Challenges and Opportunities in Implementing Formative Assessment in Medical Colleges of Peshawar: A Cross-Sectional Study

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ABSTRACT

Objective: To explore the challenges and opportunities associated with the implementation of formative assessment (FA) practices in medical colleges of Peshawar.

Study Design: A cross-sectional study.

Place and Duration of the Study: Four Medical colleges, two private (Rehman Medical College, Northwest School of Medicine) and two public (Khyber Medical College, Khyber Girls Medical College), in Peshawar, Pakistan, from November 2023 to April 2024.

Methodology: This study used a validated questionnaire to gather quantitative information about the challenges teachers face and the present use of formative assessment in the medical college. The sample included four medical colleges, two private and two public sectors, with a total sample size of 258 medical teachers. The data collected were analysed employing descriptive statistics, including frequencies and percentages, which were used to summarise the demographic characteristics and responses to the questionnaire items.

Results: The quantitative study revealed that 88.4% (n = 228) of the medical teachers believed that they understood the concept of FA. Similarly, 86% (n = 222) felt they clearly understood the distinction between formative and summative assessments. Additionally, 81.4% (n = 210) considered feedback to be a crucial component of FA. In contrast, 62% (n = 160) believed that FA to be an approach primarily used for grading and certification. Only one-third of participants frequently conducted FA and provided feedback to students, whereas almost half stated they did so only occasionally. About the adding of FA scores in final course, semester, or overall grade, over half of the participants reported doing it occasionally, while 28.8% (n = 74) of participants revealed doing it routinely.

Conclusion: Despite most of the participants expressing confidence in their understanding of FA, a discrepancy was identified between teachers' perceived understanding and their actual practice of FA. Although many participants acknowledged the significance of FA, the low proportion of teachers who practise it regularly raises concerns about the implementation of this valuable tool in medical education.

Key Words: *Formative assessment, Medical colleges, Challenges, Peshawar, Practice, Teacher.*

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INTRODUCTION

Formative assessment (FA) is a type of assessment conducted during the learning process to provide feedback to students and teachers on how well the students are learning and what they need to do to improve.[1] It differs from summative assessment, which is used to evaluate student performance by making decisions on passing and exit examination at the end of a learning period.[2]

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It is believed that an active, learner-centred environment fosters a greater understanding of basic science and its significance in clinical medicine, supporting the shift toward curriculum integration in undergraduate medical education that has occurred in recent years.[3] It was discovered that one of the difficulties of an integrated curriculum is creating an FA system that reflects active learning.[4] Teachers' cooperation and involvement are essential for the effective implementation of FA. However, a recent systematic review showed that the actual implementation of FA in classrooms is far from ideal.[5]

The implementation of FA can pose various challenges, which have been addressed in the literature. Some studies concluded that this method is less effective due to lack of teachers' training on how to design, implement, and evaluate FA.[4] However, a study by Ali and Khan showed that due to limited time and resources, teachers feel overburdened by implementing FA properly, especially if they are also responsible for other tasks such as teaching and grading.[6] The quality of feedback, which has been found to have the biggest impact on student achievement, is another aspect of FA that contributes

to its success.[7] However, feedback is frequently neglected in the medical colleges of Pakistan, as reported by Rauf *et al*. that progressive colleges use a variety of techniques to conduct FA as a brief component of the curriculum, which may or may not include providing feedback to students.[8] Another study by Hussain *et al*. found that strong preparation and coordination between stakeholders in medical institutions are necessary for the proposed switch from the conventional to the new integrated curriculum.[9]

Understanding how teachers perceive and practise FA is important because their attitudes and beliefs can have a significant impact on the effectiveness of this approach.[10] To the best of the authors' knowledge, no studies have been found so far that assess the challenges faced by teachers in the implementation of FA in medical colleges. Based on the cultural context of the region, this effort will address national concerns in the education system. This study aimed to explore the challenges and opportunities associated with the implementation of FA in medical colleges of Peshawar. This will provide a baseline data, which can be further used to develop strategies to overcome these challenges. Moreover, this could improve the quality of medical education and the performance of medical students in Peshawar, Pakistan.

METHODOLOGY

A cross-sectional quantitative analysis was conducted. A previously validated questionnaire was used with a permission granted by the author to collect the data on the challenges faced by teachers in the current practices of FA.[11] During the initial tool development, internal consistency reliability was evaluated using Cronbach's Alpha, resulting in a score of 0.63 for the perception domain and 0.55 for the practice domain.[11] Cronbach's Alpha was recalculated using the current data set to improve contextual reliability and guarantee relevance to the present study population. With a score of 0.70 for the perception and 0.67 for the practice domain, the results revealed enhanced internal consistency, demonstrating appropriate reliability for both domains. Furthermore, the content validity of the questionnaire was established through expert review by three subject specialists using a 4-point relevance scale. The scale-CVI average (S-CVI/Ave) was 0.89, indicating strong overall content validity. Minor changes were made based on the recommendations.

