Validation of the measure of processes of care for adults: a measure of client-centred care

ELENA L BAMM1, PETER ROSENBAUM1,2 AND PAUL STRATFORD1

1School of Rehabilitation Science, IAHS, McMaster University, 1400 Main St. West, Hamilton, Canada ON L8S 1C7, and 2CanChild Centre for Childhood Disability Research, IAHS Building, Room 408, 1400 Main Street West, Hamilton, Canada ON L8S 1C7

Address reprint requests to: Elena Bamm, School of Rehabilitation Science, IAHS, McMaster University, 1400 Main St. West, Hamilton, Canada ON L8S 1C7. Tel: +905-525-9140 ext. 26410; E-mail: bammel@mcmaster.ca

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Abstract

Objective. To assess the psychometric properties of the measure of processes of care for adults (MPOC-A), a measure of client-centredness of care for parents of children with disabilities, adapted for adult health-care settings.

Design. A validation study.

Setting. Regional orthopaedic service of a university-affiliated hospital in ON, Canada.

Participants. All patients and families who had had joint replacement surgery (Knee or Hip) between January and August of 2007.

Main Outcome Measures. MPOC-A and the client satisfaction questionnaire (CSQ).

Results. One hundred and seventy-six questionnaires filled out by patients and 81 by family members were analysed. Scales demonstrated high internal consistency (Cronbach’s alpha varying from 0.81 to 0.93 for patients and from 0.88 to 0.96 for family members). MPOC-A domain scores were moderately correlated with CSQ total scores (Pearson coefficients varying from 0.44 to 0.66 for patients and from 0.53 to 0.72 for family members). Moderate to good inter-rater agreement [intraclass correlation coefficient (ICC) from 0.50 to 0.74] and high test–retest reliability were found (ICCs varying from 0.73 to 0.83 for patients and from 0.75 to 0.91 for family members).

Conclusions. MPOC-A has demonstrated good psychometric properties. As general satisfaction scores are notoriously poor indicators of the quality of care, this measure can help us understand the elements that contribute to overall judgements of satisfaction and provide a level of understanding that is important to improve service quality and delivery.

Keywords: family/client-centred care, measures, service evaluation, rehabilitation

Introduction

Family-centred care has been implemented as a ‘best practice’ in many child health-care settings around the world [1–7]. Recent qualitative studies conducted with adult patients and their families have identified important aspects of client–service provider interaction similar to studies in the paediatric field [7–16]. Information provision, respectful and supportive care, personalized, and coordinated care were identified by clients as being of equal importance to the technical medical skills of the health-care team. However, they also reported dissatisfaction with the degree to which these behaviours were actually demonstrated by health professionals [9, 10, 12, 17–19]. Specifically, patients and carers expressed the need for more timely information on etiology and prevention of the disease, as well as coordinated updates on their current condition and future perspectives. Personalized care and psychological support were other aspects of interpersonal relationships that did not meet patients’ and families’ expectations [9, 10, 12]. There is considerable work in the field of child health exploring and measuring ‘family-centred service’ and this work has been replicated across countries and languages [1–7]. On the other hand a detailed overview of the state of the field in adult medicine identified a dearth of valid and reliable measures of client-centredness [7]. Psychometrically sound tools are needed that will allow systematic exploration of client-centred service from the adult clients perspectives.

Satisfaction measures have been widely used in an attempt to evaluate the quality of health-care from the client's
The measure used most frequently in paediatric settings to assess client/family-centredness is the measure of processes of care (MPOC), ‘...developed to meet the need for a rigorously designed measure of parents’ perceptions of the care they and their children receive from rehabilitation treatment centres’ [27]. As described in detail in the many publications about the development of MPOC, large numbers of parents were intimately involved in an iterative quantitative–qualitative–quantitative process to develop and field test the measure. All the items in the current version of MPOC are worded as parents reported them to the developers, of which the second author was a part. MPOC has been used worldwide and has demonstrated strong psychometric properties [2, 5, 29–31]. Recently, the MPOC for adults (MPOC-A) was adapted from MPOC with data from 130 adults and seniors who participated in field testing of the original measure. The adaptation was carried out by two occupational therapy students working with the second author (one of the developers of MPOC). The measurement properties of MPOC-A were sound (unpublished data), but it was recognized that further data collection was needed in order to complete the psychometric evaluation of this new tool.

