Use of work-based assessments in postgraduate medical education

ABSTRACT

Work-based assessments are ubiquitous in postgraduate medical training in the UK. This article discusses the variety of these assessments and explores barriers to their use and solutions for improving the educational value of these tools for adult learners. The focus should be on feedback and learning rather than assessment, and this may promote discussion of more challenging scenarios where the opportunity for learning is greater. Mobile devices may help reduce the administrative, geographical and time constraints of completing work-based assessments.

Assessment and learning are two processes run in parallel within the medical education journey (Prideaux, 2007; Ferris and O'Flynn, 2015). The primary aim of an assessment is to evaluate whether learners have achieved the required goals of the teaching plan (Harlen, 2005). These assessments can be formative and serve as a learning tool (Tully et al, 2018), which includes reflection and identifying areas for further development, or they are summative and thereby pass or fail (Harlen, 2005).

There has been a significant shift in postgraduate medical education toward competency rather than time-based progression (Gruppen et al, 2018). Frank et al (2010) explained that the main focus of competency-based education is the outcome of the learning process rather than simply time spent training. The same group defined competency as a collection of knowledge, skills and attitudes (Frank et al, 2010). These criteria have to be liable for observation and measurement so they can be assessed (Frank et al, 2010). Therefore the need for regular assessment is more important than ever. As a result, formal and informal assessments have been incorporated into specialty training schemes for postgraduate doctors (Gray et al, 2008).

While most assessments in undergraduate education focus on knowledge and skills, postgraduate medical education requires evaluation of elements such as communication skills, behaviours and attitude, team work and professionalism (Fraser and Greenhalgh, 2001; Frank et al, 2010).

Different types of assessment are in use in postgraduate medical training (Norcini and McKinley, 2007). The written exams and the oral or clinical assessment remain the main components for postgraduate specialty degrees (Norcini and McKinley, 2007). However, other assessments have been incorporated into the training system to observe and evaluate the competencies of trainees. Simulation has been increasingly popular assessment tool in the last few years in medical education (Jones et al, 2015). It provides a practice platform for a learner to acquire knowledge, skills and behaviour in a safe and controlled environment as well as enabling constructive feedback and reflection (Jones et al, 2015). Moreover, it allows evaluation of non-technical skills such as communication skills and team work (Helmreich, 2000).

Another increasingly used form of assessment in medical education and training is the work-based assessment (Norcini, 2003; Norcini and McKinley, 2007). These have become a common tool within medical education and are discussed in more detail in this article.

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The background of work-based assessments

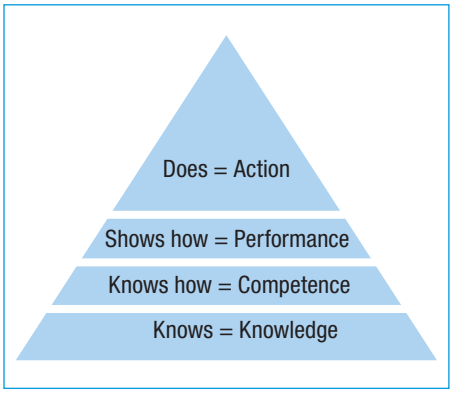
Miller described a pyramidal framework for clinical assessment (*Figure 1*) (Miller, 1990; Norcini, 2003). Each level of the pyramid represents a different stage of clinical competency which lends itself to a different assessment tool. The base of the pyramid represents knowledge, where the learner knows what is needed to perform effectively (Miller, 1990). This is tested through formative medical exams that the learner usually undertakes to achieve a degree or certificate (Miller, 1990).

The second level is competency, where the learner knows how to apply the knowledge. The third level is where the learner demonstrates how to apply the knowledge. Finally the top of the pyramid represents the action of performing within a real situation, with adaptation for unplanned events (Miller, 1990). Work-based assessments are particularly useful for assessing the final stage of the pyramid, i.e. action under real conditions away from a simulated environment (Norcini, 2003).

Types of work-based assessments

The commonly used types of work-based assessments are case-based discussion, direct observation of procedural skills, mini-clinical evaluation exercise, multisource feedback, procedure-based assessment and mini peer assessment tool (Burkill, 2008). Most require only one assessor to complete the assessment.

Figure 1. Miller's pyramid. From Miller (1990).



Case-based discussion

This includes a discussion between the learner and the assessor about a specific patient case (Mehta et al, 2013; Mohanaruban et al, 2018). This may focus on a part of the case or review the broader clinical episode including clinical assessment, diagnosis, management and the follow-up plan (Mohanaruban et al, 2018). It also evaluates some non-clinical skills such as communication, leadership, team work and reflection. The learner can select the case in advance or choose a case for discussion in retrospect (Mohanaruban et al, 2018). It is important to emphasize that in this assessment there is no pass or fail mark, rather the focus is on giving constructive feedback as part of a formative assessment (Mohanaruban et al, 2018). While many aspects of health care are judged by patient outcomes, the grade for the case-based discussion is not, instead it depends on the learner's approach and reasoning (Norcini, 2003).

As there is no penalty for mistakes, the suggestion is that learners can use this type of assessment as a more effective learning and reflection tool, and as part of their postgraduate medical armamentarium (Jyothirmayi, 2012). Mohanaruban et al (2018) surveyed 78 medical trainees in the UK to investigate the educational value of using case-based discussions. They reported that 76% of trainees used feedback from the case-based discussion assessment to address the educational development they required (Mohanaruban et al, 2018). Similar results were reported by Mehta et al (2013) from a survey of 32 paediatric trainees in the Mersey Deanery, UK. Using qualitative research methods, and by recording, transcribing and analysing a series of case-based discussions, Jyothirmayi (2012) concluded that case-based discussion acts as an educational and a learning tool in addition to its role in assessment.

