

EFFECTIVENESS OF COMPETENCY-BASED ASSESSMENT VERSUS TRADITIONAL ASSESSMENT IN UNDERGRADUATE MEDICAL EDUCATION

Sadaf Rasheed¹, Junaid Sarfaraz², Ayesha Junaid³

¹Professor, Department of Anatomy, Gomal Medical College, Dera Ismail Khan, Pakistan

²Professor, Rector/Director Academics, Health Service Academy, Islamabad, Pakistan

³Assistant Professor of Linguistic, Department of English Language & Literature, Center for Language Development, Forman Christian College University, Lahore, Pakistan

*Corresponding Author: Sadaf Rasheed, Email: Sadafmoed77@gmail.com

ABSTRACT

Background: Assessment processes are integral to the needs for achieving undergraduate medical students of knowledge, clinical skills, professional behavior, and decision making for independent practice. Traditional Assessment methods tend to be based on set and regular written/verbal/clinical assessments, while competency assessment focuses on real-life working, repeated evaluation, observation, feedback and demonstration of predefined competencies. The objective of this study was to compare competency-based assessment with traditional assessment among undergraduate medical students.

Methods: A comparative study was conducted at Gomal Medical College, Dera Ismail Khan, from January 2025 to June 2025. Ninety-two undergraduate medical students were included, half of whom (46) were assessed using a competency-based method, and the other half (46) using the traditional method. Assessment results showed that general performance, written examination, clinical examination, workplace assessment, clinical reasoning skills, patient management, patient safety, patient satisfaction, clinical confidence and self-directed learning were the most commonly assessed items. Items that were most frequently assessed included general performance, written examination, clinical examination, workplace assessment, clinical reasoning skills, patient management, patient safety, patient satisfaction, clinical confidence, and self-directed learning. The data were analysed by SPSS version 25.0. Independent-samples t-test, chi-square test, Fisher's exact test and binary logistic regression were used appropriately. The criteria for statistical significance was defined as a p value of <0.05.

Results: Students assessed through the competency-based approach achieved a significantly higher mean overall assessment score than those assessed traditionally (81.63 ± 6.42 vs. 75.28 ± 7.11 , $p < 0.001$). Significant improvements were also observed in clinical examination performance, workplace-based assessment, clinical reasoning, clinical decision-making, procedural competence, communication, professionalism, teamwork, patient management, and patient-safety competencies. Feedback quality and student satisfaction were significantly greater in the competency-based group. Satisfactory competency was achieved by 89.1% of students in the competency-based group compared with 67.4% in the traditional group ($p = 0.012$), while remediation was less frequent in the competency-based group (8.7% vs. 26.1%, $p = 0.028$). After adjustment for age, gender, and academic year, competency-based assessment remained independently associated with satisfactory competency achievement (adjusted OR = 3.68; 95% CI: 1.18–11.46; $p = 0.025$).

Conclusion: Competency-based assessment was associated with better academic and clinical performance, stronger competency achievement, improved feedback, and greater student satisfaction compared with traditional assessment. Incorporating structured competency-based assessment into undergraduate medical education may support the development of clinical competence and provide a more comprehensive evaluation of student learning.

KEYWORDS: Competency-based assessment, traditional assessment, undergraduate medical education, medical students, clinical competence, workplace-based assessment, medical education.

INTRODUCTION

Undergraduate medical education aims to develop the knowledge, clinical skills, professional attitudes, communication abilities, and decision-making skills required for safe and effective clinical practice under appropriate supervision. Assessment plays an important role in this educational process by guiding student learning, identifying areas requiring improvement, providing information about academic progression, and determining whether predefined learning outcomes have been achieved. Therefore, selection of an appropriate assessment strategy is an important component of undergraduate medical education (1-3).

