

Research Article

Effectiveness of Competency-Based Assessment versus Traditional Assessment in Postgraduate Residency Training

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ABSTRACT

Background: Assessment is an integral part in the process of post-graduate medical training, because it defines the process and readiness of the resident for independent clinical work. Traditional assessment techniques focus on written tests and viva voce/viva voce at the end of rotation while competency-based assessment focuses on multiple observations in the workplace, with structured feedback and a demonstration of pre-established clinical skills. In the postgraduate residency training program, this study examined the competency based assessment and traditional assessment methods.

Methods: A prospective comparative study was conducted at the Rawal Institute of Health Sciences, Islamabad from January 2025 to June 2025. The total number of residents included was 76, with an equal number in each group of postgraduates. Thirty-eight residents were competency assessed and 38 were traditionally assessed. The outcomes were overall assessment scores, clinical knowledge, clinical and procedural skills, communication, professionalism, clinical decision-making, patient management, competency achievement, pass rate and resident satisfaction. Data were analysed using appropriate descriptive and inferential statistical tests and a p value of < 0.05 was set as the criteria to be statistically significant.

Results: Residents assessed through the competency-based approach achieved a significantly higher mean overall score than those assessed traditionally (78.6 ± 6.9 versus 71.3 ± 7.5 ; $p < 0.001$). The competency-based group also obtained significantly higher scores in clinical skills, procedural competence, communication, professionalism, clinical decision-making and patient management. The mean improvement from baseline was 13.4 ± 5.8 points in the competency-based group and 7.1 ± 5.2 points in the traditional group ($p < 0.001$). Competency achievement was observed in 86.8% and 65.8% of residents, respectively ($p = 0.031$), while final pass rates were 92.1% and 73.7% ($p = 0.034$). Residents receiving competency-based assessment also reported greater satisfaction, more useful feedback and lower assessment-related stress.

Conclusion: Competency-based assessment was more effective than traditional assessment in improving clinical performance, competency achievement and residents' learning experiences. Its implementation may strengthen postgraduate residency training, although adequate faculty preparation, time and institutional support are required.

Keywords: Competency-Based Assessment, Traditional Assessment, Postgraduate Residency, Workplace-Based Assessment, Clinical Competence, Medical Education.

INTRODUCTION

Assessment is essential in postgraduate medical education, as it determines if residents

have developed the knowledge, clinical competencies, professional behaviours and decision-making skills that are necessary for safe and independent practice. An assessment system should incorporate more than just passing or failing, but should also identify areas of learning need and provide information for professional development and evidence of incremental enhancement of clinical competence. However, the choice of an appropriate assessment approach is still difficult due to the need of assessing residents in several domains and with various clinical scenarios [1-3].

Residency programs generally have written exams, viva voce, long cases, short cases and end of rotation exams as a part of the traditional assessment method. These methods can be applied in assessing theory knowledge and performance in a standardized exam setting. However, they often just show a small part of a resident's competency and may not be a true indicator of how well they perform in the real clinical setting. They can also provide very late or "indirect" feedback, making them not very effective for ongoing learning and improvement [4-6].

Competency based assessment is an approach to assessment that moves away from progression being time based and the exam being isolated, to being based on the demonstration of clearly defined abilities. It assesses what residents are able to do in the real or simulated clinical environment, and whether they can incorporate knowledge, communication, professionalism, procedural skills and clinical judgment in providing patient care. Common competency-based assessment instruments are the Mini-Clinical Evaluation Exercise, Direct Observation of Procedural Skills, case-based discussion, multisource feedback and structured supervisor evaluations. These include multiple observations and timely feedback, which enable residents to identify gaps and correct their work during training [6-8].

Although competency assessment has received educational benefits, it can be challenging to implement. It needs experienced educators, frequent on-the-job checks, factual records, time to receive feedback, and consistency when applying assessment criteria. It can be time consuming due to faculty workload, to limited clinical time, and to the variability of assessors and excessive documentation. As a result, traditional examinations are still used extensively, and a blend of both these methods

are still used in many training programmes. There is still not much formal evidence that compares their effectiveness in local postgraduate training contexts [9-11].

