



Analysis Of Impact Of Regular Formative Assessment On Final Summative Assessment Among MBBS Students

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ABSTRACT

Introduction: Evaluations in education should exhibit reliability, acceptability, and cost-effectiveness. Formative assessment aids in motivating and guiding students through effective feedback, thereby enhancing learning outcomes. Consistent formative assessments have been shown to enhance performance in summative assessments. This study aimed to assess the impact of continuous formative assessment on summative assessment scores among first-year MBBS students.

Materials and Methods: A cross-sectional descriptive study was conducted. 166 first-year MBBS students were randomly assigned to two groups of 83 each: the study group and the control group. The study group participated in weekly formative assessments with feedback sessions covering topics from that week, while both groups underwent summative assessments. A pretested questionnaire was used to gather student opinions, and data were collected, analyzed, and interpreted.

Results: The summative scores of the study group exhibited a significantly higher performance compared to those of the control group ($p < 0.001$).

Conclusion: Incorporating formative assessments with regular feedback leads to improved performance in summative assessments.

Keywords: Assessment, formative, summative, medical education, performance

INTRODUCTION

Undergraduate medical education is constantly evolving to meet the dynamic demands of the medical profession. Assessment plays a crucial role in this process, serving as a method to evaluate students' achievements throughout their course of study. It is a central feature of teaching and curriculum design [1]. Assessments are broadly categorized into formative, which enhances learning, and summative, which is focused on grading and evaluating overall performance.

Formative assessments are designed to support learning and improvement by providing students with opportunities to identify their weaknesses and areas for improvement. They also enable teachers to pinpoint areas where students may need additional support. Formative assessment methods have a positive impact on learning and the curriculum, contributing to continuous improvement [2-3]. On the other hand, summative assessments ensure that learning objectives have been met and serve as motivators for student learning. They provide a comprehensive evaluation of students' understanding and knowledge gained throughout a specific period [4].

While assessments are intended to have a positive effect on learning, there can be instances where the testing effect may not always yield desirable outcomes. For example, receiving a poor score on a test can potentially discourage a student from further studying or engaging with the material [5]. It is important for educators to consider the potential impact of assessments on student motivation and learning outcomes, striving to create a supportive and encouraging learning environment. As consistent formative assessments have been shown to enhance performance in summative assessments, this study aimed to assess the impact of continuous formative assessment on summative assessment scores among first-year MBBS students.

MATERIALS AND METHODS

The Interventional Comparative Study was conducted at an Indian medical College. A semi-structured proforma was used to collect participant information, including name, age, gender, college ID, address, and formative and summative assessment scores.

166 were randomly selected using the lottery method and divided into two groups: the study group and the control group, each consisting of 83 students. Teaching activities such as lecture classes and small group discussions on selected topics were conducted for all students by the teaching faculty. Only the study group underwent regular formative assessments, conducted at the end of each week covering the topics taught during that week. There were 8 such formative assessments for the study group. The formative assessment, with a maximum score of 50 marks, included modified essay questions, short answer questions, and diagrams assessing cognitive and psychomotor domains. The assessments were reviewed by subject experts, and students received feedback after each assessment to aid their learning improvement.

A summative assessment was conducted for all students (study and control groups) after the completion of 8 continuous formative assessments. The scores from both formative and summative assessments were tabulated and statistically analyzed. Additionally, the summative assessment scores were compared between the study and control groups and analyzed statistically. The perception of students regarding formative assessment was analyzed by collecting feedback through a questionnaire using a 5-point Likert scale ranging from "Strongly Disagree" (1) to "Strongly Agree" (5).

Statistical Analysis: SPSS v19 software was used for statistical analysis, including descriptive statistics such as mean, percentage, and standard deviation, as well as inferential statistics like the Student's t-test. A p-value less than 0.05 was considered statistically significant.

RESULTS

Table 1 presents the student's perspectives regarding Formative Assessment. The students found that the utilization of formative assessment (FA) methodologies proved to be adequately effective in enhancing their understanding of the subject matter. Its high relevance played a crucial role in facilitating a more effective grasp of the topic, leading to noticeable improvements in their learning outcomes. The timing and scoring parameters of the FA sessions were deemed adequate, contributing to a comprehensive evaluation process. Furthermore, the feedback received post-FA was both pertinent and instrumental in guiding their learning trajectory. The iterative nature of continuous FA significantly bolstered their performance in summative assessments, leaving them feeling better prepared and more confident in their knowledge base. Overall, their experience with FA was exceedingly positive, prompting them to recommend its ongoing implementation for optimal learning outcomes.

Table 2 illustrates a substantial increase in the summative scores of the study group in comparison to the control group, as demonstrated by the Independent Student's t-test with a significance level of $p < 0.05$. Figure 1 displays a visual comparison of students' performance in the summative assessment.

