

A Comparative Study Of Formative And Summative Assessment Pattern Of Clinical Skills For Undergraduate Students In Surgery

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Abstract

Background

The surgical skills and application of knowledge in clinical situations and regular assessment of student's surgical skills are essential. Formative assessment forms a critical aspect of the undergraduate medical curriculum, and their skills can be certified periodically for undergraduates. Assessment should aim to help the students develop the skills and knowledge of the subject, which is considered crucial for the students to blossom into successful surgeons in the future. While end-of-the-course summative assessment mainly assesses net skills acquired by the students at the end of the course, formative assessment helps in periodic evaluation and forms a part of the progress in acquiring skills in surgery, with scope for feedback.

Aim: To Compare the assessment methods of Formative and Summative Assessment Patterns of Clinical knowledge and Skills for Undergraduate Students in Surgery

Materials and Methods

A prospective cohort study, for prefinal and year surgery undergraduate students for one year 2022-2023, to assess the impact of formative assessment vs summative assessment. 200 students in their final two years of surgery formed the study population (n=200) Four modules were assessed for both knowledge and skills with both formative and summative. The data was collected using SPSS software and analysed using T-tests with descriptive tables.

Results: The mean summative assessment score of students, with those who volunteered for formative assessment also in all four modules was found significantly higher than the mean score of students who were not willing for formative assessment. The mean summative score of the p value was found to be (p-Value = 0.00).

Conclusion: Compared to only summative assessment, the addition of formative assessment complements as an effective tool for improving student's knowledge and skills in surgery summative assessment and overall improvement of the student's performance.

Key Words: Formative assessment, Summative assessment, CBME, Knowledge, skills, Medical education.

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I. Introduction

The newly introduced competency-based medical curriculum gives clear guidance on training students in not only technical skills but also in AETCOM in addition to acquiring knowledge. The objectives of the CBME curriculum may not be achieved if we rely only on summative assessment. The formative assessment is where the students' performance is assessed periodically and with suitable feedback, they can perform in their summative exams also. A review of the literature shows that now CBME curriculum is followed in current undergraduate medical education, where assessments are conducted, which may not be sufficient. Formative assessments can be used as a complementary to summative assessment as a tool for providing effective feedback and guiding students in improving their academic performance, especially needed students.¹ Assessment of students' competency in skill acquisition and knowledge is an important aspect of learning. Assessment is a fundamental component of learning and teaching as it reflects students' understanding of concepts and their skills certification.² Formative assessment helps in better understanding of learning methods and clinical skills by way of giving confidence to the students and scope for improvements if the need arises. Faculties support in way of continuous monitoring of progress and guidance facilitates the students not only in their exams but their performance in facing competitive exams.³ The summative assessments lack the comprehensive assessment without any chance for feedback from both stakeholders with little scope for suggestions and no chance to understand the student's needs.⁴ End of the academic year assessment cannot assess, what the students have learnt in a whole year. Scoles PV, et al. on clinical Assessment of medical students has documented those different types of assessments, and training is needed based on students' capabilities as the calibre of students differ. Though different formative assessment methods like SNAAP, MINI-CEX, DOAP and MCQS are available for evaluating medical students, they should be chosen based on topics, and skills, including communication and professionalism., though no single form of assessment should be relied upon. The optimal must be a mix of both assessments, in addition to feedback and scope for improvisation from both sides⁵.

II. Materials And Methods

A prospective cohort study, for prefinal and year surgery undergraduate students for one year 2022-2023, to assess the impact of formative assessment vs summative assessment. 200 students in their final two years of surgery formed the study population(n=200) Four modules were assessed for both knowledge and skills. The assessment comprised formative assessments at the end of each module for both clinics and theory, Endocrine and Colorectal The tests were designed by the module faculties in charge of each module The students were divided into two groups for each module concerned, Group 1, students who took both the formative assessment and summative assessment and group II students who did not opt for formative assessment. SPSS software-based t-tests were used in comparing the summative assessment and formative assessment results in the form of tables conducted only offline for knowledge and clinical and communication skills. Though formative assessments were optional, summative assessment was made compulsory.

The students were briefed about both types of assessment and obtained oral consent for participation. Both types of assessments were compared at the end of the summative exam after all modules were completed.

III. Results

The features of both the online formative assessments were recorded in Table 1. The mean scores were used in further statistical The first formative assessment (test I) was conducted in an endocrine (Endocrine I) module which was four weeks long. The second formative assessment (test II) was carried out in the next 8 weeks on the hepatobiliary. Endocrine consisted of 8 weeks of teaching and Hepatobiliary 8 weeks.