The present study was conducted to compare competency-based assessment with traditional assessment among postgraduate residents at the Rawal Institute of Health Sciences, Islamabad. It aimed to evaluate differences in overall assessment performance, clinical knowledge, practical skills, communication, professionalism, decision-making, patient management, competency achievement, pass rates and resident satisfaction. The findings may help postgraduate training institutions select assessment methods that provide fair evaluation while also supporting continuous learning and professional development.

MATERIALS AND METHODS

This prospective comparative study was conducted at the Rawal Institute of Health Sciences, Islamabad, from January 2025 to June 2025. The study was designed to compare the effectiveness of competency-based assessment with traditional assessment among postgraduate residents. A total of 76 residents undergoing structured postgraduate clinical training were enrolled. Participants were divided into two equal groups: 38 residents were evaluated through a competency-based assessment approach, while 38 residents underwent the traditional assessment method. Residents from medical and surgical specialties who were actively enrolled in an accredited residency programme during the study period were considered eligible for participation.

Persons who were post-graduate residents from the age of 24 to 40 years with at least six months of residency training and who gave written informed consent were included. Residents who had been on extended leave, were missing from the assessments overall or were not involved in the final assessment or had already undertaken formal training in competency-based assessment were excluded. A non-probability consecutive sampling technique was used to recruit the participants until the required number of participants were obtained. The residents were randomly distributed in the assessment groups based on the assessment system used in each of the clinical units. Demographic data such as age, gender, specialty, year of residency, academic performance, past experience of workplace-based assessment, and length of postgraduate

training were collected on a pre-designed data collection form.

In the competency-based assessment group, residents were assessed repeatedly on the basis of direct observation of their clinical performance in the actual workplace. The assessment tools used were Mini-Clinical Evaluation Exercise, Direct Observation of Procedural Skills, case-based discussion, as well as structured supervisor feedback and assessment of clinical competencies. Assessed domains covered clinical knowledge, taking history, physical examination, procedural ability, communication, professionalism, clinical reasoning and decision-making and patient management. Immediate and systematic feedback was provided to residents following each encounter of an assessment. Their progress was monitored during the study period and their achievement of the required competence level assessed using pre-established criteria. The competency-based approach focused on ongoing assessment, clinical performance that was observed, feedback, and progressive independence.

The traditional assessment group was assessed according to the system of routine assessment that is followed by the institution. This comprised written examinations, viva voce, long case assessment, short case assessment, end of rotation assessments and overall supervisor assessments. Traditional evaluations were mostly routine, and mainly tested recall of knowledge and performance in formal assessment situations. All items were scored on a common 100-point scale for both groups. The overall assessment score at the end of the study was the primary outcome. Secondary outcomes included clinical knowledge, clinical skills, procedural competence, communication, professionalism, clinical decision-making, patient-management scores, competency-achievement rate, final pass rate, need for remediation and residents' satisfaction with the assessment method. A structured five-point Likert scale questionnaire was used to collect data on the following factors: satisfaction,

clarity of assessment criteria, quality of feedback, motivation, confidence and examination-related stress.

IBM SPSS Statistics, version 26, was used to enter and analyze the data. Data for continuous variables (e.g., age) were summarized as mean and standard deviation; and data for categorical variables (e.g., assessment scores) are presented as frequency and percentages. The independent-samples t-test was used to compare mean scores between two groups, while the paired-samples t-test was used to evaluate the change in scores from baseline to end of assessment between groups. Categorical outcomes such as competency achievement, pass rate and remediation were compared using the chi-square test or Fisher's exact test. Independent predictors of successful achievement of competency were determined using binary logistic regression. Odds ratios adjusted for 95% confidence intervals (CI) were presented and those with a p-value < 0.05 were deemed statistically significant.

