

Involvement, self-reported knowledge and ways in which clinicians learn about assessment in the clinical years of a medical curriculum

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Background. Medical students in their clinical years are assessed by clinician educators (CEs) with different levels of involvement and responsibilities in the assessment process.

Objective. To obtain a better understanding from CEs of their involvement in assessment activities in the clinical years of a medical degree programme, their self-reported knowledge of assessment and methods of learning about assessment. This study also explored the potential association between involvement in assessment activities, self-reported knowledge of assessment and employment profile.

Methods. An online cross-sectional survey was conducted among CEs involved in assessment of an undergraduate medical programme (years 4 - 6) at a South African university.

Results. Fifty-four CEs were contacted and 30 responses (56%) were received. Assessment responsibilities included design of assessment instruments, participation in assessment activities and quality assurance of assessments. The top five assessment activities that CEs were involved in were conducting objective structured practical examinations (OSPEs)/objective structured clinical examinations (OSCEs), designing multiple-choice questions, being a clinical examiner, conducting portfolio-based oral examinations and marking written assessments. CEs ($\geq 80\%$) reported having some knowledge of formative and summative assessment, and of validity and reliability. Fewer CEs reported knowledge of constructive alignment, standard setting, item analysis and blueprinting. CEs acquired knowledge of assessment predominantly through informal methods such as practical experience and informal discussion rather than through formal education processes such as attending courses.

Conclusions. CEs participated extensively in assessment, but their knowledge with regard to assessment concepts varied.

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Assessment helps to determine the impact of the educational experience on students' learning. Clinical assessment decisions are informed by the practice of assessors who typically have no formal training in assessment.^[1] Formal training in the theory and practice of education, including assessment, remains a rarity among the routine requirements for appointment to a clinical or academic position that typically includes teaching and assessment responsibilities in undergraduate or postgraduate medical degree programmes.^[2,3] The requisite knowledge and skills are largely acquired on the job.^[4,5] An unavoidable feature of this education model is that levels of knowledge and expertise among medical educators responsible for conducting assessment processes vary widely.^[6,7] Gaining insight into clinicians' assessment expertise and practices is therefore essential to understand the decisions made about students' competencies.

Notwithstanding the steady expansion of knowledge regarding assessment methods and best practices, little attention is devoted to educators who are responsible for assessment activities in medical training programmes. Those involved in assessment not only develop and engage in assessment processes, influencing the quality of data available for decision-making, but also use those data to make strategic decisions about performance, i.e. pass/fail decisions. Given this responsibility, it seems reasonable to assume that

medical educators should have pertinent knowledge and skills to inform their assessment practices. While the published literature provides assessors with a plethora of information regarding specific assessment methods, such as the observed structured clinical examination (OSCE) or multiple-choice questions (MCQs),^[8-10] few empirical studies provide guidance on the competencies required of assessors in medical education.^[11,12]

Clinician educators (CEs) involved in medical education assessment are often university-employed academic staff with academic and clinical teaching responsibilities, as well as clinical staff who have a joint health service and university appointment (referred to as joint appointments). In our context, this latter group has a dual role as clinicians (70% of the time) and educators/researchers (30% of the time). These clinical staff work in a range of healthcare settings such as hospitals, community health centres and primary healthcare clinics. Assessment responsibility devolves to and rests with both academic and clinician educators. An unavoidable feature of this model is the variable levels of expertise and involvement in assessment processes. These variations among clinicians and academics with their varying levels of involvement and challenging workloads are compounded by competing interests, personal experiences and beliefs about assessment, all of which influence assessment practices.^[13]

While there have been calls for a more formalised approach to developing the competence of medical educators with regard to assessment,^[12,14] there are few formal descriptions of the competencies required,^[7,15,16] the levels of knowledge^[6,7] or where or how medical educators gain the knowledge required to meet these obligations.^[17,18] Furthermore, expectations and involvement may vary at both departmental and institutional levels. Therefore, a one-size-fits-all faculty development programme for assessment would be predicated on the flawed belief that educators (university academic and hospital-based clinician) assessing students have equivalent roles, responsibilities and expertise in assessment.

The purpose of this study was therefore to obtain a better understanding from CEs of their involvement in assessment activities in the clinical years of a medical degree programme, and their self-reported knowledge and methods of learning about assessment. The study also explored the potential association between involvement in assessment activities, self-reported knowledge of assessment and employment profile (university academic or hospital-based clinician).