Traditional assessment in undergraduate medical education commonly includes written examinations, oral examinations, practical examinations, Objective Structured Clinical Examinations (OSCEs), long and short clinical cases, and periodic summative assessments. These methods can be used to evaluate knowledge and selected clinical skills; however, performance of a single examination may not reflect the student's capacity to apply knowledge and skills over time in clinical situations. The clinical case presented, examination conditions, examiner variation and short-term preparation may also affect examination performance (4-6).

Competency-based medical education focuses more on what students can show than on what they know. Competency-based assessment is not just based on examination scores but on the demonstration of pre-specified skills, including clinical reasoning, assessment of patients, procedures, communication, professionalism, teamwork, patient safety and clinical decision making. Evaluation may take place over several experiences and learning environments, and can inform judgments about student learning through a wider array of evidence (7-9).

A key element of competency-based assessment is the incorporation of direct observation for workplace-based or clinical assessment and formative feedback into the everyday medical education. Students can learn to take histories, examine patients, communicate with patients, demonstrate procedural skills and make clinical decisions under the supervision of the clinical teacher. Supportive feedback given after these experiences may allow students to identify their strengths and weaknesses and set their learning objectives, which in turn will enable them to do better in the next try (10).

Despite the potential benefits, competency-based assessment is accompanied by some challenges. To implement effectively, there needs to be trained faculty, opportunities for on-site observation, well-defined competency criteria, documentation, and consistency among assessors. This may be limited by differences of judgment among assessors, limited faculty time, clinical workload, lack of feedback, and lack of standardization. The traditional assessment continues to be important, especially for the knowledge assessment and the standardized academic performance (11)(12).

Evidence directly comparing competency-based and traditional assessment approaches among undergraduate medical students remains important, particularly in institutions where competency-based medical education is being progressively incorporated into existing curricula. Therefore, the present study was conducted at Gomal Medical College, Dera Ismail Khan, to compare the effectiveness of competency-based assessment versus traditional assessment among undergraduate medical students. The study evaluated overall assessment performance, clinical reasoning, clinical decision-making, procedural skills, communication, professionalism, teamwork, patient management, patient safety, feedback quality, satisfaction, self-directed learning, competency achievement, and the requirement for remediation.

METHODOLOGY

This comparative study was conducted at Gomal Medical College, Dera Ismail Khan, from January 2025 to June 2025 to assess the effectiveness of competency-based assessment compared with traditional assessment among undergraduate medical students. The total number of students in the study was 92. The participants were split into two groups of 46 students, based on the assessment approach adopted: competency-based and traditional. Representatives from the various stages of the undergraduate medical programme were included by taking students from relevant academic years.

Undergraduate medical students who were actively enrolled in the MBBS program during the study period and had completed the relevant teaching and assessment activities were eligible for inclusion. Students who provided informed consent and had complete assessment records were included. Students with prolonged absence, incomplete assessment records, or failure to complete the required evaluation components were excluded. Participants were selected through non-probability consecutive sampling until the required sample size of 92 students was achieved. A structured data collection form was used to record demographic and academic information, including age, gender, and academic year. Students in the competency-based assessment group were evaluated according to their demonstration of predefined competencies rather than relying solely on a single examination. Assessment domains included clinical reasoning, clinical decision-making, procedural skills, communication, professionalism, teamwork, patient management, and patient safety. Where applicable, workplace-based assessment activities, direct observation, structured clinical evaluations, and regular formative feedback were incorporated. Students in the traditional assessment group were assessed primarily through written examinations, oral examinations, clinical or practical examinations, and periodic summative assessments routinely used within the undergraduate medical program.

The principal outcome was the difference in overall assessment and competency performance between the two assessment approaches. Academic and clinical outcomes included overall assessment score, written examination score, clinical examination or OSCE score, workplace-based assessment score, clinical reasoning, clinical decision-making, procedural competence, communication skills, professionalism, teamwork, patient-management skills, and patient-safety competence. Learning-related outcomes included perceived feedback quality, student satisfaction, clinical confidence, self-directed learning, frequency of feedback, and perceived improvement in learning. Students

who did not achieve the predefined satisfactory competency level and required additional teaching, supervised practice, or reassessment were classified as requiring remediation.

