Medical Education

Workplace-based assessment: Measuring and shaping clinical learning

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ABSTRACT

Assessment of clinical competence is a challenge. It should not only help us in measuring performance but also in improving performance. Traditional assessment has many flaws, mainly related to snapshot observations, artificial settings and lack of opportunity to improve performance. Workplace-based assessment (WPBA) refers to direct observation of performance at the workplace. It builds on the ways people learn at the workplace. The key feature of all tools used for WPBA is direct observation of trainee performance at the workplace followed by provision of feedback based on that observation. This makes such an assessment valid. Though most of the tools use subjective observations, the assessment is reliable due to use of multiple encounters being assessed by multiple assessors in multiple settings. In addition, WPBA has high utility in terms of its educational impact. WPBA involves sampling of the clinical work using logbooks or encounter cards and direct observation of performance of clinical competence and procedural skills. These are supplemented by assessment by various people who can provide authentic information about a trainee's work habits. The encounters and ratings are documented in a portfolio, which allows a longitudinal record of trainees' progress. Experience suggests that WPBA has the potential to shape clinical learning and steer it towards desirable learning outcomes. Most of the tools used for WPBA can be applied in the Indian context.

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INTRODUCTION

Assessment is an important input for improving the quality of education. This is especially so for helping students acquire good clinical skills during all phases of their learning—as students, interns and postgraduates. This function of assessment is sparingly used in India because of our obsession with objectivity.[1] However, it has been widely argued and now accepted that objectivity is not the *sine qua non* of reliability.[2] The utility of any assessment is a function of its many attributes, viz. validity, reliability, acceptability, feasibility and educational impact.[3] An assessment low on any one of these attributes can compensate by being high on others.

The most important issue in assessment is to build validity. Miller's pyramid[4] provides a useful model for assessment of clinical competence, and many experts suggest that validity is in fact a matter of climbing higher on the pyramid.[5] What it means is that assessing what physicians do in a real-life setting is likely to be more valid and, therefore, a better predictor of future performance compared with assessment in a controlled situation. Similarly, workload and availability of infrastructure may impact the functioning of a physician.[6] Traditional assessments ignore this aspect—performing a small task at an objective-structured clinical examination (OSCE) station is very different from performing the same task in an outpatient department crowded with patients.

Another important reason for dissatisfaction with traditional assessment is its lack of direct observation. A long case, for example, is assessed without actually observing the student taking the history or performing the physical examination. OSCE does provide for direct observation, but the complete task is broken into smaller components which may not add up to the total in a particular situation. Lastly, traditional assessment has very little scope, if any, for providing feedback to the trainee. Even where it is provided, it is not based on direct observation, is not in the vicinity of the performance and is not reliable because of its dependence on a single encounter/examiner.

Assessing physicians in the workplace is not an entirely new concept. There has been renewed interest in it because it allows direct observation of the trainee in a real-life setting performing actual tasks and enables feedback to the trainee based on the observation.[7] It has been designated differently in different settings—workplace-based assessment (WPBA), in-training assessment, continuous assessment or internal assessment. We use WPBA due to the wider use of this term. Whatever the term used, the main feature of this assessment is direct observation of performance in the workplace.

The Postgraduate Medical Education and Training Board, UK defines WPBA as 'the assessment of working practices based on what doctors actually do in a clinical setting, predominantly carried out in the workplace itself'.[8] It is a vehicle for collecting quantitative and qualitative data about trainee performance from various sources and using it to provide feedback, thus enabling learning. It is a good tool for regular feedback while providing some assurance that there is ongoing growth in competence.

WHY WPBA?

Our better understanding of the philosophy and process of assessment provides many reasons for adopting WPBA. These include:

1. *Focus on clinical skills*: It has been shown in many primary-care settings that a good history and physical examination can provide a correct diagnosis in over 75% of cases.[9] This is a large proportion, considering that diagnostic imaging alone provides a diagnosis in only one-third of cases.[10] Treating a patient also requires a number of soft skills (professionalism, ethics, communication, etc.), which are best assessed in a real-

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life setting.[11] Interaction with other members of the health team is also best assessed at the workplace. There is increasing evidence to suggest that when things go wrong in actual practice, most of the time it is attributable to lack of these skills.[12] However, these skills do not lend themselves to assessment easily except by direct observation. Standardized patients may be able, to some extent, to provide information about these skills but may not fully replace the ability to directly observe the impact on real patients. Context plays a major role in deciding the way physicians act in a given situation.[13] Physicians are known to perform differently in the controlled setting of the examination and the real setting of work.[14]

