 2000, 26 patients were randomly selected and asked to participate in this additional COPM study. Inclusion criteria were:

• they had residual impairments and disabilities (Rankin score ≥ 2),
• communication (understanding and producing language) and general condition were sufficient to participate in two additional interviews (judged by the research occupational therapist) and
• they gave informed consent for the extra visits by the occupational therapist.

Patients were interviewed at their place of residence. The COPM interviews were administered by two trained occupational therapists. The medical ethics committees of the participating approved this study.

**Instruments**

In this study the client-centred COPM is compared with measures that were used in the study to evaluate stroke services in the Netherlands. These are all frequently used standardized functional measures in stroke research:

• The *Barthel Index* (BI) measures disability in basic self-care activities and mobility. Total scores range from 0 to 20; higher scores denote greater independence.

• The *Frenchay Activities Index* (FAI) measures disability in instrumental activities and some aspects of handicap. In this study the total scores (range 0–45) are divided by the number of questions that are applicable (maximum 15 questions). Therefore FAI scores range from 0 to 3, higher scores reflect greater independence.

• The *Stroke Adapted Sickness Impact Profile 30* (SA-SIP30) assesses quality of life after stroke. Scores are weighted percentile scores and range from 0 to 100; higher scores mean lower independence.

• The *Euroqol 5D* (EQ-5D) is a nondisease-specific health-related quality of life instrument. Scores are weighted and range from –1 to 1; higher scores indicate better quality of life.

• The *Rankin Scale* can be viewed as a global functional health index with a strong accent on physical disability. Scores range from 0 to 5, a higher score reflects a more severe handicap.

**Test–retest reliability**

Each patient was interviewed twice by the same occupational therapist with a mean interval of eight days (SD 2.5, range 5–16). The first COPM interview consisted of problem identification up to and including scoring performance and satisfaction of the five most pressing problems. During the second COPM interview, again the patient identified the five most pressing problems. First, to research the test–retest reliability of the item pool, the problems identified during the first interview were compared with the problems identified the second time. Secondly, to research the test–retest reliability of the COPM performance and satisfaction scores, only the problems that were identified during the first
COPM interview were scored again the second time.

**Discriminant validity**

Discriminant validity was established by comparing the COPM with five standardized functional measures: the BI, the FAI, the SA-SIP30, the EQ-5D and the Rankin Scale. First, the item pool was compared. We checked whether the activities that were identified as problems with the COPM were present as specific items within the standardized functional measures. If the activities were not present as specific items, we checked whether the item fitted into one of the domains of the scale. For instance ‘cutting one’s nails’ is not a specific item in any of the standardized functional measures, but it fits within the question ‘grooming’ of the BI and the domain ‘body care and movement’ of the SA-SIP30. Also many hobbies, like ‘playing volleyball’ or ‘collecting stamps’ or ‘attending the bingo’, are not specific items in the standardized measures, but they all belong to the FAI question ‘actively pursuing hobby’.

Secondly correlations between the performance scores on the COPM and the performance scores on each of the standardized functional measures were calculated.

**Statistics**

Descriptive statistics, scatterplots and Spearman’s rho correlation coefficients were used to show the results of the test–retest reliability of the performance scores and satisfaction scores. Spearman’s rho correlation coefficients were also calculated for the outcome on the COPM performance scale and standardized functional measures. Data were analysed using the SPSS/PC+ Statistics version 10.0 (SPSS Inc. Illinios, USA).

**Results**

The study group consisted of 26 stroke patients, 11 men and 15 women with ages varying from 26 to 83 years (mean 68 years, SD 15). Twenty-four patients were six months and two patients were two months post stroke. Fourteen patients were living at home (54%), nine patients (35%) stayed in a nursing home on a rehabilitation ward and three patients (11%) in a rehabilitation centre. The mean scores were for the BI 14.7 (SD 4.6, range 6–20), for the FAI 0.5 (SD 0.6, range 0–1.9), for the SA-SIP30 20.7 (SD 5.9, range 4.7–30.8), for the EQ-5D 0.34 (SD 0.35, range –0.36–0.85) and for the Rankin 3.1 (SD 0.7, range 2–4).

**Test–retest reliability**

The initial COPM interview revealed a total of 115 problems. During the second COPM interview 112 problems were identified. Of the 115 problems identified the first time, 64 problems (56%) were also identified the second time. The mode was that three of five problems were identified on both occasions. The first time, the mean score for performance was 3.5 (SD 1.8, range 1.0–7.0) and for satisfaction 3.3 (SD 1.9, range 1.0–7.5). At the second time, the mean score for performance was 3.7 (SD 1.9, range 1.0–6.8) and for satisfaction 3.5 (SD 2.1, range 1.0–7.4). Figures 1 and 2 provide scatter-plots of all individual mean scores on both occasions. The Spearman’s rho correlation coefficient for the test–retest performance scores was 0.89 ($p < 0.001$) and for the test–retest satisfaction scores 0.88 ($p < 0.001$).
Figure 1  Mean COPM performance scores on two occasions.