For both assessments, all questions were answered and carried equal marks with no negative marks. The test I consisted of 25 multiple-choice questions with a time duration of 25 minutes was given for taking the test physically. After submitting answers to any question, students were not allowed to make any corrections or attempt the question again these are specific types of questions. The students were given messages in case of correct or incorrect answers but the key was not displayed in case the answer was incorrect. Test II consisted of 25 MCQs and was allowed only one attempt. On the completion of each test, a result was displayed for the students which showed the number of correct and incorrect answers and customized feedback. Following each test, discussion on the topic and question were discussed as an exam wrapper method. This was also an

opportunity for the students to clarify any queries regarding these topics At the end of both of these modules a summative exam was carried out for both the topics for all students. SPSS software-based t-tests were used to produce summaries comparing the summative assessment and formative assessment results in the form of tables (Table 1)

Table :1
Formative assessment at the end of two topic modules

Variables (Time) Seconds	Endocrine (Breast &Thyroid)		Hepatobiliary	
	MCQS	SKILLS	MCQ	Skills
Minimum time taken	422	185	160	182
Maximum time taken	1561	205	1230	148
Average	1046	194	699	125
Minimum score	0	0	0	0
Maximum score	95.6	94	99.9	98

In the Endocrine Module, out of 200 students, 51% took the formative assessment while 49% did not. The mean summative score for the group of students who took the online formative assessment was 11 marks more than those who did not. The male-to-female ratio was about 1. 1:1. In the HB module, out % of 200 students, 48% took the formative assessment while 52% did not. The mean summative score for the group of students who took the online formative assessment was 9 marks more than those who did not. The male-to-female ratio was about 1.1:1. To assess the overall impact of formative assessment assessments on the mean score for summative assessments, the scores were compared using a t-test and the results were recorded in Table 2.

Table 2: Impact of Computer-based formative assessments on summative assessments

EXAM TYPE(MCQ&DOPS)	MEAN SCORE	P value
ENDOCRINE(FA)	32.1	0.05
ENDOCRINE (SA)	70.6	
HEPATOBILIARY(FA)	36.1	0.05
HEPATOBILIARY (SA)	73.9	

Exam Type Mean Score p value EOM formative assessment 32.1 < 0.05 EC summative assessment 70. 6. HB formative assessment 36.1 < 0.05 NEU summative assessment 73.9

Furthermore, to assess whether the summative scores of students who took the formative assessment in each module group I were better than Group II (3%).

IV. Discussion

The mean time in our study for both the formative assessments for knowledge and skills was far less than the mean time of a 2008 study in which the average time was 32 ± 5 minutes (1920 ± 300 seconds) This confirms that the number of questions in a formative assessment can influence the thinking and performing period, as our study had 25 questions each for formative assessments similar to the study in 2008 that also had 25 questions⁶ Furthermore, our study included questions of a multiple-choice format while the study in 2008 had extended matching questions which concludes that the thinking time is also influenced by the style of these formative assessments⁷. In our study, we also included skills by assessing DOPS (Direct observation of procedure skills and using a Likert scale to score from 1 to 10. The percentage of students taking both the formative and summative assessment had slightly dropped to 1.2 in the HB module which can be related to the fact that may be adjacently scheduled to the summative assessment for both modules.

A study conducted in Malaysia showed that CBA with automated feedback improved the performance of high-achieving students in subsequent summative assessments⁸ Although this needs further research, a positive impact of Computer-based formative assessment on summative performance, at least in high-achieving students, can be expected⁹. This is supported by our study. However, when compared with this study, the mean score of formative assessments of our students was lower, 31.4 and 36.1 versus 61.7 ± 17.6 . However, the scores of our students in summative exams were much higher than the students in the Malaysian study, 70.1 and 72.9 versus 56.4 ± 12.2 12. The difference can be attributed to the reason that students focus more on exams that count towards their internal assessments. In terms of students' perception towards CBA. A study in Singapore showed that 79.8% of final-year students preferred computer-based MCQ exams over paper-based assessment (PBA)¹⁰, furthermore, in a similar study of post-graduate trainees in Pakistan, 61.8% rated CBA better than PBA Although our study did not aim to compare the two modes of formative assessment our qualitative data reflected that the students would like to see more of this assessment tool during their education which highlights the fact that computer-based assessments are much less threatening as shown by many studies¹¹. The general themes that were concluded from the free-text comments provided by many participants strengthened the notion that CBA is a very flexible method of assessment.¹² Although online formative assessments are being introduced widely into

undergraduate medical colleges, their benefits need validation by further studies.¹³ The results of our study can be taken as a cue for further exploration in the field of 'online formative assessments' as a replacement for 'paper-based formative assessments'. The noteworthy concerns regarding online formative assessments were mainly related to technical issues as stated by some students who had difficulty accessing the test due to poor internet connection and problems with the server which interfered with the valid¹⁴

V. Conclusion:

To conclude, the formative assessment is found very effective assessment tool for assessing knowledge skills and facilitating better learning. Formative assessments provide ongoing progress of study feedback during the learning process, helping students and teachers make real-time adjustments. Summative assessments evaluate student learning at the end of a learning period, determining if learning objectives have been met. Formative and summative assessments complement each other to give educators and students insight into performance and areas for improvement.

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