2. *Role (and lack) of feedback:* A meta-analysis showed a feedback effect size of 0.79 on student achievement compared to 0.40 for overall schooling.[15] The greatest effects were seen when information was provided around a specific task. In the field of medical education, another meta-analysis showed a beneficial effect in a majority of studies.[16] The magnitude of these effects was increased further when feedback was combined with educational interventions. Despite its importance as a tool to promote learning, the use of feedback based on the observation of performance does not occur frequently in medical education.[17,18] Observed assessment of clinical performance is sparingly used for medical students during clinical clerkship[19] and almost half the students are not observed while performing a clinical examination.[20] Other reports also suggest that less than one-third of the clinical encounters during training are observed.[21] Even at the postgraduate level, trainees do not receive any meaningful feedback 80% of the time.[22] No studies are available from India but we may expect similar (or even worse) figures. This limits the number of opportunities where meaningful feedback based on direct observation could have been provided to the students.
3. *Problem of content/context specificity*: Traditional assessments are opportunistic and suffer from the problem of non-representative sampling. In addition, many examiners insist on 'difficult' cases (central nervous system cases in medicine/paediatrics, for example) to be given, on the presumption that a student who can deal with such a case can deal equally well with a 'simple' case such as malnutrition or anaemia. Sometimes arguments such as 'looking at the process only' are advanced, which are baseless as the process of dealing with a particular patient is highly context-specific.[5] There is general agreement that physicians perform differently with different patients and therefore case specificity is more a cause of unreliability compared to marker variability.[23] WPBA allows a better sampling of work that physicians actually do rather than assessing them on patients whom they are unlikely to handle during their professional work.
4. *Longitudinal assessment*: Failure of one-shot observation to provide sufficient information about clinical competence is another important reason in favour of WPBA. As against examinations, which depend a lot on chance in terms of which case (easy or difficult) or which examiner ('dove' or 'hawk') a trainee gets, WPBA assesses the trainee on day-to-day work. Also, in the artificial setting of an examination, students can disguise behaviour which they otherwise routinely practice. It has been observed that single measurements, howsoever well designed and executed, are *inherently* unreliable (emphasis added).[24] Meaningful assessments must be longitudinal, sample multiple areas of work and focus on the process of learning as much as on the product of learning.
5. *Alignment with learning in the workplace:* Purposive assessment should align with the way people learn. Courses and independent study lead to learning about general problems. Learning in the workplace, on the other hand, is triggered by specific problems in patient care, which are solved by consulting either published resources or colleagues. This difference has been well researched and is influenced by conflict between workload and available time as well as the learning climate.[25,26] Differences of opinion among treating physicians and feedback from various sources also influence such learning.

TOOLS FOR WPBA

A variety of tools can be used for WPBA. A mix of tools is of utmost importance to get a broader picture of student attainment.[5] Broadly speaking, the tools of WPBA can be divided into four categories:

1. Documentation of work experience through logbooks, such as clinical encounter cards (CECs)
2. Observation of individual clinical encounters such as the mini-clinical evaluation exercise (mini-CEX) and direct observation of procedural skills (DOPS)
3. Discussion of individual clinical cases, such as chart-stimulated recall (CSR), also called case-based discussion (CbD)
4. Feedback on routine performance from peers, coworkers and patients, collected by survey and usually called multisource feedback.

In addition, data from these tools and information from other sources are often combined into a portfolio which serves to document experiences and achievements.

It is pertinent to mention here that many institutions across India may have been using many of these or similar tools without having a formal WPBA programme. Some of the other tools are, of course, new to us. What is important is to have an overarching concept of WPBA and then use each tool with a specific purpose. Similarly, it is equally important to use assessment data to provide relevant feedback to students to shape learning.

We discuss some of the tools as described in the literature. We have avoided detailed description of individual tools and kept the focus on the concept of WPBA. Most of these tools can be used within the existing guidelines of various regulatory bodies in India.