RESULTS

The total number of postgraduate residents studied was 76. Of these, 38 residents were assessed based on competency and 38 were assessed traditionally. The study was performed with all participants and they all finished the study and were a part of the end analysis. The mean age of the residents in the group who were assessed using the competency-based approach was 29.2 years old (SD 2.4 years), while the mean age of the residents in the group who were assessed using the traditional approach was 29.6 years old (SD 2.6 years). The number of male participants was 55.3% of the competency-based group and 52.6% of the traditional group. Residency year, specialty, prior academic performance and prior exposure to workplace-based assessment was similar between the two groups. None of the baseline differences were statistically significant, so the groups were reasonably similar prior to the assessment intervention.

Table 1. Baseline Characteristics of Residents According To Assessment Method

Variable	Competency-Based Assessment N = 38	Traditional Assessment N = 38	P-Value
Age, Years, Mean $\pm$ SD	29.2 $\pm$ 2.4	29.6 $\pm$ 2.6	0.489
Male, N (%)	21 (55.3)	20 (52.6)	0.817
Female, N (%)	17 (44.7)	18 (47.4)	
First Or Second Residency Year, N (%)	20 (52.6)	21 (55.3)	0.818
Third Or Fourth Residency Year, N (%)	18 (47.4)	17 (44.7)	

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Medical Specialty, N (%)	22 (57.9)	21 (55.3)	0.819
Surgical Specialty, N (%)	16 (42.1)	17 (44.7)	
Previous Academic Score, Mean $\pm$ SD	69.8 $\pm$ 6.5	70.4 $\pm$ 6.8	0.696
Previous Exposure To Workplace-Based Assessment, N (%)	12 (31.6)	10 (26.3)	0.612

Those residents who were evaluated using the competency-based approach, had significantly higher overall assessment scores than those evaluated using the traditional approach. The mean overall score for the competency-based group was 78.6 ± 6.9 and for the traditional group was 71.3 ± 7.5 ($p < 0.001$). Residents in the competency-based group also had higher clinical-skills scores, at 80.2 ± 7.1 , than did those in the traditional group, who had scores of 70.9 ± 8.0 . Similarly, residents who were

assessed by competency had significantly better scores for procedural competence, communication skills, professionalism, and clinical decision making, patient management. The difference in knowledge scores was smaller but remained statistically significant. These findings indicate that competency-based assessment was associated with improvement across several dimensions of resident performance rather than only theoretical knowledge.

Table 2. Comparison of Performance Scores between the Two Assessment Groups

Assessment Outcome	Competency-Based Assessment Mean $\pm$ SD	Traditional Assessment Mean $\pm$ SD	Mean Difference	P-Value
Overall Assessment Score	78.6 ± 6.9	71.3 ± 7.5	7.3	<0.001
Clinical Knowledge Score	76.8 ± 7.4	72.1 ± 7.8	4.7	0.009
Clinical-Skills Score	80.2 ± 7.1	70.9 ± 8.0	9.3	<0.001
Procedural-Skills Score	81.0 ± 7.8	70.5 ± 8.6	10.5	<0.001
Communication-Skills Score	79.5 ± 6.6	71.8 ± 7.3	7.7	<0.001
Professionalism Score	82.1 ± 6.3	75.0 ± 7.1	7.1	<0.001
Clinical Decision-Making Score	78.9 ± 7.0	71.4 ± 7.6	7.5	<0.001
Patient-Management Score	79.7 ± 7.2	72.0 ± 7.9	7.7	<0.001

There was greater improvement from baseline to final assessment for the competency-based group (13.4 ± 5.8 points) than the traditional group (7.1 ± 5.2 points). This difference was found to be statistically significant ($p < 0.001$). There was a higher percentage of the people in the competency-based group who met the specified competency level. There were 33 residents (86.8%) who achieved the competency level in the competency-based group versus 25 residents (65.8%) in the

traditional group ($p = 0.031$). The percentage of students passing the final assessment in the competency-based group was 92.1% compared with 73.7% in the traditional group. The difference in remediation rate for the residents assessed traditionally was of borderline statistical significance. The group with competency-based assessment had a significantly higher mean improvement than the traditional group as presented below.