Figure 2  Mean COPM satisfaction scores on two occasions.
Canadian Occupational Performance Measure in stroke patients

Table 1  Presence of problems identified with the client-centred COPM in four standardized functional measures \((n = 26)\)

<table>
<thead>
<tr>
<th></th>
<th>BI</th>
<th>FAI</th>
<th>SA-SIP30</th>
<th>EQ-5D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present as item</td>
<td>29 (25%)</td>
<td>26 (23%)</td>
<td>22 (19%)</td>
<td>20 (17%)</td>
</tr>
<tr>
<td>Fitting within a domain</td>
<td>5 (4%)</td>
<td>39 (34%)</td>
<td>56 (49%)</td>
<td>88 (77%)</td>
</tr>
<tr>
<td>Total</td>
<td>34 (30%)</td>
<td>65 (57%)</td>
<td>78 (68%)</td>
<td>108 (94%)</td>
</tr>
</tbody>
</table>

Bi, Barthel Index; FAI, Frenchay Activities Index; SA-SIP30, Stroke Adapted Sickness Impact Profile-30; EQ-5D, Euroqol 5D.

Table 2  Spearman’s rho correlation coefficients of the COPM performance scores with the scores on five standardized functional measures \((n = 26)\)

<table>
<thead>
<tr>
<th></th>
<th>COPM</th>
<th>BI</th>
<th>FAI</th>
<th>SA-SIP30</th>
<th>EQ-5D</th>
</tr>
</thead>
<tbody>
<tr>
<td>BI</td>
<td>-0.225</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FAI</td>
<td>-0.115</td>
<td>0.794**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SA-SIP30</td>
<td>0.102</td>
<td>-0.517**</td>
<td>-0.426*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Euroqol</td>
<td>0.143</td>
<td>0.701**</td>
<td>0.648**</td>
<td>-0.483*</td>
<td></td>
</tr>
<tr>
<td>Rankin</td>
<td>0.209</td>
<td>-0.806**</td>
<td>-0.797**</td>
<td>0.468*</td>
<td>0.675**</td>
</tr>
</tbody>
</table>

*p ≤ 0.05; **p ≤ 0.01.

measures significantly correlated with the COPM, but they all significantly correlated with each other.

**Discussion**

Frequently used standardized functional measures in stroke like the BI, FAI and SA-SIP30 evaluate daily performance from a society perspective, meaning that it is focused on independence and not on the needs and problems of the individual patient. To measure individual problems in daily activities perceived by patients, the COPM has been developed. The COPM is very helpful in identifying goals and in making a treatment plan together with the patient even without the rating part. The big advantage of the allocation of scores is that the effect of the treatment becomes measurable. This idea of measuring goals is not new. In 1990 Ottenbacher and Cusick described the Goal Attainment Scaling (GAS), a method which has been used to evaluate programmes in psychotherapy and mental health since 1974.26 The GAS provides a framework for the development of goals that are measurable, attainable, desired by the patient and the patient system, socially, functionally and contextually relevant. The main difference with the COPM is the scoring procedure. Although both the COPM and the GAS aim at measuring client-centred treatment goals, in the COPM the patient is the rater and with the GAS the therapist allocates the scores. In a true client-centred approach, the patient should be the rater. In case patients have cognitive problems as a result of acquired brain damage such as stroke or brain injuries, they may have difficulties judging and rating their own performance. Then a combination of the COPM and the GAS, as done by Trombly et al.19 seems a

**Clinical messages**

- The Canadian Occupational Performance Measure (COPM) evaluates patient-unique problems that are not evaluated by frequently used standardized functional measures.
- Although the stability of the COPM item pool is moderate, the test–retest reliability of the COPM scores is good.
good alternative. In their study with adults suffering from traumatic brain injury, the COPM was used to set treatment goals with the patient and the GAS was used to make these goals measurable.\(^{19}\)

The current study showed that the test–retest reliability or stability of the item pool (the activities identified by the patient) is subject to change when the COPM is administered twice. In this study generally three of five problems were the same when patients were interviewed twice. The semi-structured character of the COPM may result in a somewhat different interview on different occasions. On every single day a patient may experience different problems. It is therefore not surprising that the item pool is not completely stable. One can argue whether this is acceptable or not. In clinical practice this will not be a problem. New problems can be added if they become a priority, even when they were not mentioned before. However, this is not easily done when the COPM is used as an outcome measure in clinical trials. Then the item pool needs to be valid and reliable.

In this study the interviewer was the same person on both occasions. Because every therapist has his or her own style of interviewing, there may be even more variation in the outcome when different therapists interview the patient. This needs further evaluation.

Regarding the validity, it was expected that the problems identified with the COPM would not be covered by the frequently used standardized functional measures. This would demonstrate the additional value of the COPM. The COPM covers a broad spectrum of daily activities in the areas of self-care, productivity and leisure. Patients are allowed to nominate any activity that is of importance to them. The BI only investigates basic personal care activities and the FAI addresses productivity and leisure. Although the SA-SIP30 evaluates problems in all areas, many patient-unique problems are not specifically addressed with the SA-SIP30. Examples of problems identified with the COPM, which were not assessed in any of the other measures, include reading the newspaper, going to the hairdressers, using the video-recorder or planning the day. Although many problems fit into the questions of the EQ-5D, this measure is so general that it will not be very useful for client-centred goal-setting and individual treatment planning. When comparing the COPM performance scores with frequently used standardized functional measures, there are no significant correlations between the COPM and any of the standardized health measurement scales, but the standardized scales all significantly correlate with each other, confirming discriminant validity of the COPM.

In conclusion, the COPM is a valuable tool to assist in client-centred rehabilitation. In contrast to standardized functional measures it truly focuses on the problems and needs of the individual patients. For research purposes, the reliability of the COPM item pool is doubtful. However, the test–retest reliability of the performance and satisfaction scores is good.

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**References**