1. *Clinical encounter cards (CECs):* These are a packet of 5×8 inch computer-readable cards. The students are provided with these cards at the beginning of a clinical posting along with a list of clinical diagnoses and their codes, which are used to record the clinical condition. Students complete a card each time they see a patient. Multiple encounters with the same patient (e.g. follow-up) are recorded on the same card. The cards are scanned weekly and a report is generated for the tutor to ensure that each student has seen the specified number and variety of cases.[27] Analysis of reports allows the tutors to identify pattern of diseases not seen by students during a particular posting and arrange for remedial action. Contextual feedback is another positive aspect of using CECs.
2. *Mini-clinical evaluation exercise (Mini-CEX):* Mini-CEX is a snapshot observation of a clinical encounter. As the name indicates, it is brief, lasting only 10–15 minutes. A variety of clinical skills such as data gathering, physical examination, clinical judgement, counselling, organization and efficiency and overall competence can be assessed using this modality.[28] The assessor observes the student using a standard rating form. At the end of the observation, the assessor provides a focused

feedback to the student. To get reliable ratings, six to eight encounters per year with different assessors are needed. Although it may look subjective, the assessment using mini-CEX has been reported to have a high degree of reliability in a number of studies.[29] Mini-CEX ratings have also shown a good correlation with other measures of clinical competence, providing validity evidence.[30] In addition, the variety of assessors each trainee encounters exposes trainees to different viewpoints, which is a strength of this method. Mini-CEX is widely used in many universities abroad for formative assessment. Reports of its use in India have also started trickling in.[31,32]

3. *Direct observation of procedural skills (DOPS):* This was designed to provide formative assessment and feedback about the procedural skills of a trainee.[33] It is analogous to the mini-CEX, with a focus on procedures rather than clinical skills. The assessor observes a procedure, rates it and then provides developmental feedback. The observation typically lasts for 10–15 minutes with 5–10 minutes of feedback. Commonly used skills, e.g. inserting a Ryle tube, endotracheal intubation or performing a lumber puncture, are selected for such encounters. Assessment focuses on understanding of indications, asepsis, analgesia and technique. A trainee undergoes DOPS with different assessors on different procedures. Akin to mini-CEX, six to eight encounters per year are needed for reliable assessment. Experience with its use shows that assessors are generally able to distinguish between various levels of performance.[34]
4. *Case-based discussion (CbD)/chart-stimulated recall (CSR) oral examination:* This modality is used extensively for WPBA. A trainee selects two to three cases from the ones that he has recently managed and gives the patients' records to the assessor in advance. The assessor picks up one or more for discussion. The assessment is based on specific aspects of the case, e.g. a particular diagnostic or therapeutic approach. The discussion revolves around what has been actually done and does not involve hypothetical situations (e.g. what will you do if report shows X). CbD allows assessment of clinical reasoning skills.[35] It also uses single encounters to make judgements of the quality of clinical acumen, investigations, treatment, referrals and ethical issues. Each session lasts 10–15 minutes with 5–10 minutes for feedback. Correlations with other measures of clinical competence are generally fair. Though the name indicates similarity, there are differences from the traditional case presentation. Case presentations look for what the trainee says he/she will do while CSR looks for what the trainee has actually done. Both assess different competencies and one is not a replacement for the other.
5. *Mini-peer assessment tool (m-PAT):* This allows trainees to receive anonymous feedback, centrally collected, about their performance. Six to eight assessors are nominated by the trainee from among his/her supervisors or peers, including nurses and other health professionals. The assessors are required to fill out a feedback form concerning the technical and interpersonal skills of the trainee. The focus is on assessing professional competence within a teamwork environment.[36] Verbatim comments from assessors are also included anonymously. These data are then shared with the trainee and the educational supervisor so that there is agreement about the strengths and weaknesses of the trainee and a plan for improvement is developed. The validity of m-PAT has been established.[37]
6. *Multisource feedback (MSF)/360 degree feedback:* MSF involves collection of feedback from a number of persons in the trainee's sphere of influence.[38] These could be supervisors, colleagues, nurses, other health professionals and patients. The common characteristic of these raters is their ability to provide insight into the trainee's work habits, team work and interpersonal relations. To be effective, MSF includes narratives in addition to quantitative data. Trust and confidentiality are essential to the success of MSF.
7. *Portfolio:* A portfolio is a tool for collecting, storing and presenting evidence about learning and competence development at all levels of training. A portfolio has been defined as 'a collection of evidence that is gathered together to show a person's learning journey over time and to demonstrate his abilities'.[39] It can contain educational experiences (procedures, case presentations, journal clubs, conferences, etc.), reflections on those experiences, publications, critical incidents, performance on WPBA methods or multiple-choice question (MCQ) tests. The power of a portfolio lies in its reflective component.[40] Reflection separates portfolios from log books. The portfolios are assessed and feedback is provided to the trainee. Portfolio assessment is intimately linked to self-directed learning and is most useful for evaluating mastering of competences that are difficult to evaluate in other ways such as practice-based improvement, use of scientific evidence in patient care, professional behaviour and patient advocacy. Portfolios reflect what is actually done in the workplace. With our present level of understanding, they are best used as a formative tool. They have the potential to assess clinical performance over a period time, constituting one form of authentic assessment. However, assessment through portfolios is labour-intensive and requires staff development.