Data were entered and analyzed using SPSS version 25.0. Continuous variables such as age and assessment scores were presented as mean $\pm$ standard deviation, while categorical variables were summarized as frequencies and percentages. The independent-samples t-test was used to compare mean scores between competency-based and traditional assessment groups, while the chi-square test or Fisher's exact test was used for categorical variables as appropriate. Binary logistic regression was performed to determine the independent association between assessment approach and satisfactory competency achievement after adjustment for age, gender, and academic year. Adjusted odds ratios with 95% confidence intervals were reported, and a p-value <0.05 was considered statistically significant.

RESULTS

A total of 92 undergraduate medical students were included in the study, with 46 students in the competency-based assessment group and 46 in the traditional assessment group. The two groups were compared according to demographic and academic characteristics. No statistically significant differences were observed between the groups regarding age, gender, or academic-year distribution (all $p > 0.05$).

Table 1. Demographic and training characteristics of study participants

Characteristics	CBA group (n = 46)	Traditional group (n = 46)	p-value
Age, years, mean $\pm$ SD	21.57 $\pm$ 2.25	28.91 $\pm$ 2.39	0.485
Gender, n (%)			0.674
Male	27 (58.7)	25 (54.3)	
Female	19 (41.3)	21 (45.7)	
Academic year, n (%)			0.936
First year	12 (26.1)	11 (23.9)	
Second year	12 (26.1)	13 (28.3)	
Third year	11 (23.9)	12 (26.1)	
Fourth year or above	11 (23.9)	10 (21.7)	

Students assessed through the competency-based approach demonstrated better academic and clinical performance than those assessed through the traditional approach. The mean overall assessment score was significantly higher in the competency-based assessment group (81.63 $\pm$ 6.42) than in the traditional assessment group (75.28 $\pm$ 7.11, $p < 0.001$). Significant differences were also observed in clinical examination, workplace-based assessment, clinical reasoning, and clinical decision-making scores. Although the written examination score was slightly higher in the competency-based group, the difference was not statistically significant.

Table 2. Comparison of academic and clinical performance between assessment groups

Performance measure	CBA group (n = 46), Mean $\pm$ SD	Traditional group (n = 46), Mean $\pm$ SD	p-value
Overall assessment score	81.63 $\pm$ 6.42	75.28 $\pm$ 7.11	<0.001
Written examination score	78.46 $\pm$ 7.14	75.67 $\pm$ 7.52	0.072
Clinical examination/OSCE score	83.17 $\pm$ 6.31	76.54 $\pm$ 7.26	<0.001
Workplace-based assessment score	84.35 $\pm$ 5.82	74.98 $\pm$ 7.05	<0.001
Clinical reasoning score	82.72 $\pm$ 6.08	75.89 $\pm$ 6.94	<0.001
Clinical decision-making score	81.48 $\pm$ 6.37	75.24 $\pm$ 7.02	<0.001

Assessment of individual competency domains demonstrated consistently higher scores among students evaluated through the competency-based approach. Procedural skills, communication, professionalism, teamwork, patient-management competency, and patient-safety competency were significantly higher in the competency-based assessment group. The greatest difference was observed in procedural skills, with a mean score of 84.09 $\pm$ 5.91 in the competency-based group compared with 75.61 $\pm$ 7.23 in the traditional assessment group ($p < 0.001$).

