

The case Conference Assessment Tool (cCAT): a new workplace-based assessment

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ABSTRACT

Rehabilitation medicine is an educational, problem-solving specialty that relies on excellent team communication, honest discussion with patients and their families, and collaborative goal setting. The case conference has been described as the technology of rehabilitation medicine because it encompasses all of these functions. Trainees should have the opportunity to develop skills in chairing case conferences through receipt of constructive feedback on their performance from their trainers. The aim of this project was to develop and evaluate the case Conference Assessment Tool (cCAT), a workplace-based assessment designed to score a trainee's performance on the key elements of chairing a case conference. Experienced rehabilitation medicine educational supervisors participated in a training workshop and then rated a series of simulated case conferences using the cCAT. Internal consistency was high (Cronbach's $\alpha = 0.945$) and interrater reliability was acceptable (intraclass correlation coefficient range 0.673–0.777). Following feedback from the workshops, a final version of the cCAT was developed. The cCAT has now been adopted as a workplace-based assessment for specialty trainees in rehabilitation medicine by the Training Board of the Joint Royal Colleges of Physicians. Further work will explore its utility for trainees in other specialties and in communication and leadership skill training for undergraduate students.

KEYWORDS: Workplace-based assessment, simulation, rehabilitation

Introduction

Rehabilitation medicine physicians must be confident in the medical management of people with complex disabilities, possess the knowledge and skills necessary to provide medical and functional prognoses to patients, and lead and coordinate

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Box 1. Example of a script for case conference simulation.

A meeting room on the rehabilitation unit. Those present are the patient, her sister and mother, the specialty registrar in rehabilitation medicine, the patient's physiotherapist and occupational therapist, and a rehabilitation nurse. The patient is a 47-year-old woman who had had a stroke 3 months previously and who had been on the rehabilitation unit for 8 weeks. She was previously well and had lived with her 19-year-old son. The last multidisciplinary team meeting had decided that, as the patient had reached her full potential for recovery, there was no point in continuing rehabilitation and discharge planning should commence. This has not yet been directly communicated to the patient or her family.

the activities of a multidisciplinary rehabilitation team.¹ A satisfactory outcome from a course of rehabilitation treatment relies on good communication among the members of the multidisciplinary team, patients and their families, and carers.² Timely, accurate communication and involvement of all parties in collaborative goal setting enhance this outcome.³ These, and other tasks, are performed in the case conference, a joint meeting of the patient, his or her family, and the healthcare professionals involved in treating that patient. As the rehabilitation medicine physician often chairs this meeting, training in chairing case conferences is an integral part of the rehabilitation medicine postgraduate curriculum.¹

Workplace-based assessments have established their value in higher medical training, but currently there is no assessment that rates a direct observation of the doctor-in-training's interaction with a patient, the patient's family and members of the multidisciplinary team. Such interactions are common in medical specialties such as rehabilitation medicine, paediatrics, palliative medicine and psychiatry, and require a particularly high level of performance from trainees in these disciplines. The direct observation of procedural skills (DOPS) is closest to the type of assessment tool that might evaluate a trainee's ability to chair a case conference.⁴ However, the DOPS is based on an individual trainee's interaction with a single patient – there is no record of interaction with the patient's family or the rest of the multidisciplinary team, and it is limited in its applicability to assessment of the specific skills of chairing a case conference.

Measuring a trainee's performance in chairing case conferences relies on identifying the required competencies and determining these against a psychometrically robust scale.⁵ Standardised statistical principles for the development of workplace-based assessments should be followed when developing assessments and should include establishing appropriateness (acceptability) and estimates of error (reliability), and determination of what the scale purports to measure (validity).⁶ Many of the workplace-based assessments in use in postgraduate medical training do not have demonstrable psychometric properties. Where these exist, they are incomplete and from small, local samples.^{4,7}