The questionnaire consisted of 16 questions with three domains: demographic, perception, and practice of implementing FA. The demographic information included gender, department, designation, and medical college. The second section included nine statements with a five-point Likert scale (5 = strongly agree, 4 = agree, 3 = I am not sure, 2 = disagree, and 1 = strongly disagree), while the third section included three statements with a three-point Likert scale (3 = never, 2 = sometimes, and 1 = regularly) about the practices of FA by medical teachers.

Four medical colleges, two private (Rehman Medical College, Northwest School of Medicine) and two public (Khyber Medical College, Khyber Girls Medical College), in Peshawar, Pakistan, were deliberately chosen to exemplify a balanced combination of administrative frameworks and institutional capabilities. The selection criteria included: the colleges which were among the largest in Peshawar, with full-time faculty ranging from 55 to 120 medical instructors; each institution was teaching an integrated undergraduate medical curriculum; and faculty members were trained in effective pedagogical methodologies. These criteria ensured that the chosen institutions have both the structural readiness and the educational involvement, which was essential for the participation in this study. The studied population comprised full-time medical faculty members (lecturer level and above), who had at least two years of teaching experience. Newly appointed faculty or those who did not consent to participate were excluded, as they may not have designed or implemented assessments.

An online OpenEpi calculator was used to determine the sample size of 254 based on the anticipated individuals.[12] After estimating the eligible population, it was assumed that half of the medical faculty at the four institutes would take part in the study. This would give the study 95% power to find the differences at the 0.05 alpha level.

After receiving ethical approval from the Khyber Medical University's Institute Review Board (Ref. No. 1-12/IHPER/MHPE/KMU/24-02, Dated: 23-10-2024), the questionnaires were distributed among the medical teachers at the designated medical colleges *via* a Google form link.

The information gathered from the participants' questionnaire responses (Annexure 1) was converted into quantitative information form. The data were then analysed descriptively using the Statistical Package for the Social Sciences (SPSS) and summarised as frequencies and percentages.

RESULTS

Following the distribution of the questionnaire, 258 out of 790 medical professors from four medical colleges responded — exceeding the intended sample size of 254. The average number of respondents per college was 64.5 ± 3.35. According to the demographic data, 50.4% of the respondents were male and 48.8% were female. Demonstrators made up 50% of the respondent population. Faculty members teaching both basic and clinical medical sciences were nearly evenly distributed (Table I).

Table I: Demographic data of the faculty participants in the quantitative study.

Gender	Male	50.4% (n = 146)
	Female	48.8% (n = 130)
Job title	Demonstrator/lecturer	45% (n = 116)
	Senior registrar	14% (n = 36)
	Assistant professor	30.4% (n = 78)
	Associate professor	4.7% (n = 12)
	Professor	6.2% (n = 16)
Department	Clinical sciences	44.2% (n = 114)
	Basic sciences	41.9% (n = 108)
	Public health	14% (n = 36)

Table II: Medical teachers' perception of FA.

FA statements	Strongly agree	Agree	I am not sure	Disagree	Strongly disagree
I understand the concept of FA.	24%	64.3%	4.7%	5.4	0.8
I am familiar with the distinctions between summative and formative assessments.	14.3%	71.7%	8.5%	4.7%	1.6%
FA carried out for grading and certification.	6.2%	55.8%	26.4%	9.3%	2.3%
FA promotes superficial learning.	2.1%	17.1%	24.0%	41.9%	15.1%
FA promotes deep learning.	18.6%	69.8%	10.1%	1.6%	0.8%
FA is considered criterion-referenced test.	7.8%	27.1%	55.8%	7.8%	1.6%
Feedback is a cornerstone of FA.	10.1%	70.5%	17.1%	1.6 %	0.8%
Better performance in FA leads to improvement in overall results.	14.7%	72.8%	10.1%	1.6%	0.8%
The student's final grade in a course are collected from his/her grades in FA.	13.2%	62.8%	10.9%	9.3%	3.9%

Table III: Practice responses of medical teachers on FA.

FA statements	Never	Sometimes	Regularly
I conduct FA.	11.6%	50.4%	38%
I provide feedback to students in FA.	17.1%	59.7%	23.3%
I add scores obtained by the student in FA to his/her final grades at the end of the course/semester/year.	24%	47.3%	28.7%

According to the findings, a significant majority (89.9%) of medical teachers indicated that they understood the concept of FA. Similarly, 86.8% demonstrated a clear understanding of the distinction between formative and summative assessment. Moreover, a substantial 81.4% acknowledged the critical role of feedback within the context of formative evaluations. Furthermore, these teachers demonstrated a strong understanding of the benefits of FA, including its role in promoting deep learning and the link with improved performance in both FA and final exams.