Table 3. Comparison of Competency Achievement and Educational Outcomes

Outcome	Competency-Based Assessment N (%)	Traditional Assessment N (%)	P-Value
Achieved Required Competency Level	33 (86.8)	25 (65.8)	0.031
Passed Final Assessment	35 (92.1)	28 (73.7)	0.034
Required Remediation	4 (10.5)	10 (26.3)	0.076
Progressed To Next Training Level	34 (89.5)	29 (76.3)	0.128
Completed Required Procedures Independently	31 (81.6)	23 (60.5)	0.043

The mean improvement in assessment score was significantly greater in the competency-

based group than in the traditional group, as shown below.

Performance Improvement	Competency-Based Assessment Mean $\pm$ SD	Traditional Assessment Mean $\pm$ SD	P-Value
Baseline Assessment Score	65.2 $\pm$ 6.7	64.2 $\pm$ 7.0	0.527
Final Assessment Score	78.6 $\pm$ 6.9	71.3 $\pm$ 7.5	<0.001
Mean Score Improvement	13.4 $\pm$ 5.8	7.1 $\pm$ 5.2	<0.001

The competency-based group had a more positive assessment experience compared to residents in the other groups. They rated clinical practice confidence and motivation for learning, clarity of assessment criteria and usefulness of feedback as significantly higher. The level of usefulness of feedback was most

different. The mean score on the feedback section for competency-based residents was 4.32 $\pm$ 0.61 whereas among the traditionally assessed residents it was 3.18 $\pm$ 0.78. The competency-based group experienced significantly less stress related to the exam.

Table 4. Residents' Perceptions of the Assessment Process

Perception Variable	Competency-Based Assessment Mean $\pm$ SD	Traditional Assessment Mean $\pm$ SD	P-Value
Overall Satisfaction	4.21 $\pm$ 0.65	3.39 $\pm$ 0.74	<0.001
Clarity Of Assessment Criteria	4.29 $\pm$ 0.57	3.42 $\pm$ 0.72	<0.001
Usefulness Of Feedback	4.32 $\pm$ 0.61	3.18 $\pm$ 0.78	<0.001
Perceived Fairness	4.11 $\pm$ 0.68	3.53 $\pm$ 0.73	0.001
Motivation For Learning	4.16 $\pm$ 0.64	3.47 $\pm$ 0.76	<0.001
Confidence In Clinical Practice	4.08 $\pm$ 0.67	3.45 $\pm$ 0.71	<0.001
Self-Directed Learning	4.03 $\pm$ 0.69	3.50 $\pm$ 0.75	0.002
Examination-Related Stress	2.71 $\pm$ 0.83	3.58 $\pm$ 0.79	<0.001

Scores were measured on a five-point Likert scale, with higher scores indicating stronger agreement. For examination-related stress, a higher score represented greater stress.

The faculty member's evaluated competency based assessment higher on these aspects: Objectivity, identifying learners' needs within the workplace, Feedback and assessment of learners' actual workplace performance.

However, competency-based assessment required more faculty time and was associated with a greater assessment workload. The mean score of perceived objectivity was 4.18 $\pm$ 0.60 for competency-based assessment and 3.41 $\pm$ 0.68 for traditional assessment. The mean workload score was significantly higher for the competency-based approach, which illustrates the education benefits of this approach and the increased demands placed on faculty members.

Table 5. Faculty Perceptions of Competency-Based and Traditional Assessment

Faculty-Related Outcome	Competency-Based Assessment Mean $\pm$ SD	Traditional Assessment Mean $\pm$ SD	P-Value
Perceived Objectivity	4.18 $\pm$ 0.60	3.41 $\pm$ 0.68	<0.001
Ability To Assess Clinical Competence	4.35 $\pm$ 0.55	3.28 $\pm$ 0.72	<0.001
Ability To Identify Learning Needs	4.27 $\pm$ 0.59	3.36 $\pm$ 0.69	<0.001
Quality Of Feedback	4.31 $\pm$ 0.57	3.14 $\pm$ 0.75	<0.001
Ease Of Implementation	3.29 $\pm$ 0.74	4.05 $\pm$ 0.63	<0.001
Faculty Workload	4.08 $\pm$ 0.69	3.08 $\pm$ 0.71	<0.001
Overall Faculty Satisfaction	4.02 $\pm$ 0.66	3.51 $\pm$ 0.70	0.002