The purpose of this study was to assess the measurement properties of the MPOC for adults (MPOC-A) with clients who have received an elective total joint replacement (TJR) surgery (hip or knee). Based on the experience with the development and use of MPOC and on the body of qualitative research conducted to date in adult settings, the following characteristics of MPOC-A were tested.

(i) High internal consistency (Cronbach’s $\alpha \geq 0.80$) of each scale was expected if the items were measuring the same domain.

(ii) A moderate correlation (Pearson product-moment correlations of 0.5–0.7) was expected between MPOC-A scale scores and a measure of general satisfaction with treatment.

(iii) A moderate inter-rater reliability correlation [intraclass correlation coefficient (ICCs) between 0.5 and 0.7] was expected between patients’ and families’ scores on MPOC-A.

(iv) A high test–retest reliability correlation (ICCs between 0.70 and 0.90) was expected in the test–retest MPOC-A scale scores.

**Methods**

**Sample and setting**

The study was carried out through the regional orthopaedic services of a university-affiliated hospital in ON, Canada. All patients and families who had been treated for planned joint replacement surgery (knee or hip) and had received immediate post-surgical acute rehabilitation services from a variety of health professionals (physicians, nursing staff, physiotherapy, etc.) in the hospital between January and August of 2007 were invited to take part in the study. The only exclusion criterion was lack of English fluency (as all the questionnaires are currently available in English only).

**Design**

Figure 1 provides a depiction of the study design. Time 1 data (6 months post-surgery) were used to estimate the internal consistency and cross-sectional convergent construct validity of the MPOC-A. Cross-sectional validity was assessed by comparing MPOC-A scores to CSQ scores. This study also assessed inter-rater and test–retest reliability of the MPOC-A. Inter-rater reliability was assessed at Time 1. Test–retest reliability of the MPOC-A was assessed by comparing Time 1 and Time 2 scores (2–4 weeks after Time 1).

**Procedures**

A package of materials was prepared, including a consent form, a demographic sheet, two copies of MPOC-A (one each for the patient and a family member), two client satisfaction questionnaires (CSQ) [20] and a stamped self-addressed envelope. The ‘patient’ participants were asked in the information letter to identify a family member who was closely involved in their care and to invite them to participate in the study. To assess respondents’ experiences of services, as evaluated by MPOC-A, the package was sent at 6-month post-surgery. It was assumed that by that time the patients had settled after this traumatic experience, completed their rehabilitation and would not have any new health-care experiences that might influence test–retest scores.

The second package containing two MPOC-As and two CSQs was sent to randomly chosen responders 2–4 weeks later to evaluate MPOC-A’s test–retest reliability [32]. One of the goals of this study was to undertake a factor analysis of data, to understand the factor structure of the measure.
The recommended rule for this procedure is to have a minimum of 5, and preferably 10, subject per item [33]. The sample of 350 participants was planned for this study. Sample size required to support test–retest reliability of the measure was calculated based on the expected reliability of 0.80, one-sided 95% confidence interval and lower limit of 0.70 (confidence interval width of 0.10) [34]. This calculation identified that 52 participants were required for the test, and when adjusted to expected 50% response rate from the second administration, a total of 100 packages were sent.

The protocol of the study was approved by the Hamilton Health Science Research Ethics Board.

