

FORMATIVE ASSESSMENT AS A PERFORMANCE PREDICTOR FOR SUMMATIVE ASSESSMENT IN UNDERGRADUATE MEDICAL STUDENTS: A COMPARATIVE CORRELATIONAL ANALYSIS IN THE SUBJECT OF PATHOLOGY

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ABSTRACT

Background and Objectives: To study the correlation between formative assessment and end of session summative assessment in undergraduate medical students in the subject of pathology.

Methodology: Undergraduate medical students of third and fourth year ($n = 193$) participated in this cross-sectional analytical study. Internal assessment score of students was compared with the score obtained by them during their annual professional examination in the subject of pathology.

Results: Significant positive correlations were observed between formative and summative assessments in both 3rd year MBBS ($r^2 = 0.866, p = 0.000$) and 4th year MBBS ($r^2 = 0.850, p = 0.000$) in the examination subject of pathology.

Conclusions: Formative assessment is a strong predictor of performance in the end of session summative assessment. Continuous assessment throughout the academic year can help in better outcomes and encourage the students towards improved performances at the end of the session.

Key Words: Formative assessment, summative assessment, medical education, academic performance.

INTRODUCTION

This era of productive innovations in medical education is geared toward improving the standards of teaching and learning of medical students. Improving the quality of assessment for undergraduate medical students is a major interest of medical educators nowadays. Assessment is an activity in which evidence of learning is gathered systemically and is used to make judgment about learning process.¹ Ideally, it facilitates students in their learning by providing them the opportunity to improve.² Continuous assessment during medical training forms an important part of a physician's career and helps reduce the chances of clinical error.³

Assessment methods employed in medical schools of Pakistan are of both formative and summative types. Formative assessment provides feedback to the students and teachers over the course of instruction.⁴ Formative assessment is a systemic intervention that is administered during the academic session in a relaxing non-threatening environment to improve the learning and achievements of the students in various ways; by making the students aware of the gap between their existing and expected knowledge levels, by familiarizing them with the end of session summative assessment, and by guiding them to improve their learning process and skills.⁵

Summative assessment reports student perfor-

mance in an entire academic session and involves assigning grades to the students.⁴ Summative assessment sums up the learning process and looks at the post achievement only.⁶ It sometimes encourages students to seek for preparatory courses or crash tests and accept the theoretical ideas without understanding the core concept.⁷ Formative assessment differs from summative assessment in that it focuses on improvement of learning rather than declaring students as being 'pass' or 'fail'.³ Despite its evident advantages, formative assessment and its impact on the end of course summative assessment has not been put to test as much as it should have been.⁸

Student evaluation in Pakistan is mostly done at present through high stake summative assessments. To our knowledge, no study in Pakistan has analyzed the impact of formative assessment on grades attained in the end of course summative assessment in the subject of pathology. The aim of the present study was to explore determine the relationship between formative and summative assessments in the subject of pathology and explore the role of the former as a prognosticator of academic performance in the latter.

MATERIALS AND METHODS

A cross-sectional analytical study design was employed. A total of 193 undergraduate medical students of Central Park Medical College from 3rd and 4th year MB-

BS were enrolled in the study (Table 1). The students who passed the annual professional university exam in

Table 1: Characteristics of study participants.

Total Number of students	n = 193
Percentage of Female students	63.3% (n = 122)
Percentage of Male students	36.7% (n = 71)
Percentage of participants from 3 rd year MBBS	47.7 (n = 92)
Percentage of participants from 4 th year MBBS	52.3% (n = 101)

the first attempt were included in the study. Ethical approval for the study was granted by Institutional review board of Central Park Medical College Lahore which operates under the auspices of Central Park Research Committee. At Central Park Medical College, the formative assessment in the subject of pathology is conducted via monthly tests, OSPE and midterm examinations. The table of specifications (TOS) and the percentage and distribution of SEQs and MCQs followed in construction of these test papers for formative assessment at Central Park Medical College is as per the guidelines and instructions laid down by the University of Health Sciences. Monthly tests are carried out every month comprising of MCQs, SEQs and a structured viva voce. Midterm examination consists of MCQs, SEQs, OSPE and a structured viva voce. The results of all these tests are displayed on the notice board of the department in the form of total score acquired as well as the percentage. The internal assessment of the students is calculated as a cumulative percentage of all the test scores and midterm examination. The annual university professional examination (summative assessment) comprises of MCQs and SEQs in theory component, and OSPE and viva voce taken by external and internal examiners in the practical component.

Internal assessment of students (percentage) in the subject of pathology was compared with the score obtained (percentage) in the university professional examination in the subject of pathology (3rd year and 4th year MBBS). Data analysis was carried out using Statistical Package for Social sciences (SPSS) version 23 (IBM). Correlation between summative and formative assessment of students was calculated using Pearson correlation coefficient.

RESULTS

Significant positive correlations were observed between the performance of both 3rd year MBBS and 4th year MBBS students in the annual university professional examination and their internal assessment in the subject of pathology (Table 2, 3) (Figure 1, 2).

Table 2: Correlation of summative assessment with formative assessment of 4th year MBBS students in the subject of pathology.

4 th year MBBS (n = 101)	Pearson Correlation	P value
Score in annual university professional examination vs. Internal Assessment	0.850	0.000*

*Difference is significant at $p < 0.05$

Table 3: Correlation of summative assessment with formative assessment of 3rd year MBBS students in the subject of pathology.