The required competency standard was achieved by binary logistic regression analysis

of factors associated with achievement of the standard. After adjustment for age, gender,

residency year, specialty and previous academic performance, competency-based assessment remained an independent predictor of successful competency achievement. The probability of attaining the level required for the competency was about 3 times higher for

residents in the competency based group compared to the traditional assessment group. The other factors that were found to be significantly correlated with competency achievement were higher baseline academic performance and regular feedback.

Table 6. Predictors of Successful Competency Achievement

Predictor	Adjusted Odds Ratio	95% Confidence Interval	P-Value
Competency-Based Assessment	3.21	1.08–9.52	0.036
Higher Baseline Academic Score	1.09	1.01–1.18	0.028
Regular Structured Feedback	2.84	1.03–7.86	0.044
Senior Residency Year	1.47	0.51–4.22	0.476
Male Gender	1.12	0.40–3.13	0.826
Surgical Specialty	0.91	0.31–2.69	0.865

Overall, competency-based assessment produced better resident performance, greater competency achievement, higher pass rates and more favourable learning experiences than traditional assessment. Although it required

additional faculty time and effort, it appeared to provide a more comprehensive and educationally useful evaluation of postgraduate residents.

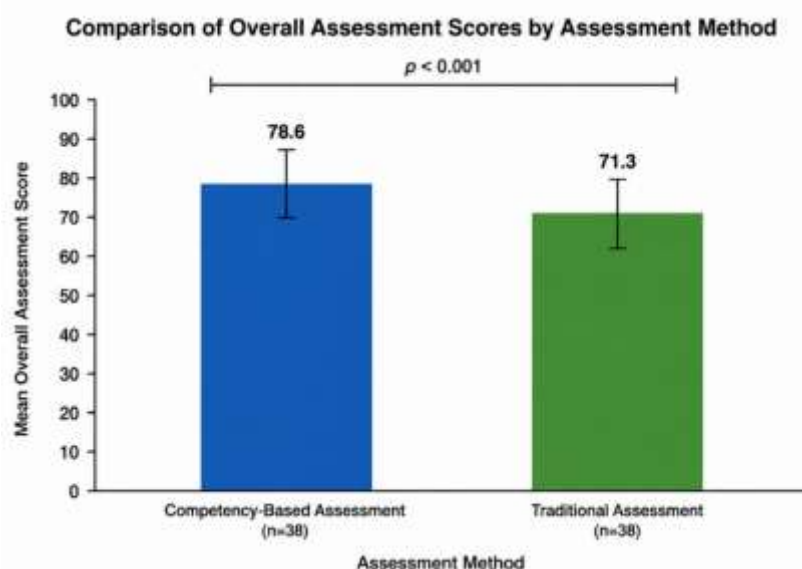


Figure 1. Comparison of Mean Overall Assessment Scores between Residents Evaluated Through Competency-Based Assessment and Traditional Assessment. Error Bars Represent Standard Deviations; the Difference Between the Groups Was Statistically Significant ($P < 0.001$).

DISCUSSION

The present study found that competency-based assessment was more effective than traditional assessment in evaluating postgraduate residents. Residents evaluated through the competency-based approach obtained significantly higher overall assessment scores, with a mean score of 78.6 ± 6.9 compared with 71.3 ± 7.5 in the traditional assessment group. They also demonstrated better performance in clinical skills, procedural

competence, communication, professionalism, clinical decision-making and patient management. These findings may be explained by the continuous and performance-oriented nature of competency-based assessment, which evaluates residents repeatedly during real clinical encounters rather than relying mainly on isolated written, viva or end-of-rotation examinations. Workplace-based assessment is intended to integrate assessment with everyday clinical practice and provide a

broader picture of a trainee's performance across different clinical situations [12-14].