Feedback from assessments should improve trainees' competence⁸ and compare trainees' performances with an explicit standard.⁹ Unfortunately, in postgraduate medical education, feedback is infrequently provided by trainers to their trainees,¹⁰ or, if it is provided, it fails to be useful to the trainee.¹¹ There are several initiatives to enhance trainers' ability to provide feedback,^{12,13} and educational programmes for trainers have been shown to improve trainers' ability to provide feedback.^{14,15} This is important because inexpert provision of negative feedback to trainees may actually worsen the trainees' performances, possibly through decreasing motivation.¹⁶

Completing workplace-based assessments and providing feedback should improve trainees' performances. The likely mechanism for this is through enhancing trainees' self-regulation.¹⁷ This has been termed 'feed-forward' and will allow trainees to address shortcomings and incorporate suggestions for improvement into their work.¹⁸ There is some evidence to suggest that enhanced performance based on good quality feedback will lead to improved patient outcomes, which, of course, should be the aim of postgraduate medical education.¹⁹ Thus, providing feedback to trainees has a powerful educational effect that we should harness to improve patient care.

The aim of this project was to develop and test a robust means of assessing a rehabilitation medicine trainee's performance in chairing a case conference and providing a structure for feedback. The project encompassed identifying the competencies in chairing a case conference and testing the psychometric properties of the case Conference Assessment Tool (cCAT).

Methods

This project comprised three phases: development of the cCAT, a pilot study and a confirmatory study. The project received institutional board approval by the University of Leeds' Education Research Ethics Committee.

Development of the cCAT

The authors met with four groups of experienced rehabilitation professionals working with different multidisciplinary rehabilitation teams in Yorkshire and the south-east of England to develop a list of competencies that a trainee would be expected to demonstrate while chairing a case conference. During these meetings, delegates described the behaviours that they would expect a *trainee in rehabilitation* medicine to exhibit while competently chairing a case conference. Examples from their own clinical practice and their experiences of training postgraduate doctors were discussed. After each meeting, a list of competencies was drawn up and circulated to those present

at the meeting for their confirmation. After four meetings no new competencies were identified. This list of competencies was matched to an assessment matrix, as is commonly used by other workplace-based assessments, such as the DOPS, to produce the pilot version of the cCAT.

Pilot study

For the pilot phase we scripted and filmed two scenarios. The scripts for these scenarios described case conferences involving patients and their families who would be typically encountered in routine clinical practice in NHS rehabilitation units in the UK and were developed together with rehabilitation clinicians and patients. An example is described in Box 1.

These two recordings were shown to two workshops in which educational supervisors, using the pilot version of the cCAT, rated the performance of each trainee. These data were collated and analysed using standardised psychometric principles for the development of workplace-based assessments.⁶ Items in the list of competencies that did not contribute to the assessment process or failed to meet the minimum requirements of the psychometric standards were eliminated from the final version of the cCAT (see Appendix 1).

Confirmatory study

Based on feedback from the pilot study, six further clinical scenarios were filmed with simulators playing the roles of clinicians, patients and family members. Educational

Table 1. Details of meetings for the final version of the case Conference Assessment Tool (cCAT).

Location	Number of raters	Number of recordings shown	Total number of ratings
Birmingham	7	1	7
Aberdeen	4	5	20
London	12	5	57
Taunton	3	3	9
Leeds	4	4	16
Portsmouth	13	4	50
Glasgow	5	4	19
Total	48		178

Key points

- > Rehabilitation medicine demands a high degree of medical leadership

- > Communication among the team, patients and their families is paramount to the success of the rehabilitation programme

- > The case Conference Assessment Tool (cCAT) provides a structured assessment to enable trainers to help trainees develop their team leadership skills

Table 2. Statistical characteristics of the final version of the case Conference Assessment Tool (cCAT).