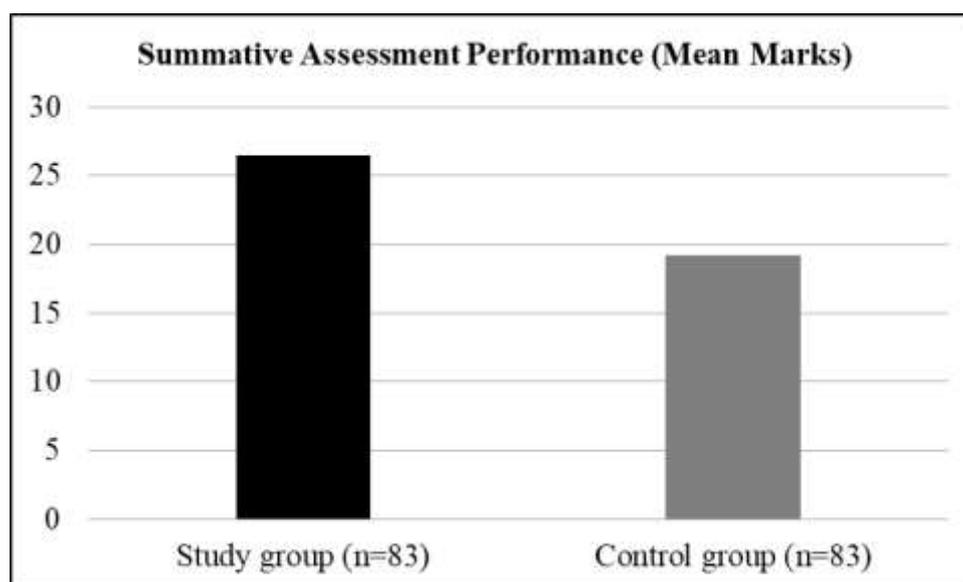
Table 1: Perception of students about Formative Assessment

Perception	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
	n	%	n	%	n	%	n	%	n	%
The FA methods were sufficient.	0	0.00	7	4.22	12	7.23	37	22.29	27	16.27
The FA was highly relevant.	3	1.81	0	0.00	0	0.00	50	30.12	30	18.07
FA helped me understand the topic more effectively.	4	2.41	0	0.00	6	3.61	30	18.07	43	25.90
I noticed improvement in my learning due to FA.	6	3.61	0	0.00	7	4.22	47	28.31	23	13.86
The timing and marks of FA were sufficient.	0	0.00	4	2.41	29	17.47	33	19.88	17	10.24
The feedback given after FA was relevant.	4	2.41	0	0.00	5	3.01	31	18.67	43	25.90
The feedback given after FA was helpful.	5	3.01	0	0.00	7	4.22	48	28.92	23	13.86

Continuous FA improved my summative assessment.	4	2.41	0	0.00	4	2.41	36	21.69	39	23.49
I felt better prepared after FA.	4	2.41	4	2.41	6	3.61	39	23.49	30	18.07
I experienced increased confidence in my knowledge.	4	2.41	0	0.00	9	5.42	30	18.07	40	24.10
My overall experience of FA was positive.	4	2.41	0	0.00	6	3.61	40	24.10	33	19.88
I recommend continuous use of FA for learning purposes.	4	2.41	4	2.41	12	7.23	20	12.05	43	25.90

Table 2: Comparison of performance of students in summative assessment

Parameter	Study group (n=83)	Control group (n=83)	p Value
SA marks; Mean \pm SD	26.45 \pm 7.56	19.22 \pm 6.68	<0.05

**Figure 1: Visual comparison of performance of students in summative assessment**

DISCUSSION

The aim of this qualitative study was to investigate the impact of formative assessment on students' learning and summative performance.

In medical schools, it is widely accepted that continuous student involvement and feedback are crucial for overall improvement in learning. This recognition has highlighted the importance of continuous formative assessment and its influence on end-of-term exams, which are considered summative assessments. Sanjith et al. conducted a cross-sectional study involving 142 students and collected opinions through a questionnaire. The study found that 78% of students favored continuous formative assessment as it helped them address learning gaps, identify weaker areas, and encourage deeper learning. However, 22% of students believed that formative assessment hindered their independent learning and subsequently impacted their performance in summative assessments [6].

Sumithra et al. conducted a study involving 100 students and observed that students who underwent formative assessment scored significantly better. The assessment methods included multiple-choice questions (MCQs) both online and offline. The unique aspect of the study was the inclusion of various assessment formats such as long essays, short notes, short answers, and OSPE (Objective Structured Practical Examination) for both formative and summative assessments, covering all three domains of learning. The results showed a statistically significant improvement in summative assessment scores for the study group compared to the control group, with positive feedback received for formative assessment [6].

Our findings are supported by previous studies. Tiwari et al. (2005) noted that students' efforts in preparing for assessments depended on the assessor's stringency [7]. Al-Kadri et al. emphasized the importance of students' and supervisors' orientation to the assessment process in influencing students' learning outcomes [8].

Similar positive impacts of formative assessments on learning outcomes were observed in other studies. For example, Kromann et al. found that medical students' resuscitation skills improved after a final test compared to students who solely practiced these skills [9]. Opoka et al. reported that OSCE (Objective Structured Clinical

Examination) improved students' communicative and procedural skills [10]. McKenzie et al. highlighted that assessment of procedural skills and subsequent feedback increased students' confidence in performing procedures at the patient's bedside [11]. Cilliers et al. categorized the effects of learning on summative assessments into cognitive processing activities and metacognition regulatory activities [12-13].

CONCLUSION

The study findings indicated a beneficial impact of formative assessment on summative assessment outcomes. Overall student feedback was positive about formative assessment and emphasized that formative assessment fosters regular learning habits and serves as a motivational tool. To establish these facts further study is required at a larger scale.

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