Notably, a significant contradiction emerged from the data: approximately 62% of the educators mistakenly believed that formative evaluations were methods of certification and grading. Likewise, 62.8% misconceived that the final exam scores alone determined (Table II) a student's overall course grade.

The study found that only one-third of participants regularly conducted FA and provided feedback to students, while half of the medical teachers did so only occasionally. Nearly half of the participants (48.8%) reported occasionally incorporating FA results into final course, semester, or overall grades, while 28.8% did so regularly (Table III).

DISCUSSION

The effective implementation of FA is fundamentally a teacher's responsibility and crucial to enhancing students' learning.[13] Teachers can effectively gather valuable information using FA that reveal the students' needs. By clearly understanding these needs, teachers can create an appropriate learning environment that encourages each learner to face challenges and facilitates their growth and success.[14] The current study aimed to explore the challenges and the opportunities faced by the teachers using FA in their teaching practices. Thus, quantitative research was conducted to assess the challenges and the opportunities associated with the proper implementation of FA in medical colleges.

The study revealed that although many teachers believed they had a good understanding of FA, their knowledge was limited about the concept when more specific and detailed questions were asked, as shown in Table II. Similarly, there was an inconsistency between their perceived understanding of FA and their actual practice. While many participants acknowledged the importance of FA, only one-third of them practised FA regularly, as shown in Table III.

A study conducted by Almahal *et al*. also highlighted the similar significant gap between teachers' self-perceived understanding of FA and their actual knowledge and practice, as revealed by specific and detailed questions. This discrepancy suggests that despite their confidence in their understanding, many educators might not have a comprehensive grasp of the principles and intricacies of FA, which could have potential implications for the effectiveness of FA practices in medical education. If teachers lack a thorough understanding of FA, they may struggle to implement it effectively in their teaching. Consequently, students may miss out on its full benefits, potentially hindering their learning and development.[11]

The observed lack of regular FA practice among a significant proportion of medical teachers raises concerns about the factors influencing their decision to do so. These may include time constraints, insufficient resources or training, and resistance to changing established teaching methods.[15]

Feedback quality, widely recognised as the most influential factor in student achievement, is the most crucial component of FA.[16] Research by Riaz *et al*. demonstrated that FA sessions combined with regular feedback improved the motivation and learning of first-year dentistry students and helped in the advancement of pedagogical practices.[17]

Several factors may undermine the success of FA, including faculty resistance, low motivation among both students and faculty, and insufficient commitment from senior administration.[18] In another study, both professors and students got equal scores in their ability to fully understand the concept

of FA ($p = 0.08$). Balancing job and academic responsibilities for teachers, along with managing study load, training, and psychological stress for students, emerged as the highest overall challenges.[19]

The study also found significant opportunities to enhance the implementation of FA in medical education. The positive perspectives of many teachers on its significance provide a strong basis for future initiatives. Further targeted interventions and professional development opportunities are necessary to address these issues and to improve the integration of FA in medical education.[20,21] Comprehensive training on FA techniques — emphasising its benefits, and offering practical strategies for implementation — can help bridge the knowledge-practice gap and promote its consistent use in medical education.[22]

This study provides valuable insights into the region's current state of FA. However, it has certain limitations. One limitation is the limited generalisability of the findings, as the study was focused on Peshawar medical colleges, and cultural, organisational, and contextual differences in other regions may influence teachers' perception and practice of FA differently. Secondly, the FA questionnaire used in this study is limited; therefore, more FA tools should be used — such as observation and interviews, for in-depth research in any similar further studies. Thirdly, the study focuses solely on teachers' perspectives and practices. Including student perspectives could provide a more comprehensive understanding of the effectiveness and impact of FA in medical education. Future studies can address these limitations to provide a more comprehensive understanding of the subject matter.

CONCLUSION

Despite medical teachers showing a strong perceived understanding of FA, the study revealed a notable disparity between their knowledge and its implementation in practice. Although many participants recognised the significance of FA and the role of feedback, a few of them implemented it consistently. Common misconceptions regarding FA, as an evaluative tool, were prevalent. These findings emphasise the need for faculty development and institutional support to enhance the effective execution of FA in medical education.

ETHICAL APPROVAL:

Ethical approval for the study was obtained from the Institutional Review Board of Khyber Medical University, Peshawar, Pakistan (Ref. No. 1-12/IHPER/MHPE/KMU/24-02; Dated: 23-10-2024).

PARTICIPANTS' CONSENT:

Informed consent was obtained from all the participating faculty members before the data collection.

COMPETING INTEREST:

The authors declared no conflict of interest.

AUTHORS' CONTRIBUTION:

SS: Conception and design of the manuscript, acquisition, analysis and interpretation of data.
BJ, HA: Drafting and revision of the manuscript.
SM, SS: Analysis and interpretation of the data, drafting and revision of the manuscript.
LA: Overall accountability of the manuscript.
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