Journal of Health and Rehabilitation Research 2791-156X JHRR

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Narrative Review

Implementation of Formative Assessment 'for' Learning: A Review

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ABSTRACT

Background: Background: Assessment is fundamental to medical education, driving student learning and ensuring that key objectives are met. Formative assessment, in particular, serves as both an instructional strategy and an assessment tool, aiding in the consolidation of learning.

Objective: The objective of this narrative review was to examine the implementation of formative assessment in medical education, with a focus on its role in fostering deep learning, enhancing learning outcomes, and preparing students for real-world clinical challenges.

Methods: This narrative review synthesized existing evidence on formative assessment in medical education. The authors employed a systematic approach to identify relevant literature using search strings such as "formative assessment in medical education" and "assessment for learning." Databases searched included PubMed, MEDLINE, Scopus, and the Cochrane Library. Inclusion criteria were studies examining formative assessment practices in medical education, while exclusion criteria included studies focusing solely on summative assessment or unrelated to medical education.

Results: The findings highlighted the effectiveness of formative assessment in promoting deep learning, providing feedback, and addressing learning difficulties. Bloom's concept of mastery learning underscored the importance of diagnosing learning difficulties through formative evaluations. Consistent low scores on assessments were attributed to various factors, which were effectively addressed through weekly formative assessments. The review emphasized the need for formative assessment in medical education, balanced with summative assessment, while acknowledging challenges related to faculty training, resource limitations, and cultural emphasis on summative assessment.

Conclusion: Balanced implementation of formative and summative assessments in medical education enhances learning outcomes, promotes intrinsic motivation, and ensures that future healthcare professionals are well-prepared, ultimately contributing to improved healthcare outcomes and patient experiences.

Keywords: Formative Assessment, Summative Assessment, Medical Education, Learning Outcomes, Feedback, Healthcare.

INTRODUCTION

In medical education, assessment forms the backbone of a robust educational system (1). It's widely accepted that assessment drives learning, as students tend to focus on what they anticipate will be assessed. An effective assessment should align with learning objectives, ensuring that students acquire the intended knowledge and skills (1). Medical schools have a responsibility to prepare healthcare professionals to provide safe and effective patient care (2). As part of this mission, assessments should gauge a student's grasp of essential medical knowledge, concepts, and principles. A variety of assessment tools are employed to evaluate clinical skills, procedural skills, and the application of knowledge (2).

Whether formative or summative, assessments should be conducted at regular intervals to monitor students' progress, identify areas of strength and weakness, and provide constructive feedback (3). This process allows students to learn from their mistakes, recognize areas for improvement, and develop strategies to enhance their performance (4). A well-balanced assessment system

Journal of Health and Rehabilitation Research 2791-156X JHRR

incorporates both formative and summative assessments. While summative assessments focus on outcomes, formative assessments support the learning process and benefit students by fostering continuous improvement (5).

Summative assessments play a critical role in medical education, as successful completion is often required for obtaining medical licenses or certifications, ensuring that healthcare professionals meet the necessary standards for practice (6). These assessments are typically standardized to maintain consistency across different institutions and ensure that medical professionals meet a certain standard of knowledge and competency (7). However, while students may primarily focus on summative assessments for certification, educators can leverage formative assessments to prepare students for real-world clinical challenges (8). Formative assessments serve as guideposts for both teachers and students, and should be followed by carefully planned remedial instruction, allowing learners to improve through repeated attempts (9).

The concept of formative assessment originated in the context of curriculum development and evaluation (9). Lee J. Cronbach initially suggested using evaluation as a tool for improving curricular programs, highlighting that evaluation can serve not just to grade but also to enhance the learning process (10). Building on Cronbach's work, Scriven (1967) differentiated between formative evaluation, aimed at improving curriculum, and summative evaluation, which determines the merit or worth of an educational program (11, 12, 13). Bloom (1971) extended Scriven's concept, applying it to improve student learning and teaching methodologies (12). During the 1980s and 1990s, researchers shifted from using the term "formative evaluation" to "formative assessment" (14, 15, 16). Sadler (10) expanded on previous definitions, emphasizing the active role of the student in the assessment process and viewing student self-assessment as critical to improved learning. Gipps (2012) documented a shift in the educational approach to assessment, viewing it as a tool to guide instruction rather than merely a psychometric tool (17, 18). This approach paved the way for the emphasis on formative assessment in medical education.