Table 3. Comparison of competency-domain scores between the two groups

Competency domain	CBA group (n = 46), Mean $\pm$ SD	Traditional group (n = 46), Mean $\pm$ SD	p-value
Procedural skills	84.09 $\pm$ 5.91	75.61 $\pm$ 7.23	<0.001
Communication skills	82.74 $\pm$ 6.22	77.15 $\pm$ 6.71	<0.001
Professionalism	84.17 $\pm$ 5.48	79.46 $\pm$ 6.20	<0.001
Teamwork/interprofessional skills	81.96 $\pm$ 6.11	77.28 $\pm$ 6.76	0.001
Patient-management competency	83.26 $\pm$ 5.87	76.54 $\pm$ 6.58	<0.001

Patient-safety competency	82.61 ± 5.76	77.37 ± 6.41	<0.001
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Students evaluated through competency-based assessment also reported more favorable learning experiences. The mean feedback-quality score was significantly higher in the competency-based group (4.28 ± 0.54) than in the traditional assessment group (3.42 ± 0.68 , $p < 0.001$). Student satisfaction, clinical confidence, and self-directed learning scores were also significantly higher in the competency-based group. Regular feedback was reported by 84.8% of students in the competency-based group compared with 45.7% in the traditional assessment group.

Table 4. Feedback and learning-related outcomes according to assessment approach

Outcome	CBA group (n = 46)	Traditional group (n = 46)	p-value
Feedback quality score, mean ± SD	4.28 ± 0.54	3.42 ± 0.68	<0.001
Students satisfaction score, mean ± SD	4.20 ± 0.57	3.48 ± 0.70	<0.001
Clinical confidence score, mean ± SD	4.11 ± 0.61	3.57 ± 0.67	<0.001
Self-directed learning score, mean ± SD	4.15 ± 0.58	3.63 ± 0.64	<0.001
Regular feedback received, n (%)	39 (84.8)	21 (45.7)	<0.001
Perceived improvement in learning, n (%)	40 (87.0)	27 (58.7)	0.002

Students assessed using the competency-based approach also demonstrated better overall competency achievement. Forty-one students (89.1%) in the competency-based group achieved the desired competency level compared with 31 students (67.4%) in the traditional assessment group ($p = 0.012$). The requirement for remediation was significantly lower in the competency-based group (8.7%) than in the traditional assessment group (26.1%, $p = 0.028$).

Table 5. Competency achievement and remediation according to assessment approach

Outcome	CBA group (n = 46), n (%)	Traditional group (n = 46), n (%)	p-value
Achieved satisfactory competency	41 (89.1)	31 (67.4)	0.012
Did not achieve satisfactory competency	5 (10.9)	15 (32.6)	
Required remediation	4 (8.7)	12 (26.1)	0.028
Did not require remediation	42 (91.3)	34 (73.9)	
Satisfied with assessment approach	40 (87.0)	29 (63.0)	0.008

Multiple logistic regression was performed to determine the independent association between assessment approach and satisfactory competency achievement. Students assessed using the competency-based approach had approximately 3.7 times higher odds of achieving satisfactory competency than those assessed through traditional methods after adjustment for age, gender, and academic year (adjusted OR = 3.68; 95% CI: 1.18–11.46; $p = 0.025$). Age and gender were not significantly associated with competency achievement, whereas higher academic year was independently associated with satisfactory competency achievement.

Table 6. Multivariable logistic regression for predictors of satisfactory competency achievement

Predictor	Adjusted OR	95% CI	p-value
Competency-based assessment	3.68	1.18–11.46	0.025
Age	1.08	0.88–1.33	0.454
Male gender	1.19	0.42–3.40	0.742
Higher academic year	1.58	1.02–2.45	0.041