3 rd year MBBS (n = 92)	Pearson correlation	P value
Score in annual university professional examination vs. Internal Assessment	0.866	0.000*

*Difference is significant at $p < 0.05$

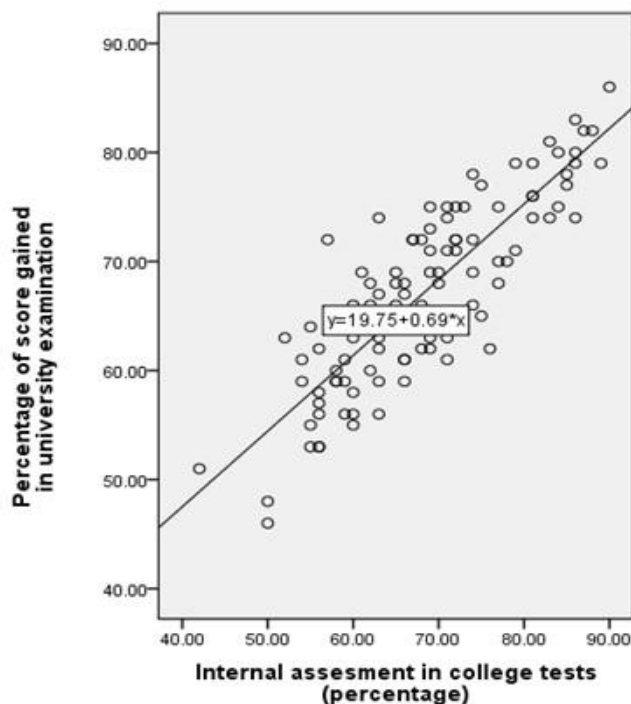


Fig. 1: Scatter plot of percentage score obtained in university examination with percentage of internal assessment of 4th year MBBS students in the subject of pathology.

DISCUSSION

Formative and summative assessments go hand in hand in the modern-day education of health professionals. The present work showed that formative asse-

ssments had a rewarding influence on students as the students who performed good throughout their academic session also showed good results and vice versa. These findings also reflect a predictive role of formative assessment on the performance of students in the annual or end of semester summative assessment.

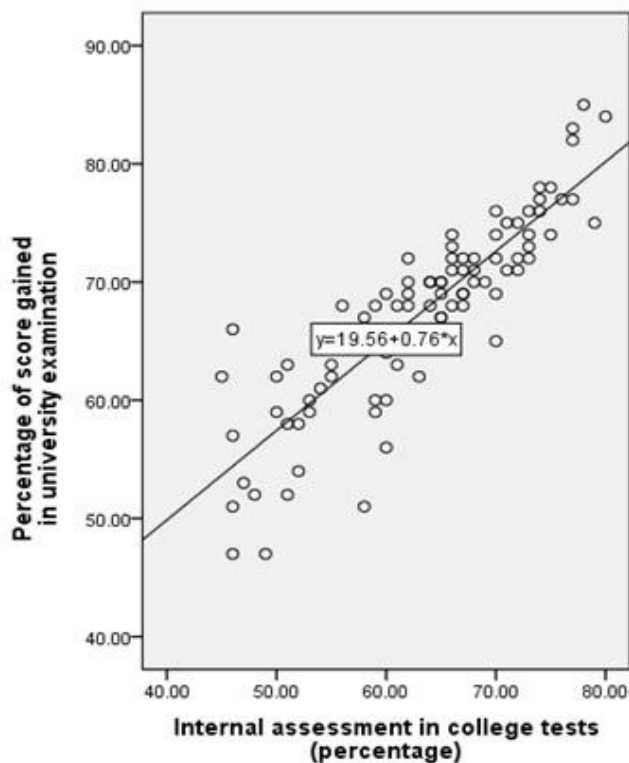


Fig. 2: Scatter plot of percentage score obtained in university examination with percentage of internal assessment of 3rd year MBBS students in the subject of pathology.

Various studies conducted previously have highlighted the potential benefits of formative assessment in student learning. Formative assessment has been suggested to encourage dynamic learning process and have a positive influence on students' grades at the end of the session.⁹ In a recent longitudinal cohort study conducted in a Caribbean Medical school, a significant improvement in students' academic performance was noticed following the implementation of formative assessment.¹⁰ The participants of the Caribbean study stated that formative assessment was helpful, motivational and was a strong predictor of self-evaluation throughout the academic session which cannot be achieved by summative assessment alone.¹⁰ An Indian study comparing end of topic summative assessment score with formative assessment found that active participation in formative assessments had a significantly positive relationship with summative score.¹¹

The benefits of formative assessment are clear but

this it requires careful planning, trained human resource and continuous monitoring. Implementation of this system needs specialized training of teachers and a thorough understanding of formative assessment classroom techniques (FACT) by them.¹² FACT is a set of cognitive strategies that help teachers to make assessment systems more sustainable and easily understandable by students. The FACT approach also caters to the different learning domains of students.¹² Further, the academic staff involved in designing formative assessments needs to be regularly monitored by senior staff members to ensure that proper strategies are being utilized to engage students so that all the students gain maximum benefit. Such training and surveillance needs both time and money along with institutional involvement.¹³

CONCLUSIONS & RECOMMENDATIONS

The current work highlighted that formative assessment has a positive influence on end of session scores. It is very important to strengthen the role of formative assessment in medical education as it directly relates to long term expertise of physicians. Comparative studies of various assessment techniques are of utmost importance for advancement of medical education. A good balance of summative and formative assessment is recommended for a productive examination strategy. It is further recommended that formative assessments must be scrutinized and approved by senior experts before the students are tested on them.

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Authors' Contributions

H Batool, U Asim, SIA Shah and AS Chughtai were involved in conception and design of the study, review and finalization while H Batool and U Asim were additionally responsible for data collection and analysis. The manuscript was seen and approved by all authors.

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Conflict of Interest

The authors declare no conflict of interest for this study.

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