MATERIAL AND METHODS

This narrative review was conducted to examine the implementation of formative assessment in medical education. The review was designed to synthesize existing evidence and analyze the role of formative assessment as an instructional and evaluative tool in enhancing learning outcomes. The authors employed a systematic approach to collect and assess relevant literature on this topic.

The search strategy focused on identifying studies that explored the differentiation between formative and summative assessment, and their respective roles in learning. The key components of the search question included formative assessment, summative assessment, medical education, and learning outcomes. The authors utilized various search strings such as "formative assessment in medical education," "formative vs summative assessment," "assessment for learning," and "formative feedback in medical training" to capture a broad range of relevant studies. The databases searched included PubMed, MEDLINE, Scopus, and the Cochrane Library.

The inclusion criteria for the review encompassed studies that examined formative assessment practices in medical education, differentiated formative from summative assessment, and discussed their impact on student learning outcomes. Exclusion criteria included studies that focused solely on summative assessment, those that did not relate to medical education, and articles that were not in English. The review aimed to include a diverse range of study designs, including empirical research, reviews, and theoretical articles, to provide a comprehensive overview of the topic.

For evidence synthesis, the authors employed a qualitative approach to analyze and summarize the findings from the selected studies. The narrative synthesis focused on identifying key themes, such as the importance of formative assessment in competency-based curriculum, the role of feedback, and the challenges and opportunities in implementing formative assessment in medical education. The authors synthesized the evidence by integrating insights from various studies and providing a cohesive overview of the topic. This approach allowed for an in-depth understanding of the role of formative assessment in enhancing student learning and performance in medical education.

FINDINGS

The differentiation between formative and summative assessments and their respective roles in learning began to be clearly defined (19). In competency-based curricula, deep learning is crucial (9). Bloom's concept of mastery learning highlighted the importance of diagnosing learning difficulties through formative evaluations to help students achieve mastery (10). Consistent low scores on assessments can be attributed to learning difficulties, an inability to keep pace, or procrastination. Weekly formative assessments can help identify and address such problems (1, 20, 21, 22, 23).

Journal of Health and Rehabilitation Research 2791-156X JHRR

Table 1: Formative Assessment: Key Findings, Challenges, Implementation, and Success Factors