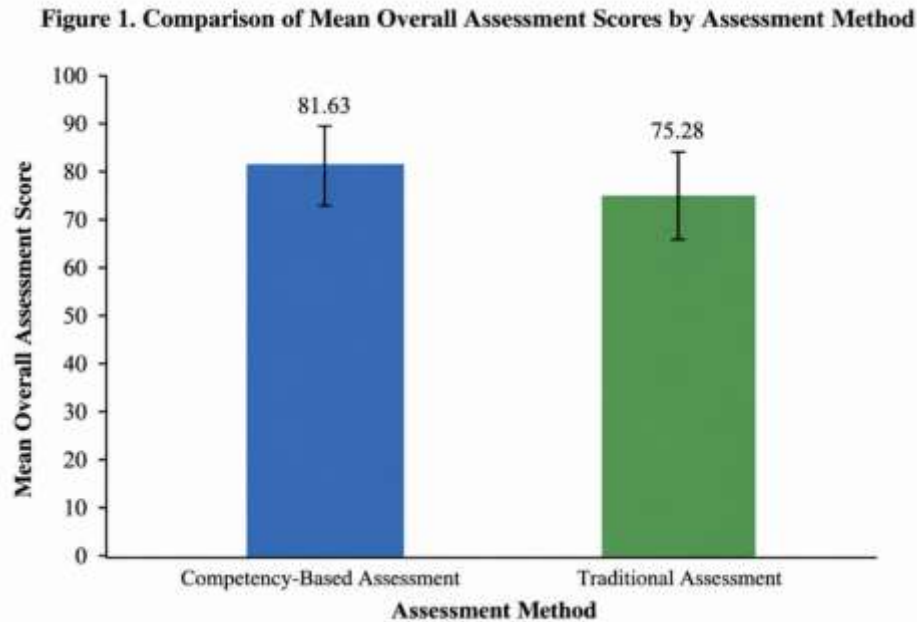


Figure 1. Comparison of Mean Overall Assessment Scores by Assessment Method.

Students assessed through competency-based assessment demonstrated a higher mean overall assessment score than those assessed through the traditional assessment approach. Error bars represent standard deviations.

DISCUSSION

The present study compared competency-based assessment with traditional assessment among undergraduate medical students and demonstrated consistently better educational and clinical outcomes among students evaluated through the competency-based approach. Students in the competency-based assessment group achieved higher overall assessment, clinical examination, workplace-based assessment, clinical reasoning, and clinical decision-making scores than those undergoing traditional assessment. These findings support the principle of competency-based medical education, which emphasizes observable abilities and achievement of predefined learning outcomes rather than relying primarily on isolated examinations (13, 14).

The significantly higher scores observed for procedural skills, patient management, communication, professionalism, teamwork, and patient safety indicate that competency-based assessment may provide a broader evaluation of undergraduate medical students' clinical abilities. Traditional examinations remain valuable for assessing knowledge and selected clinical skills; however, they may provide limited information regarding how consistently students apply these abilities in actual or simulated clinical environments. Competency-based assessment allows performance to be evaluated across multiple encounters and domains, providing a more comprehensive representation of student competence (15, 16).

The competency-based assessment group also had a significantly greater proportion of students achieving satisfactory competency and a lower proportion requiring remediation. The association remained significant after adjustment for age, gender, and academic year. These results suggest that repeated assessment against clearly defined competency standards may facilitate earlier identification of learning gaps and allow targeted educational interventions before students' progress to more advanced stages of medical training. Structured competency frameworks, direct observation, OSCEs, workplace-based assessments, and programmatic assessment may therefore complement traditional examinations within undergraduate medical curricula (17, 18)(19, 20).

Despite these favorable findings, competency-based assessment should not be considered automatically superior in every educational setting. Its effectiveness depends on adequate faculty training, availability of time for direct observation, consistency among assessors, clearly defined competency standards, institutional resources, and the quality of feedback provided to students. The present study was conducted at a single institution with a relatively small sample of 92 undergraduate medical students, which may limit generalizability. Some learning-related outcomes, including satisfaction, confidence, and perceptions of feedback, were self-reported and may therefore be influenced by response bias. The relatively short study duration also prevented evaluation of long-term retention of competencies. Future multicenter longitudinal studies involving larger samples, different academic years, standardized competency frameworks, and objective clinical outcomes are recommended.

CONCLUSION

Competency-based assessment was associated with better overall performance, clinical reasoning, procedural skills, communication, professionalism, patient-management competency, feedback quality, student satisfaction, and satisfactory competency achievement compared with traditional assessment among undergraduate medical students. Students assessed through the competency-based approach were also less likely to require remediation, and competency-based assessment remained independently associated with successful competency achievement after adjustment for selected participant characteristics. These findings support the incorporation of structured and longitudinal competency-based assessment into undergraduate medical education alongside traditional assessment methods. Effective implementation requires trained faculty, reliable assessment tools, regular observation, constructive feedback, and continued evaluation of educational outcomes.