Measurement instruments

The MPOC-A is an adaptation of MPOC-56. It is a self-administered 34-item questionnaire with positively worded short statements and a 7-point Likert response scale. The stem question for all items is: ‘To what extent do health-care providers who work with you….’. The answer scale varies from ‘To a Very Great Extent’ to ‘Not At All’ (from 7 to 1, respectively) and a ‘Not applicable’ box is also provided (rated as 0). Five main domains have been identified for MPOC-A based on extensive literature review and previous work in pediatric settings. The Enabling and Partnership domain focuses on patients’ and families’ involvement in their care process, particularly in decision-making (e.g. provide opportunities for you to make decisions about treatment/services?). Providing General Information domain is looking at how clients’ general information needs are being addressed by the health-care providers (e.g. have information available to you in various forms such as a booklet, kit, video?). Providing Specific Information focuses on provision of specific information about client’s condition, progress and prognosis (e.g. provide you with written information about your progress?). Coordinated and Comprehensive Care is focusing on continuity and consistency of care over time, settings and people (e.g. plan together so they are all working in the same direction?). Respectful and Supportive Care looks for relationships between clients and health providers in which the client is treated with respect as individual, equal and expert (e.g. provide enough time to talk so you don’t feel rushed?) (Appendix 1). Each domain score, varying from 1.0 to 7.0, is computed by averaging the ratings for the items of that domain. The “Not applicable” responses are treated as missing data and the questionnaires that have more than 50% missing and ‘not applicable’ answers combined are discarded. To be able to calculate the mean of the scale at least two-thirds of valid responses for that domain’s items have to be present [29].

CSQ is an eight-item global satisfaction measure with proven psychometric properties (coefficient alpha of 0.92, Pearson correlation of 0.56, P < 0.01 for estimates of client satisfaction by health provider) [20]. CSQ was administered along with MPOC-A.

Statistical analysis

The data were analysed using SPSS (version 15.0 for Windows). The data were analysed to assess whether responders differed in any demographic characteristics from the non-responders.

Descriptive statistics for MPOC-A and CSQ scores including means and standard deviations were calculated to check that patients were using the full range of scores, and that there was no ceiling effect or extreme skewedness of the scores. Internal consistency was assessed using Cronbach’s alpha. The correlation between sub-scales of MPOC-A and
CSQ was calculated using Pearson product-moment correlations. Reliability was assessed using a Shrout and Fleiss type 2,1 ICC [35].

Results

Of the 800 packages sent out to patients and families after TJR who fit the inclusion criteria but had no previous knowledge of the study, 192 were returned (response rate 24%). One hundred and seventy-six questionnaires (91.7%) filled out by patients were analysed. Reasons for excluding the other 16 questionnaires from data analysis were as follows: only demographic sheet completed (one); more than 50% of the answers were missing or marked as not applicable (three); relocation/death of the participant (seven); or explicit wish not to participate in the study (five). A total of 84 questionnaires were received from family members and 81 retained for analysis (three were excluded due to more than 50% missing or not applicable responses). Respondents were assigned consecutive numbers, the files were rearranged randomly using random list generator, and all odd-numbered respondents were sent the test–retest package approximately 4 weeks from the date of first response (minimum to maximum of 14–30 days). A total of 100 questionnaires were sent. The response rate for the re-test was 76% for patients (all analysed) and 35% for family members (30 analysed, 5 had more than 50% missing or not applicable responses and were excluded from the analysis).

Table 1 displays the demographic characteristics of participants and family members. Small but significant differences were found when respondents’ age and gender were compared with those of non-respondents. Participant who returned valid questionnaires tended to be slightly younger (mean difference = 2.6 years, \( P = 0.003 \)) and had larger percentage of male patients (48%, \( P = 0.029 \)) compared with non-responders or those who declined participation (39%). No significant differences were found in responses across the domains in different age, gender and procedure groups (all \( P > 0.05 \)).

The data were analysed to detect the patterns of missing data; more than 5% responses were missing or ‘Not applicable’ for questions 7, 11, 20, 23, 25, 33, 34 (Appendix 1). Analysis of missing data was performed by each domain and in cases where missing items did not exceed two-thirds of the questions, estimated scores for missing values (but not for ‘Not applicable’) were calculated by averaging scores of the domain for that respondent. Descriptive analysis showed that the whole available range of answers was used by participants. Although scale scores tended towards the higher end of the scale (Table 2), the data were consistent with a normal distribution, which allowed the use of parametric statistics for the data analysis.