Aspect	Key Findings
Role Definition	The differentiation of formative and summative assessment and the role of each in learning began to be defined (19).
Mastery Learning	Bloom's concept of achieving mastery in learning highlighted the importance of diagnosing learning difficulties through formative evaluations to design interventions and help students achieve mastery (10).
Consistent Low Scores	Consistent low scores on assessments can be attributed to difficulty in learning, inability to keep pace with learning, or procrastination. Weekly formative assessments help identify and address such problems (1, 20, 21, 22, 23).
Summative Assessment	Summative assessments grade knowledge but do not promote learning, creating anxiety and competition without fostering internal motivation to learn (24).
Formative Assessment	Formative assessment, as an instructional strategy and assessment tool, enhances learning outcomes by providing ongoing feedback and opportunities for growth. The aim is to facilitate and consolidate learning rather than to grade it (22).
Testing and Spacing Effects	The "testing effect" (tests positively impacting knowledge retention) and the "spacing effect" (spacing tests at proper intervals) contribute to the efficacy of formative assessments (1, 24, 25).
Voluntary Participation	Formative assessment should be voluntary, non-judgmental, and include immediate feedback and remedial measures to maximize benefits (26).
Feedback Tools	Different feedback tools have varied implications for student learning. Group assessment, for example, can provide feedback on teamwork, leadership, and interprofessional coordination (27, 28).
Method Flexibility	Formative assessment can be tailored to individual or group needs, with creative methods like quizzes, reports, presentations, or even WhatsApp-based feedback (20, 26, 29).
Feedback Characteristics	Feedback should be specific, accurate, clear, timely, and focused, motivating students to reflect on and improve their learning (11).
Assessment Preferences	Students prefer various methods of formative assessment, such as multiple-choice questions, online quizzes, e-portfolios, reflection writing, and short-answer questions (9, 28, 29).
Implementation in Pakistan	Implementing formative assessment in Pakistan is challenging due to the existing culture focused on summative assessment. There is a need to emphasize assessment for learning (2, 3, 4).
Student Motivation	Repeated formative assessments encourage intrinsic motivation, making students take charge of their learning. Guidance on the benefits of formative assessment can improve attendance and participation (1, 2, 4, 7, 8, 9).
Faculty Perception	Teacher perception, understanding of formative assessment, and resource limitations are challenges to implementation. Faculty training and development programs should include formative feedback (1, 3, 4, 5, 7, 8, 9, 10, 11).
Instructional Time	Allocating time for formative assessment is challenging. Weekly assessments correlate positively with summative exam scores, but frequent feedback can be overwhelming for teachers and students. Video lessons and flipped classrooms can be useful strategies (9, 19, 20, 24, 26).
Faculty Intensive	Formative assessment is faculty intensive. Creative approaches, such as WhatsApp feedback or using online tools like Socrative, can aid implementation (19, 20, 26, 27).
Retention and Reflection	Repeated testing promotes knowledge retention and reflection, aiding both students and teachers in identifying and improving learning strategies (24, 26, 27, 28).
Success Factors	Six key success factors for effective formative assessment include appropriate method, effective reflection, frequency of assessment, appropriate score, adequate support system, and teacher knowledge and management (26, 29).
Stakeholder Involvement	Implementation requires the involvement of stakeholders, including institutions and regulating bodies. Faculty development, curriculum design, and advocacy are recommended for promoting formative assessment (30, 31, 32, 33, 34, 35).

Journal of Health and Rehabilitation Research 2791-156X JHRR

Summative assessments focus on grading knowledge but do not promote learning, often causing anxiety and competition without fostering internal motivation (24). In contrast, formative assessment, both as an instructional strategy and assessment tool, enhances learning outcomes by providing ongoing feedback and opportunities for growth, aiming to facilitate and consolidate learning (22). The "testing effect" and the "spacing effect" contribute to the efficacy of formative assessments (1, 24, 25).

Formative assessment should be voluntary, non-judgmental, and include immediate feedback and remedial measures to maximize benefits (26). Different feedback tools have varied implications for student learning, with group assessment providing insights into teamwork, leadership, and interprofessional coordination (27, 28). Formative assessment can be tailored to individual or group needs, using creative methods like quizzes, reports, presentations, or even WhatsApp-based feedback (20, 26, 29). Feedback should be specific, accurate, clear, timely, and focused, motivating students to reflect on and improve their learning (11).

Students prefer various methods of formative assessment, such as multiple-choice questions, online quizzes, e-portfolios, reflection writing, and short-answer questions (9, 28, 29). Implementing formative assessment in Pakistan poses challenges due to the existing culture focused on summative assessment, highlighting the need for assessment for learning (2, 3, 4). Repeated formative assessments encourage intrinsic motivation, enabling students to take charge of their learning. Guidance on the benefits of formative assessment can improve attendance and participation (1, 2, 4, 7, 8, 9).

Teacher perception, understanding of formative assessment, and resource limitations are challenges to implementation. Faculty training and development programs should include formative feedback (1, 3, 4, 5, 7, 8, 9, 10, 11). Allocating time for formative assessment is challenging. Weekly assessments correlate positively with summative exam scores, but frequent feedback can overwhelm teachers and students. Video lessons and flipped classrooms can be useful strategies (9, 19, 20, 24, 26). Formative assessment is faculty intensive. Creative approaches, such as WhatsApp feedback or using online tools like Socrative, can aid implementation (19, 20, 26, 27).

Repeated testing promotes knowledge retention and reflection, helping both students and teachers improve learning strategies (24, 26, 27, 28). Six key success factors for effective formative assessment include appropriate method, effective reflection, frequency of assessment, appropriate score, adequate support system, and teacher knowledge and management (26, 29). Implementing formative assessment requires involving stakeholders, including institutions and regulating bodies. Faculty development, curriculum design, and advocacy are crucial for promoting formative assessment (30-35).