Methods

Study design

A cross-sectional observational study of all clinicians teaching in years 4 - 6 of a 6-year programme at a South African (SA) medical school was conducted using a self-designed questionnaire. A cross-sectional design was chosen, as it is a cost-efficient method to collect data at a point in time about clinician educators' knowledge of and involvement in assessment.^[19]

Participants

Participants included medically trained staff employed by either the university or a university-affiliated teaching hospital. Those involved for <1 year within the university or the healthcare system were excluded, as they were deemed to have had inadequate exposure to assessment processes.

Survey instrument

A questionnaire was developed based on a review of the literature and feedback from interviews held with 4 clinicians with an educational background and/or qualification. The questionnaire captured the demographic details of participants, their responsibilities in assessment processes, self-reported knowledge of assessment concepts using a 3-point scale categorised as 'I can explain this to somebody', 'I have heard about it' or 'I have never heard of it', and ways in which CEs learnt about assessment. The questionnaire was piloted with 2 CEs who were not participants in the study.

Study procedure

The study was conducted as an anonymous online questionnaire using SurveyMonkey software (SurveyMonkey, USA). The questionnaire was accompanied by an introductory explanatory email, and the initial invitation was followed by 2 further calls for participation by the year and course convenors, who are responsible for the organisation of assessment activities at the institution.

Analysis

Respondents were allocated an alpha-numeric code prior to the data being exported to an Excel (Microsoft, USA) spreadsheet. A global 'knowledge

score' was generated during analysis. Participants who recorded a positive response ('I can explain this to somebody' and/or 'I have heard about it') to ≥ 5 of the 8 terms used to assess knowledge were considered to be 'assessment aware'.

Descriptive and inferential statistical analysis was performed using Stata 13.1 (StataCorp, USA). All responses were used in the analysis, and where answers were omitted these were recorded as missing values. Associations between categorical variables were determined using Fisher's exact test. A *p*-value of <0.05 was considered statistically significant.

Ethical approval

The study was approved by the University of Cape Town's Faculty of Health Sciences Ethics Committee (ref. no. HREC REF: 201/2014). Consent was obtained from all participants and participation was voluntary.

Results

Work profile of clinician educators

Of the 54 CEs invited to participate in the study, 30 completed the survey (56% response rate). Most of the CEs were medical doctors (83%; *n*=25) with a postgraduate qualification (93%; *n*=28) and >5 years of teaching experience (77%; *n*=23) (Table 1). A similar proportion of staff were university employed (50%; *n*=15) or joint appointments (43%; *n*=13) (Table 1). Of those who completed the survey (*n*=30), a small number did not indicate their employment status (7%; *n*=2); these values were recorded as being missing (Table 1).

More than half of the participants (57%; *n*=17) devoted up to 40% of their weekly working time to educational activities at their place of employment, and 57% (*n*=17) were also external examiners at other SA medical schools. Furthermore, almost half participated in national specialist licensing examinations conducted by the Colleges of Medicine of SA (47%; *n*=14).

While participants contributed to assessment events across the clinical years of the programme (years 4 - 6), almost all (83%; *n*=25) were involved in the assessment of final-year medical students (year 6).

Involvement of clinical educators in assessment activities

CEs were involved across a range of assessment activities; the median number of activities was 7 (range 2 - 13). Approximately half were involved in design activities, more than half in conducting examinations and fewer than half in quality-assurance activities (Table 2). The top 5 assessment activities that CEs were involved in were conducting objective structured practical examinations (OSPEs)/OSCEs (90%; *n*=27), designing MCQs (70%; *n*=21), being a clinical examiner (70%; *n*=21), conducting portfolio-based oral examinations (67%; *n*=20) and marking written assessments (67%; *n*=20). Of note, half were involved in administrative tasks related to assessment activities.

Clinician educators' self-reported understanding of assessment terminology

Respondents' self-reported understanding of 8 terms frequently used in the assessment literature is shown in Table 3. More than half of the respondents considered themselves as either being able to explain the term or having heard about all of the terms. Specifically, $\geq 80\%$ were conversant with formative assessment, summative assessment, validity and reliability. Fewer

Table 1. Work profile of clinician educators

Profile	Profile details	Respondents, <i>n</i> (%)
Teaching experience, years (<i>n</i> =29) (missing (<i>n</i> =1; 3%))	1 - 5	6 (20)
	6 - 10	14 (47)
	>10	9 (30)
First qualification (<i>n</i> =30)	Medical doctor	25 (83)
	Other healthcare professional*	5 (17)
Postgraduate qualification (<i>n</i> =30)	Yes [†]	28 (93)
	No	2 (7)
Employment profile (<i>n</i> =28) (missing (<i>n</i> = 2; 7%))	University	15 (50)
	Full-time	11 (37)
	Part-time (20 - 25 h/wk)	4 (13)
	Clinical staff with joint appointment	13 (43)
Time spent on educational activities per week, % (<i>n</i> =30)	<20	12 (40)
	20 - 39	5 (17)
	40 - 59	5 (17)
	60 - 79	2 (7)
	80 - 100	6 (19)
Year of study with assessment responsibilities (<i>n</i> =30)	4	15 (50)
	5	16 (53)
	6	25 (83)
External examiner (<i>n</i> =30)	Undergraduate and/or postgraduate	17 (57)
	National postgraduate licensing examinations	14 (47)

*Epidemiologist, pharmacist, professional nurse, scientist, social worker.