Scales also demonstrated high internal consistency, varying from 0.81 to 0.93 (Cronbach’s alpha) (Table 2) and moderate to good correlation between the scales (Pearson correlation coefficient varying from 0.64 to 0.92; all correlations were significant at \( P = 0.01 \) level). Similar patterns were found in family member responses, where the full range of scores was used. Internal consistency varied from 0.88 to 0.96, and Pearson correlations between the domains varied from 0.53 to 0.94. Since only 144 questionnaires were eligible for the factor analysis (with a minimum of 170 needed given the conventional rule of at least 5 cases per item) [33], no results on factor structure of MPOC-A could be reported.

MPOC-A domain scores were moderately correlated with CSQ total scores (Pearson coefficients varied from 0.44 to 0.66). Family members’ data showed slightly higher CSQ and MPOC-A domains correlations (Pearson correlations varied from 0.53 to 0.72) preserving the pattern with MPOC for lower correlation between domains 2 and 3 and the global satisfaction measure (Table 3). Moderate to good inter-rater agreement (ICC varied from 0.50 to 0.74) and high test–retest reliability were found (ICCs varied from 0.73 to 0.83 for patients and from 0.75 to 0.91 for family members) as reported in Table 4.

**Discussion**

In order to plan and deliver health services effectively it is essential to understand the processes of care that are important from clients’ perspectives. Researchers and policymakers are looking for reliable measures that will make it possible to capture the extent to which patients’ and families’ wishes and needs are addressed. The present study indicates that MPOC-A has appropriate psychometric properties. The wide range of mean scores across the various scales demonstrated that patients and their family members were able to differentiate across the proposed domains (Table 2). High Cronbach’s alphas (0.80–0.93), as well as good inter-item
correlation within each scale and moderate to good correlations between scales, support internal consistency of the domains. However, correlations higher than 0.9 also suggest that several items are tapping into the same features, and it may be possible to extract a shorter version of MPOC-A with fewer questions without sacrificing psychometric qualities of the measure [2]. This will be the focus of planned future exploration and development of MPOC-A.

Previous studies have demonstrated that implementing client/family-centred intervention strategies is associated with patient higher satisfaction scores [36–38]. Since no ‘gold standard’ measure for client/family-centredness is available, MPOC-A scores were expected to correlate positively with total score of CSQ if the construct indeed was valid. The scores were found to be moderately correlated (Pearson coefficients varied from 0.44 to 0.66) supporting the idea that MPOC-A domains provide a related but broader and more detailed description of processes of client-health provider interaction than clients’ satisfaction scores alone. It is recognized that general satisfaction scores are notoriously poor indicators of the quality of care; this is why measures like MPOC and MPOC-A are important additions to the toolbox. If these latter measures can help people ‘get under the surface’ of satisfaction and help us understand the elements that contribute to overall judgements of satisfaction, they will provide a level of understanding that is important to improving service quality and delivery. In the original validation of MPOC it was hypothesized that there would be important correlations between the five scales of MPOC and an overall measure of ‘satisfaction’—a finding which was found in that work and has been replicated [2, 29–31].

### Table 2: Descriptive statistics and internal consistency as assessed by Cronbach’s coefficient alpha of MPOC-A domains

<table>
<thead>
<tr>
<th>Domain name (number of items)</th>
<th>Patient response (n = 176)</th>
<th>Family member response (n = 81)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Enabling and partnership (9)</td>
<td>5.54</td>
<td>1.12</td>
</tr>
<tr>
<td>Providing general information (5)</td>
<td>4.60</td>
<td>1.37</td>
</tr>
<tr>
<td>Providing specific information (5)</td>
<td>4.43</td>
<td>1.62</td>
</tr>
<tr>
<td>Coordinated and comprehensive care (9)</td>
<td>5.25</td>
<td>1.26</td>
</tr>
<tr>
<td>Respectful and supportive care (6)</td>
<td>5.56</td>
<td>1.22</td>
</tr>
<tr>
<td>Global satisfaction (8)</td>
<td>27.53</td>
<td>4.33</td>
</tr>
</tbody>
</table>