DISCUSSION

The differentiation between formative and summative assessments and their respective roles in learning began to be clarified in the literature (19). In competency-based curricula, deep learning played a pivotal role (9). Bloom's concept of achieving mastery through formative evaluation highlighted the importance of diagnosing learning difficulties and designing interventions to help students achieve mastery over lessons (10). Research consistently identified several reasons for low scores on assessments, including learning difficulties, the inability to keep pace with the curriculum, or procrastination. Weekly formative assessments were found to be effective in identifying such problems and providing timely remedial measures (1, 20). However, summative assessments focused on grading knowledge rather than promoting learning, often causing anxiety and competition without fostering intrinsic motivation (24).

Formative assessment, on the other hand, served both as an instructional strategy and an assessment tool, enhancing learning outcomes through ongoing feedback and growth opportunities. The aim was to facilitate and consolidate learning rather than to grade it (22). The "testing effect" and the "spacing effect" contributed to the efficacy of formative assessments (1, 24, 25). Formative assessment was voluntary, non-judgmental, and provided immediate feedback along with remedial measures to help students overcome deficiencies (26). Various feedback tools had different implications for student learning, with group assessments offering feedback on teamwork, leadership, and interprofessional coordination (27, 28).

The flexibility of formative assessment methods allowed for individual or group assessments using creative approaches, such as quizzes, reports, presentations, or even feedback through WhatsApp (20, 26, 29). Effective feedback was specific, accurate, clear, timely, and focused, motivating students to reflect on their learning and improve (11). Students preferred various formative assessment methods, including multiple-choice questions, online quizzes, e-portfolios, reflection writing, and short-answer questions (9, 28, 29). Implementing formative assessment in Pakistan was challenging, given the culture focused on summative assessment, underscoring the need for assessment for learning (2, 3, 4). Repeated formative assessments encouraged intrinsic motivation, enabling students to take charge of their learning, while guidance on the benefits of formative assessment improved attendance and participation (1, 2, 4, 7, 8, 9).

Teacher perception, understanding of formative assessment, and resource limitations posed challenges to implementation. Faculty training and development programs needed to include formative feedback (1, 3-5, 7-11). Allocating time for formative assessment

Journal of Health and Rehabilitation Research 2791-156X JHRR

was challenging. While weekly assessments correlated positively with summative exam scores, frequent feedback could overwhelm teachers and students. Innovative strategies, such as video lessons and flipped classrooms, offered potential solutions (9-20, 24, 26). The faculty-intensive nature of formative assessment underscored the importance of creative approaches, such as feedback through WhatsApp or using online tools like Socrative (19, 20, 26, 27). Repeated testing promoted knowledge retention and reflection, aiding both students and teachers in identifying and improving learning strategies (24, 26-28). Six key success factors for effective formative assessment included appropriate methods, effective reflection, frequency of assessment, appropriate scoring, adequate support systems, and teacher knowledge and management (26, 29). Implementing formative assessment required involving stakeholders, including institutions and regulating bodies, and emphasized the importance of faculty development, curriculum design, and advocacy (30-35).

Overall, this narrative review highlighted the importance of balancing formative and summative assessments in medical education. The strengths of formative assessment included its ability to identify and address learning gaps, promote intrinsic motivation, and provide constructive feedback for continuous improvement. However, limitations included challenges related to faculty training, resource allocation, and cultural emphasis on summative assessment. Recommendations included incorporating formative feedback into faculty development programs, advocating for assessment for learning, and conducting further research to address challenges in implementing medical education in Pakistan.

CONCLUSION

In conclusion, the balanced implementation of formative and summative assessments is crucial in medical education, as it enhances learning outcomes, identifies and addresses learning gaps, and fosters intrinsic motivation among students. The emphasis on assessment for learning, coupled with effective feedback, has significant implications for human healthcare, as it ensures that future healthcare professionals are well-prepared, competent, and capable of providing high-quality patient care. This approach ultimately contributes to improved healthcare outcomes and better patient experiences.

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Journal of Health and Rehabilitation Research 2791-156X JHRR

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