FEEDBACK

The biggest strength of WPBA is the availability of authentic feedback based on direct observation of performance. The assessor who has observed the trainee (at mini-CEX or DOPS, for example) is the best person to provide feedback. The assessor compares the performance of the trainee against a standard and provides developmental advice. The trainee reflects on the feedback and uses it to improve his/her performance. These methods are best suited for apprenticeship type training programmes that are common in healthcare. They provide realistic challenges, and offer an opportunity for feedback that can have major educational benefits.

To be useful, feedback should be based on direct observation, focus on changeable behaviour and be provided in a climate of trust and confidentiality.[41] A number of models for providing feedback have been described.[42,43] The common thread running through all of them is the reinforcement of what is done right and suggestions on improving what is wrong or lacking. A non-threatening atmosphere of trust, confidentiality and genuineness is vital. Using the feedback is the domain of the trainee, who needs to reflect on what has been said and then decide what changes are required.

UTILITY OF WPBA

We have already referred to the conceptualization of utility of assessment,[3] which is represented by the formula:

$$\text{Utility} = \text{validity} \times \text{reliability} \times \text{feasibility} \times \text{acceptability} \times \text{educational impact}$$

In terms of these parameters, WPBA scores high on validity as it

assesses the student in a real-life setting using an authentic task. Various studies have also shown a consistent correlation with other measures of clinical competence, providing further evidence of validity. Many of the tools used for WPBA may seem subjective but have high reliability by virtue of multiple encounters in multiple settings by multiple assessors. Increasing the size and representativeness of the sample is an accepted statistical technique whenever there is large variability. The reliability of WPBA has never been in question; however, the issue is one of generalizability. It is difficult to compare performance across departments and institutions in the absence of standardization. Since the current recommendation is to use WPBA for formative purposes, this should not be a problem. Most of the tools discussed above are feasible in our settings though they require an extra effort and faculty training for their meaningful use. Almost all the tools require considerably less time (<20–25 minutes × 6–8 encounters per year) and preparation than a long case or setting an OSCE. The experience in India is limited, but initial reports suggest that students favour receiving constructive feedback on their performance.[31]

The biggest advantage of WPBA is its educational impact. Feedback coupled with educational interventions has been shown to be the best way to improve the quality of learning in the clinical context.[16] This makes a strong case for adopting WPBA in our setting. WPBA is most suitable for postgraduate training.

Faculty training is an important input to maintain the quality of WPBA. The assessors need to be 'calibrated' on what to look for and also to identify suboptimal performance. Any performance classified as unsatisfactory must be corroborated by other tools of performance assessment, e.g. OSCE.[28]

Many of us may be tempted to say that we have been using these or similar tools in our setting, but their use as a formal programme is non-existent. Using mini-CEX or DOPS in isolation may mean little unless it is done in a programmatic manner and the results are used to modify educational experiences for subsequent phases of training. Similarly, not providing feedback to the trainees seriously hampers the usefulness of WPBA.

Not many institutions in India are using WPBA. Even where it is used, it is at an informal level because of an individual's interest rather than as a part of an assessment programme. Mini-CEX has been used in India and has shown good acceptability.[31] It is easy to integrate mini-CEX into routine clinical work; and if clinical teachers are convinced, it is easy to implement. Similarly, DOPS can also be built into undergraduate/postgraduate training.[32] The first author has started using a modified form of OSCE, wherein the observer provides developmental feedback to the students using standard techniques.[41,42] These experiences have not, however, been published. The second author has also been using mini-CEX for internal medicine residents with good acceptance (unpublished observations). There may be issues relating to shortage of faculty and observers; however, peers and senior trainees can very well fill that void. In India, senior trainees in any case provide a lot of informal feedback to juniors. WPBA aims to make that feedback more formal and organized. Implementation of portfolios and multi-source feedback may require more time before it is inducted into our system, but a process of sensitization of the faculty has to start now.

We would like to reiterate that WPBA is not a replacement for any other form of assessment.[44] It is an additional modality which aligns assessment with the way people learn at the workplace. It not only measures performance but also helps to improve performance. It can be used to steer learning towards desired outcomes. It integrates teaching, learning and assessment. WPBA is to clinical competence what class tests are to knowledge. We feel it would be useful to develop a programme of WPBA so that assessment can truly serve its proven function.

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