There are two main shortfalls with the use of case-based discussions. First, while the recommended time to perform one case-based discussion is 20–30 minutes (Mohanaruban et al, 2018), in practice this is often shortened into a 5-minute discussion because there is no time formally allocated to doing the assessments, limiting their educational value (Mehta et al, 2013; Mohanaruban et al, 2018). Second, the educational value of a case-based discussion is largely user dependent. Hence both the learner and assessor should undergo formal training in this type of assessment (Mohanaruban et al, 2018).

Direct observation of procedural skills and procedure-based assessment

These two assessments are similar and at their core include an assessor's observation of a learner while he or she is performing a practical procedure (Marriott et al, 2011; Awad et al, 2015). The learner may be assessed on part of or on the entire procedure (James et al, 2009).

The key is that these practical assessments are performed under real circumstances with the potential for unexpected events, so should provide a reliable and valid assessment of the learner's performance (Awad et al, 2015). Awad et al (2015) studied 3152 procedure-based assessments of otolaryngology trainees and their data showed very good internal consistency (Cronbach's alpha 0.899), indicating good reliability of the assessment. Moreover, when they compared the overall calculated score of the assessment and the overall performance rating (0–4) between senior and junior trainees, there was a good correlation between the score and the year of training (overall calculated score 93±0.6% for a senior trainee *vs* 71±3.1% for a junior trainee; overall performance rating 3.2±0.03 for a senior trainee *vs* 2.3±0.08 for a junior trainee) which was statistically significant (Mann–Whitney U: $P<0.001$) and confirmed the validity of the test.

Similar results were reported from Sheffield Teaching Hospitals following an analysis of 749 procedure-based assessments among trainees from six different surgical specialities in a prospective study over a 2-year period (Beard et al, 2011; Marriott et al, 2011). Beard et al (2011) showed that the use of procedure-based assessment provides a reliable measurement of the learners' surgical skill, with good construct validity.

The educational value of using practical assessment was demonstrated by Hengameh et al (2015) who conducted a randomized controlled trial on nursing students comparing the use of direct observation of procedural skills *vs* traditional assessment (subjective judgment by an instructor) and the effect on developing their skills. Their results showed a significant improvement in the clinical skills when using direct observation of procedural skills *vs* routine observation ($P=0.000$).

Perceptions, limitations and maximizing the benefit of work-based assessments

The use of work-based assessments has increased over the last few years and they are now well incorporated into the postgraduate training schemes of several medical specialties (Cheung et al, 2017). Surveys have looked at the perceptions of learners and assessors toward work-based assessments (Massie and Ali, 2016). In summary, while work-based assessments add educational value to their training, learners face challenges such as a paucity of willing assessors or poor engagement with the process (Hawkins et al, 2015; Massie and Ali, 2016). While the Royal colleges and the responsible training bodies set guidelines on the required numbers of work-based assessments for each training level, the achieved benefit from this process relies predominantly on the willingness of the trainee to use this learning opportunity rather than using it as a tick-box exercise to acquire the mandated competency (Scarff et al, 2019).

A recent systematic review investigated trainees' perceptions of clinical performance assessments and showed that not all trainees find this form of evaluation valuable to their learning (Scarff et al, 2019). Trainee engagement with the process had a significant influence on the outcome (Scarff et al, 2019). Other factors related to outcome are the work environment and willingness of the assessor to invest time and effort in the process.

Lack of sufficient time during busy clinical schedules is cited as another problem faced by learners (Massie and Ali, 2016). This is also a problem faced by assessors who are usually not given extra time in their schedules for such educational activities. Affording learners the freedom to select the case may lead to challenging clinical scenarios with greater potential for learning being concealed. This may bias the overall rating of the assessments (Sabey and Harris, 2011; Massie and Ali, 2016). Learners are also able to choose their assessor, so may select assessors who are perceived as being less severe rather than more rigorous ones (Massie and Ali, 2016).

From an assessor's point of view, the lack of designated time for the assessment remains the main barrier reported in several surveys (Wiles et al, 2007; Bindal et al, 2011; Swayamprakasam et al, 2014). If these assessments are incorrectly used as a grading measure of competency instead of being used as an educational tool, this can cause anxiety to learners, who may avoid using them in areas where they feel an educational development is required, and rather use it in areas where they know they will perform well (Harlen, 2005; Massie and Ali, 2016).

To maximize the benefits of these assessments, two key areas need to be improved. First, adding extra time for trainees and trainers within their clinical schedule to be able to go through these assessments efficiently and adequately. This can be incorporated within the job plan of the assessor and the trainee's schedule (Sandars et al, 2009; Swayamprakasam et al, 2014). The increasing use of digital applications through smartphones may allow convenient recording of the assessment, minimizing administrative time (Sandars et al, 2009; Swayamprakasam et al, 2014; Fitzpatrick et al, 2019). Second, formal training is required for both learners and assessors about how to use work-based assessments most effectively (Orfaly et al, 2005; Bindal et al, 2013).

Conclusions

Work-based assessments are widely used in modern postgraduate training and education. They target the final stage in Miller's clinical assessment pyramid and provide good educational value. However, several areas can be improved to maximize the benefit from these assessments, including time availability and training on the use of these tools. **BJHM**

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KEY POINTS

- Modern postgraduate medical education is based on competency rather than time-based progression.
- Work-based assessments are increasingly used as an assessment tool in postgraduate medical education and training.
- Work-based assessments are particularly useful for assessing the advanced competencies in Miller's pyramid.
- Work-based assessments provide good educational value, but their benefits could be improved by increasing time availability and training on their use.

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