Scaling assumptions		
Item means: range		3.23–3.44
Item SD: range		1.167–1.252
Item – total correlations		0.731–0.854
Targeting		–
Skewedness		–0.269 to –0.790
Floor effects: range (%)		3.7–8.6
Ceiling effects: range (%)		16.6–23.2
Reliability		–
Cronbach's α		0.945
Interrater reliability (95% confidence interval)		
Simulation	Number of raters	Intraclass correlation coefficient
1	31	0.743 (0.630–0.845)
2	36	0.777 (0.681–0.861)
5	36	0.673 (0.546–0.794)

supervisors representing the main training areas for rehabilitation medicine in the UK were invited to participate in workshops, at which they received training on the cCAT and the use of its scoring guide (see Appendix 2). Educational supervisors viewed the scenarios and completed a cCAT for each one. Feedback from these viewings was used to finalise the format of the cCAT and the scores were again analysed using standardised psychometrics.

Psychometric analysis

To examine the performance of the competency items in the matrix we calculated data quality, scaling assumptions and targeting.²⁰ A principal component analysis was used to examine the scale's factors.²¹ Cronbach's α coefficient was used to determine internal consistency²² and interrater reliability scores (ICCs) were calculated for different raters scoring the same simulation.

Convergent and discriminant construct validity were evaluated by examining the extent to which Spearman's (ρ) correlations between the rating on the cCAT and the seniority of the trainee are consistent with expectations.²³ Content validity was established throughout the project from feedback by the raters.

Results

Pilot study

Over the course of an hour, delegates at the workshop watched the two pilot recordings and provided rating scores on the performance of the trainee in the simulation; 50 initial version cCATs were completed.

After initial analysis, a number of the items in the competency matrix were found not to contribute to the overall assessment of the trainee. The internal consistency of the pilot version was quite high (0.985), indicating that there may be redundancy of items. Principal component analysis identified that all of the competencies mapped onto one factor. However, a second factor was also identified linking 'summing up', 'conclusion' and 'time keeping', which indicates that these competencies are similar and can be combined into a single item referring to summing up agreed actions. Removal of these, and other poorly performing items, eg items with substantial floor or ceiling effects, led to the final version of the cCAT.

Confirmatory study

In total, 178 ratings of scenarios were collected at 7 workshops (Table 1). As the first workshop was a trial run of the final version of the cCAT, these ratings were excluded from the psychometric analyses. This left 171 ratings by 41 different raters for analysis.

Data quality was consistently high with less than 1% missing data across the ratings. Scaling assumptions were fulfilled (Table 2) and targeting analyses indicated that the final version of the cCAT had superior performance to the pilot version. Table 3 demonstrates that there were no significant floor or ceiling effects for the items.

The reliability of the scale was acceptable, with an appropriate level of internal consistency and reasonable interrater reliability. As not all recordings were viewed at all sessions, the intraclass correlation coefficients for the three recordings with the greatest number of ratings are presented. These indicate that the educational supervisors watching these simulations agreed with each other about the level of competency of the trainee chairing the case conference.

Validity analyses revealed that there was no correlation between the trainers' rating of trainees' performances and the trainees' length of time in training (Table 4). There was also no relationship between the trainees' rating and the trainers' rating of the complexity of the simulated case conferences and cCAT scores.

Discussion

We have developed and tested a means of assessing and providing structured feedback to trainees in rehabilitation medicine who are learning the skills of chairing a case conference. Trainees can now use the cCAT to receive structured feedback on their performance in real clinical interactions from their trainers across the range of competencies required to chair a case conference satisfactorily.

The cCAT was generated and tested using similar developmental and statistical methods to other workplace-based assessments.²⁴ This ensures that the cCAT can be used alongside other workplace-based assessments to enable trainees to demonstrate their competence across the full range of the curriculum requirements.

The validity analyses did not demonstrate a difference between trainees at distinct points in their training. This might mean that the cCAT total score has no overall meaning, with the important information in the component competency scores. For this reason, the cCAT has no rating for an overall score. The absence of a statistical relationship between

length of training and cCAT score might reflect some of the trainees' competencies already being acquired during core medical training and not requiring further development. As postgraduate medical training moves towards a competency-based model, it may become less important *when* trainees develop competencies in these areas, as long as they *do* develop the competencies, and any deficiencies in these areas are noted and remedied during training.