Using competency assessment, the assessment scores of the residents showed significant improvements from baseline to final assessment. The mean improvement for the competency-based group was 13.4 ± 5.8 points while the mean improvement for the traditional group was 7.1 ± 5.2 points. Additionally, 86.8% of the residents of the competency-based group met the identified competency while 65.8% of the residents of the traditional group met the identified competency. The results of this finding indicate that re-observation, identification of learning gaps, and prompt correctional guidance can play a role in improving education development. According to a scoping review on WPA in postgraduate education, when WPA is purposefully linked with feedback, reflection and further opportunities for improvement, it has the potential to inform learning processes. The effectiveness of these, however, relies on the quality of the engagement of assessors that is needed and whether residents see the assessment as an exercise to learn from or simply one to be documented [15-17].

The final pass rate, the independent procedural-performance rate was also higher in the competency-based group, and fewer residents needed remediation. The results suggest that competency-based assessment could detect competencies before the final exam and allow for intervention by a supervisor. Traditional assessments can be used to assess knowledge and performance in standardized circumstances, but may not provide information on the consistency of residents' application of knowledge in real-world care situations. Other instruments like Mini-Clinical Evaluation Exercise, Direct Observation of Procedural Skills and case-based discussion enable supervisors to evaluate and evaluate clinical reasoning, communication, professionalism, and procedural performance in the real workplace. However, the educational impact of these tools requires the repeated sampling and the skill of trained assessors and the use of correct interpretation of the assessment information [18-20].

Through the competency-based approach, the residents' satisfaction, assessment expectations, feedback, motivational and confidence in clinical practice were reported as higher. They also said that they were less stressed about their exams than people in the traditional assessment group. The greatest

variance was found in the perception of usefulness of feedback, consistent with the notion that feedback is one of the most important ways that assessment is impacting learning in the workplace. Constructive feedback enables residents to identify areas of strength and areas for improvement and to formulate a plan of construction. There is a focus in previous reviews that just completing assessment forms is not necessarily educational but feedback needs to be timely, specific, credible and then followed up by an opportunity for improvement. So, in any institution making use of competency-based assessment, it is essential to not only the number of assessments completed, but to the quality of the educational conversations that arise from the assessments [20].

Despite its educational advantages, competency-based assessment was considered more difficult to implement and was associated with greater faculty workload. Additional time was needed by faculty members to directly observe, document, give feedback and review residents' progress. One challenge identified in competency-based residency programmes is assessment burden which can lead to poorer assessment in situations where the supervisor is required to fill out many forms over a short clinical period. However, there are some limitations that should be considered when interpreting the findings. The study was conducted in one centre, and there was a short duration of 6 months, and a limited sample of 76 residents, which may limit the generalizability of the findings. Group assignment did not use individual randomization, and the assessment system utilized in the residents' clinical units could have been used, which created the potential for selection bias and unmeasured confounding. The assessment method was not concealed from residents and assessors, and satisfaction outcomes were assessed by self-report. Future, randomized or longitudinal, multicentre studies should examine long-term effects of enhancement of assessment scores and the long-term effects of competency based assessment on measurable independent practice and patient outcomes.

CONCLUSION

Competency-based assessment was associated with higher overall performance, greater improvement in assessment scores, better clinical and procedural competence, higher competency-achievement and pass rates, and

more favourable learning experiences than traditional assessment among postgraduate residents. Regular direct observation and structured feedback appeared to support residents' clinical development, confidence and motivation. However, competency-based assessment also increased faculty workload and required more time and institutional support. Its successful implementation in postgraduate residency programmes therefore requires trained assessors, clearly defined competency standards, feasible assessment schedules and high-quality feedback systems. Competency-based methods may be used as the principal approach for evaluating workplace performance while retaining selected traditional examinations for standardized assessment of theoretical knowledge.

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