[†]Only 1 was education related, the remaining 27 were all clinical qualifications, of which a fellowship of the Colleges of Medicine of South Africa was the most commonly reported (*n*=17).

Table 2. Participation of clinician educators in assessment activities

Assessment activities	Participating, <i>n</i> (%)	Not participating, <i>n</i> (%)	Missing, <i>n</i> (%)
Design of assessment instruments			
MCQs	21 (70)	9 (30)	0 (0)
OSCEs	14 (47)	16 (53)	0 (0)
Rubrics	12 (40)	15 (50)	3 (10)
SAQs	7 (23)	23 (77)	0 (0)
Participation in assessment activities			
Conducting OSCEs/OSPES	27 (90)	1 (3)	2 (7)
Clinical examiner (patient presentations)	21 (70)	9 (30)	0 (0)
Portfolio-based oral examinations	20 (67)	10 (33)	0 (0)
Marking written assessments (SAQs, projects, case reports)	20 (67)	10 (33)	0 (0)
Examination administration (arranging timetables, venues, rosters)	15 (50)	12 (40)	3 (10)
Oral examinations	12 (40)	18 (60)	0 (0)
Projects	7 (23)	23 (77)	0 (0)
Quality-assurance of assessment			
Reviewing questions	16 (53)	11 (37)	3 (10)
Standard setting	11 (37)	16 (53)	3 (10%)
Blueprinting	10 (33)	16 (53)	4 (14)
Examiner training	7 (23)	20 (67)	3 (10)

MCQs = multiple-choice questions; OSCEs = objective structured clinical examinations; SAQs = short-answer questions; OSPES = objective structured practical examinations.

respondents considered themselves knowing concepts describing quality assurance of assessment practices, specifically item analysis, standard setting, blueprinting and constructive alignment.

Ways clinician educators learnt about assessment

CEs learnt about assessment in a number of ways (median 7 (range 2 - 10)). Table 4 shows that CEs were more likely to have learnt of assessment through

Table 3. Self-reported knowledge of clinician educators

Knowledge terms	I can explain it to somebody, <i>n</i> (%)	I have heard about it, <i>n</i> (%)	I have never heard about it, <i>n</i> (%)	Missing, <i>n</i> (%)
Type of assessment				
Formative assessment	21 (70)	7 (23)	1 (3)	1 (3)
Summative assessment	20 (67)	8 (27)	1 (3)	1 (3)
Principles of assessment				
Validity	19 (63)	5 (17)	4 (13)	2 (7)
Reliability	19 (63)	5 (17)	4 (13)	2 (7)
Quality of assessment				
Item analysis	8 (27)	11 (37)	8 (27)	3 (10)
Standard setting	6 (20)	13 (43)	9 (30)	2 (7)
Blueprinting	10 (33)	6 (20)	12 (40)	2 (7)
Constructive alignment	6 (20)	10 (33)	12 (40)	2 (7)

Table 4. Ways in which clinician educators learnt about assessment

Learning method	Respondents, <i>n</i> (%)
Workplace-based learning	
Practical experience	28 (93)
Peer learning	
Informal discussion	28 (93)
Departmental meeting	24 (80)
Conference attendance	18 (60)
Self-directed learning	
Internet	16 (53)
Structured learning activity	
Workshops on assessment	19 (63)
Courses on assessment	10 (33)

workplace-based learning, such as practical experience and peer-learning activities, e.g. informal discussions and departmental meetings. Internet-based learning and formal courses on assessment were less common methods of learning.

Relationship between being assessment aware, employment profile and assessment activities

Seventy percent of CEs were regarded as assessment aware on the basis of self-reported knowledge of ≥ 5 assessment terms used in this study. There was no statistically significant association between being assessment aware and employment profile ($p=0.555$). Similarly, no statistically significant relationship was demonstrated between being assessment aware and involvement in assessment activities listed in Table 2.