This project has a number of limitations. The underlying premise is that educational supervisors can rate the performance of trainees in simulated case conferences and that these ratings can be used to provide statistical evidence of the reliability of the competency matrix. To try to promote verisimilitude in the recordings, patient simulators were recruited and trained, and provided with scripts developed by senior clinicians in rehabilitation medicine. Trainees rated the simulations as having a close resemblance to real case conferences, contributing to the evidence of verisimilitude. Although the individual elements of the project have been used successfully in the past, the combination of methods used in this series of studies has not previously been deployed in the development of a workplace-based assessment. It will be instructive to see how the cCAT performs in real educational situations.

As this is a new assessment, and trainers have not been used to assessing trainees' performances in case conferences in a

structured way before, there may have been a learning curve for trainers using the cCAT for the first recording. We tried to reduce this effect by providing the raters at each of the viewing sessions with an introduction to the cCAT, and encouraged them to use the scoring guide when rating the simulated case conference performances.

The statistical methods used in the analyses of the ratings assume that the competencies measured are stable traits of the individuals who volunteered to take part in the recordings. However, we know that these individuals, and trainees in general, may perform differently in similar situations due to the influence of many personal and professional factors operating at the time.²⁵ This is one of the limitations of psychometric theory in general.²⁶ Hopefully, the results from this project will help to improve methods for designing and testing workplace-based assessments and generate enthusiasm for newer statistical methods such as item response theory.²⁷

A further limitation is that the cCAT has not demonstrated effectiveness in producing changes in trainees' performances in chairing case conferences. This information can be collected only once the cCAT has been in use in training in real clinical situations. The work that will follow from this project will involve collecting serial data from trainees to demonstrate how the cCAT allows trainees to develop the competencies for chairing a case conference.

Table 3. Frequency response options for items of the final version of the case Conference Assessment Tool (cCAT).

Percentage of raters scoring each competency	At end of foundation/in early CMT (%)	At end of CMT (%)	During early higher training (%)	Mid-point of higher training (%)	CCT/end of higher training (%)
Setting the scene	8.3	16.7	30.4	25.0	19.6
Multidisciplinary teamwork	8.6	20.4	27.2	22.2	21.6
Listening skills	3.7	26.2	15.9	31.1	23.2
Clarity of explanations	7.8	19.3	24.1	29.5	19.3
Problem-solving skills	6.3	18.1	33.1	24.4	18.1
Dealing with uncertainty	8.5	21.3	28.7	22.0	19.5
Ability to sum up	6.0	23.2	24.5	29.8	16.6

CCT = certificate of completion of training; CMT = core medical training.

Table 4. Construct validity of the final version of the case Conference Assessment Tool (cCAT).

Spearman's ρ	Correlation matrix		
	Duration of trainee's experience	Trainee's rating of complexity of case	Trainer's rating of complexity of case
The cCAT total score	0.124	0.089	0.162
	0.155*	0.310*	0.089*
Duration of trainee's experience	–	0.387	–0.459
		>0.001*	>0.001*
Trainee's rating of complexity of case	–	–	0.068
			0.414*

*significance.

The cCAT is potentially useful in other specialties that require a structured tool to assess trainees' performances in chairing patient and family case conferences, such as geriatrics, paediatrics, palliative medicine and psychiatry. Further validity work will be required before the cCAT can be used by trainees in these specialties. We have also started to explore its use by medical undergraduates in interprofessional learning environments.

In summary, the cCAT is an acceptable, reliable and valid workplace-based assessment that can be used to provide structured feedback to trainees in rehabilitation medicine. This project has also demonstrated that it is feasible to combine simulations, video recording and statistical testing of assessment methods to provide a novel means to develop assessments in postgraduate medical education. ■

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