### Table 3: Pearson product-moment correlation coefficients of MPOC-A domain scores with client satisfaction scores

<table>
<thead>
<tr>
<th>Domain name</th>
<th>Patient global satisfaction (95% CI)</th>
<th>Family member Global Satisfaction (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabling and partnership</td>
<td>0.65 (0.56–0.73)</td>
<td>0.68 (0.54–0.78)</td>
</tr>
<tr>
<td>Providing general information</td>
<td>0.45 (0.32–0.56)</td>
<td>0.53 (0.35–0.67)</td>
</tr>
<tr>
<td>Providing specific information</td>
<td>0.44 (0.31–0.55)</td>
<td>0.54 (0.36–0.68)</td>
</tr>
<tr>
<td>Coordinated and comprehensive care</td>
<td>0.66 (0.57–0.74)</td>
<td>0.72 (0.59–0.81)</td>
</tr>
<tr>
<td>Respectful and supportive care</td>
<td>0.64 (0.54–0.72)</td>
<td>0.71 (0.58–0.80)</td>
</tr>
</tbody>
</table>

CI, confidence interval.

### Table 4: Patient-family member (inter-rater) and test–retest reliability as assessed by ICC

<table>
<thead>
<tr>
<th>Domain name</th>
<th>Inter-rater reliability (ICC) (95% CI) (n = 80)</th>
<th>Test–retest reliability (ICC)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Patient responses (95% CI) (n = 76)</td>
<td>Family responses (95% CI) (n = 30)</td>
</tr>
<tr>
<td>Enabling and partnership</td>
<td>0.5 (0.28–0.66)</td>
<td>0.77 (0.66–0.85)</td>
</tr>
<tr>
<td>Providing general information</td>
<td>0.74 (0.62–0.83)</td>
<td>0.73 (0.60–0.82)</td>
</tr>
<tr>
<td>Providing specific information</td>
<td>0.67 (0.51–0.78)</td>
<td>0.73 (0.61–0.82)</td>
</tr>
<tr>
<td>Coordinated and comprehensive care</td>
<td>0.55 (0.36–0.69)</td>
<td>0.83 (0.75–0.89)</td>
</tr>
<tr>
<td>Respectful and supportive care</td>
<td>0.61 (0.42–0.74)</td>
<td>0.77 (0.65–0.85)</td>
</tr>
</tbody>
</table>

CI, confidence interval.
The authors hypothesized that patients’ responses would correlate moderately with those provided by family members who have been involved in the same client-health provider interactions. Moderate to good agreement (ICC varying from 0.50 to 0.74) between patient and family member scores supported the assumption. These findings were also consistent with results of previous research conducted by Lobchuk et al. [39]. That study showed that even with a neutral approach (when they were neither encouraged nor discouraged to take the patient’s perspective) caregivers were able reliably to report patients’ experiences (ICCs as high as 0.87). These findings are especially important in situations where patients are unable (due to poor health or other reasons) to answer for themselves. Under these circumstances carers’ reports can provide clinicians with additional information not only from the patient’s perspective, but also identify specific family needs that might differ substantially from those of the patient [8, 11, 12, 31].

This study also provided excellent support for stability of the measure over time. High to excellent agreement between two scores administered approximately 4 weeks apart (ICCs varying from 0.73 to 0.83 for patients and from 0.75 to 0.91 for family members) provided good evidence of test–retest reliability of the new measure.