Discussion

This study provided a better understanding of CEs' involvement in assessment activities in the clinical years of a SA medical degree programme, self-reported knowledge of assessment and most common methods of learning about assessment. To date, these topics, which are critical to designing bespoke faculty development initiatives for this niche group of health professions educators, have not been widely discussed in the assessment literature.^[20,21]

Almost half of respondents were jointly appointed staff in fulltime clinical practice. This is consistent with reports in the literature, which highlight that health service employees make a significant contribution to medical education, particularly in resource-constrained settings.^[22] Despite their significant health service commitments, the respondents were an experienced group of assessors, with involvement at local, inter-institutional and national level. They engaged in a broad range of assessment activities, predominantly focusing on grading processes, i.e. development of assessment instruments and appraisal of student performance. A much smaller proportion of CEs were involved in quality-assurance activities, including blueprinting, standard setting and examiner training, a shortcoming that needs to be addressed when identified.^[23] This pattern of involvement may reflect a bias of clinical expertise rather than educational expertise, which appears to be a key determinant when inviting examiners to participate in clinically related examinations.

It is worth noting that half of CEs were involved in administration tasks related to assessment events. This is of particular concern because the competing interests of education, research and patient care already limit the amount of time CEs can devote to assessment activities or the pursuit of knowledge regarding assessment.^[24] Addressing this inefficient use of CEs' time should be a priority if better quality-assessment practice is to be achieved.

Respondents ($\geq 80\%$) reported that they were aware of (could explain or had heard of) formative and summative assessment and the principles of validity and reliability. A third or more of respondents with assessment responsibilities had never heard of item analysis, standard setting, blueprinting or constructive alignment. This finding is in keeping with the limited practice of blueprinting and standard setting. Of note, though, is that there was no statistically significant difference between the appointment of staff (academic v. clinical) and being assessment aware (based on self-reported knowledge of ≥ 5 of the 8 assessment terms). This finding is somewhat unexpected because academic appointees, with a primary responsibility for teaching and assessment, may be expected to be more knowledgeable than clinical staff, who are primarily responsible for providing a clinical service. The latter have limited time to participate in faculty development initiatives that may advance their knowledge of assessment. This has previously been shown to be true of clinicians who provide teaching in clinical service settings.^[25]

The dominant mode of learning was practical experience in the workplace, with limited use of structured learning activities such as workshops and assessment courses. The two most common ways in which respondents reported learning, practical experience and informal discussions may provide limited opportunities for gaining experience in quality assurance-related activities. The prevailing belief that assessment is predominantly a process of measuring knowledge may contribute to this situation.^[25,26] This belief is of concern, because it has been suggested that those teaching in the clinical years of medical training programmes not only require knowledge of medicine, patients and context, but also of education to enhance their teaching and assessment practices.^[27]

The key findings of this study provide some useful information that could contribute to faculty development initiatives aimed at addressing the assessment-related knowledge gaps of CEs. In keeping with the preference for learning-by-doing, it would make sense to offer faculty development activities that involve CEs in authentic planning, design and quality-assurance processes within their working environment rather than in a traditional workshop setting.^[28] The timing of these activities and their duration are key to accommodating busy clinical and academic schedules, e.g. snippets slotted into existing departmental meetings or at the end of the working day.^[29] Ideally, a short course of customised modules dealing with specific topics would enable CEs to focus and develop expertise in targeted areas of assessment in which they usually participate. This type of faculty development programme would promote distributed expertise within a team of CEs rather than a few assessors with broad expertise who are limited by time constraints and therefore unable to meet all the assessment demands of a clinical programme. Freeing up educators from performing examination administration would be one approach to making capacity available for their broader involvement.

Study limitations

This study has a number of limitations. First, the small sample size limits the generalisability of the findings. A larger sample size involving multiple institutions is required to thoroughly explore the potential association between variables. Second, self-reported knowledge is widely recognised to be of limited value and further studies using objective measures of knowledge would be more meaningful.

Conclusions

This study confirms that clinicians play a role in the assessment of medical students and the need for involvement and training of both university-employed and health service-employed staff with regard to assessment-related quality-assurance processes. Faculty development initiatives should be customised to target the predominant assessment knowledge gaps of CEs, while taking workloads into account. Furthermore, such initiatives should focus on a learning-by-doing approach using authentic assessment material rather than traditional generic assessment workshops, where the focus is on knowledge acquisition rather than knowledge application. Finally, there is a need to understand why CEs do not attend formal courses on assessment. Although this study was conducted at one institution, it may be relevant to other institutions in resource-constrained settings that face the challenge of engaging a mixed group of educators around the current body of knowledge of assessment so that changes in practice can keep up with the exponential growth in assessment knowledge.

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