REFERENCES

1. Branfield Day L, Colbourne T, Ng A, Rizzuti F, Zhou L, Mungroo R, et al. A qualitative study of Canadian resident experiences with competency-based medical education. 2023;14(2):40-50.
2. Rawekar A, Choudhari SG, Mishra V, Vagha SJJoFM, Care P. Formative assessment in practical for Indian postgraduates in health professions education: a strategic initiative towards competency-based education. 2020;9(7):3399.
3. Baboolal SO, Singaram VSJBme. Specialist training: workplace-based assessments impact on teaching, learning and feedback to support competency-based postgraduate programs. 2023;23(1):941.
4. Hsiao C-T, Chou FC, Hsieh C-C, Chang LC, Hsu C-MJJomIr. Developing a competency-based learning and assessment system for residency training: analysis study of user requirements and acceptance. 2020;22(4):e15655.
5. Lindeman B, Sarosi GAJS. Competency-based resident education: the United States perspective. 2020;167(5):777-81.
6. Hanrahan JG, Sideris M, Pasha T, Dedeilia A, Papalois A, Papalois VJAM. Postgraduate assessment approaches across surgical specialties: a systematic review of the published evidence. 2021;96(2):285-95.
7. Crawford L, Cofie N, McEwen L, Dagnone D, Taylor SWJJoeicp. Perceptions and barriers to competency-based education in Canadian postgraduate medical education. 2020;26(4):1124-31.
8. Kealey A, Naik VNJA, Analgesia. Competency-based medical training in anesthesiology: Has it delivered on the promise of better education? 2022;135(2):223-9.
9. Shrestha S, Shrestha A, Shah JN, Gongal RN. Competency based post graduate residency program at Patan Academy of Health Sciences, Nepal. 2021.
10. Szulewski A, Braund H, Dagnone DJ, McEwen L, Dalgarno N, Schultz KW, et al. The assessment burden in competency-based medical education: how programs are adapting. 2023;98(11):1261-7.
11. Virk A, Joshi A, Mahajan R, Singh TJJopm. The power of subjectivity in competency-based assessment. 2020;66(4):200.
12. Lee J, Ross SJFM. A comparison of resident-completed and preceptor-completed formative workplace-based assessments in a competency-based medical education program. 2022;54(8):599-605.
13. Ryan MS, Holmboe ES, Chandra SJAM. Competency-based medical education: considering its past, present, and a post-COVID-19 era. 2022;97(Supplement_1):S90-S7.
14. Young JQ, Holmboe ES, Frank JRJPC. Competency-based assessment in psychiatric education: a systems approach. 2021;44(2):217-35.
15. Branfield Day L, Miles A, Ginsburg S, Melvin LJAM. Resident perceptions of assessment and feedback in competency-based medical education: a focus group study of one internal medicine residency program. 2020;95(11):1712-7.
16. Meliagros P, Garber A, Sadr N, Forrest R, Qayyum RJJohm. Competency-based assessment of procedural skills in resident training. 2023;18(8):703-18.
17. Harrington KL, Teramoto M, Black L, Carey H, Hartley G, Yung E, et al. Physical therapist residency competency-based education: development of an assessment instrument. 2022;102(5):pzac019.
18. Mann S, Truelove AH, Beesley T, Howden S, Egan RJCMEJ. Resident perceptions of competency-based medical education. 2020;11(5):e31.
19. La Chimea T, Kanji Z, Schmitz SJCJoDH. Assessment of clinical competence in competency-based education. 2020;54(2):83.
20. Danilovich N, Kitto S, Price D, Campbell C, Hodgson A, Hendry PJFM. Implementing competency-based medical education in family medicine: a narrative review of current trends in assessment. 2021;53(1):9-22.