Several demographic factors that tend to affect clients’ satisfaction ratings have been identified in the literature. Older patients, especially women, tend to report high satisfaction with health-care services regardless of the settings [8, 19, 21, 24, 25]. Health status has also been pointed out as a potential factor in satisfaction reports [21, 24]. The present study, however, did not identify any significant relationship between age, gender, operation site, or procedure (primary or revision) and MPOC-A or CSQ scores. Although small but statistically significant age and gender differences between responders and non-responders were found, the authors believe that the sample was clinically representative of the whole population of people receiving TJRrs. The wide range of ages and the absence of any statistical relationship between demographics and response scores supports that idea. Further investigation of possible covariates will allow clearer understanding of specific needs of different age and gender groups and possibly shape new tailored intervention strategies to improve their experiences with health services.

Although this project identified good psychometric properties of the new client-centred measure, some limitations of the study have to be noted. The relatively low response rate (24%, although considered good for one-time mailed contact), along with missing values and ‘Not applicable’ responses for some of the items, could have underpowered the analysis. Future studies with other populations can determine whether a refined and shortened version of the existing measure will be more user-friendly and efficient, while still retaining good psychometric qualities, a task that was beyond the scope of this project. At present, lower endorsement of several items can be explained by different needs and wishes of patients and families in acute versus chronic rehabilitation settings. Partnership in care, continuity and information on available resources can be especially important in long-term relationships between clients and health service providers [13]. Exploring long-term relationships between patients, families and health professionals with the help of MPOC-A will help not only to further develop the measure, but also to improve our understanding of specific needs of clients who live with chronic illness and disability, and of their families.

It can be argued that due to the long period between actual experience and survey time there might have been different services and health professionals involved in the care of the participants, which might have biased their answer. We believe, however, that since this study did not intend to evaluate specific programs, service providers or hospitals and was focused on testing the psychometric properties of the measure, the population of participants can be considered to consist of people with similar overall experiences, and respondents who are representative of populations with whom MPOC-A might be used in future.

Conclusions

To improve planning and delivery of health-care services researchers, clinicians and stakeholders need reliable measures that will allow simple and effective gathering of information about the experiences of the services from patients’ and families’ perspectives. This study was a first step in validation of a new, generic measure of family centrerness. Overall, MPOC-A has demonstrated good psychometric properties and with some refinement should be tested in additional health-care settings and with a variety of populations around the world.

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Appendix I

To what extent do health-care providers who work with you...

(1) help you to feel competent in managing your own care?
(2) make sure you have a chance to say what is important to you?
(3) provide you with written information on what you are doing in therapy?
(4) tell you about the results from tests
(5) provide a caring atmosphere rather than just give you information?
(6) make sure that your health history is known to all persons working with you so that information is carried across services and service providers?
(7) let you choose when to receive information and the type of information you want?
(8) tell you about the options for treatments or services?
(9) look at the needs of your ‘whole’ self (e.g. at mental, emotional and social needs) instead of just at physical needs?
(10) offer you positive feedback and encouragement?
(11) make sure that at least one team member is someone who works with you and your family over a long period of time?
(12) are polite and friendly to you and your family?
(13) fully explain treatment choices to you?
(14) provide opportunities for you to make decisions about treatment?
(15) appear aware of your needs as your health changes?
(16) provide enough time for you to talk so you don’t feel rushed?
(17) display honesty about your condition and how it may affect your life?
(18) plan together so they are all working in the same direction?
(19) explain things to you in a way that you understand?
(20) provide opportunities for your entire family to obtain information?
(21) treat you as an equal rather than just as the patient?
(22) give you information that is consistent from person to person?
(23) make themselves available to you as a resource (e.g. emotional support, advocacy, information)?
(24) suggest therapy/treatment plans that fit with your needs and lifestyle?
(25) provide opportunities for your family to participate in decisions about your care?
(26) treat you as an individual rather than as a ‘typical’ patient?
(27) provide you with written information about your progress?
(28) have information available about your condition (e.g. its causes, how it progresses, future outlook)?
(29) provide you with written information about your medications (i.e. purpose, side effects, risks)?
(30) tell you about the results from tests/assessments?
(31) have information available to you in various forms such as a booklet, video?
(32) give you information about the types of services offered at the health-care facility or in your community?
(33) provide advice on how to contact other people with the same condition?
(34) provide opportunities for your family to receive information about your progress?

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