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Original Research Article

A Study to Assess the Effects of Continuous Weekly Assessment along with Providing Feedback on the Final Performance in Examination of First MBBS Students in Physiology

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ABSTRACT

Background: Assessment and evaluation is a continuous activity in medical education which should be designed simultaneously with curriculum development. Aims: The present study was conducted to assess the effects of continuous weekly assessment along with providing feedback on the final performance of first MBBS students in examination in Physiology.
Materials and Methods: The study was conducted over a period of 2 years in the Department of Physiology at Burdwan Medical College and Hospital, West Bengal, India. This was an interventional study involving 300 students, who took a comprehensive internal assessment and final examination in Physiology in 2016 and 2017. The first MBBS students of batch 2015-16 (Group A) were exposed to weekly assessment which comprised of written tests. The questions were short answer type of structured questions and they were formulated by senior faculty members of the department. The topics on which the examinations were conducted were declared to the students one week ahead of the examinations so that they had time for their own preparation. All important and difficult topics were covered in these weekly examinations. The papers were corrected by the faculty members and residents and randomizations of allocation of the answer sheet to the examiners were done using an online randomizer. A model answer was also prepared by the paper setter and it was distributed to all examiners. The examined papers were handed over to the students and the shortcomings were discussed in details by the teacher who had examined the papers. Two semester examinations were also conducted as per university guidelines and periodical tutorial classes were conducted as usual. The first MBBS students of batch 2016-17 (Group B) were not exposed to weekly assessment. Two semester examinations were also conducted as per university guidelines and periodical tutorials were conducted as usual. The computer software "Statistical Package for the Social Sciences (SPSS) version 16 (SPSS Inc. Released 2007. SPSS for Windows, Version 16.0. Chicago, SPSS Inc.)" was used to analyze the data, $P < 0.05^{*}$ was considered as significant and $P < 0.01^{**}$ was considered as highly significant.
Results: This study was conducted in a time span of two years on three hundred students. Mean and SD value of age was 18.62± 1.28 years consisting of 2 batches of first MBBS students Group A and Group B. Learner satisfaction was high with an overall score of 4.8 on a 5-point Likert scale in Group A while in Group B it was 3.9. In written comments, students reported that repeated internal assessments with weekly feedback in small groups with faculty involvement provided a safe learning environment. They felt that weekly internal assessment was more effective than traditional methods of assessment. Faculty reported that students remained engaged and required minimal oversight. The

Percentage of marks obtained by Group A in semester I was 65.26 ± 12.67 and by Group B was58.69 ± 10.45; P value <0.01. The Percentage of marks obtained by Group A in semester II was 76.24 ± 7.5 and by Group B was 65.3± 16.7; P value <0.01. The results demonstrated that Group A had a significantly better performance as compared to Group B in both the semester examinations.
Conclusions: The present study revealed a definite better performance of medical students in internal assessment and final summative examination in First MBBS Physiology examination with weekly regular examinations and feedback. Emphasis should also be laid upon the assessment of attitudes, communication skills, ethics and interpersonal skills in order to improve the level of performance in continuous assessments as well as in the final examinations of the undergraduate medial students.
Keywords: Medical education, continuous internal assessment, feedback.

INTRODUCTION

The present learning experience at in MBBS curriculum in West Bengal involves didactic lecture-based formats, which are often supplemented with short, intensive, summary tutorials. This may result in a teaching learning gap in medical education. Assessment and evaluation is a continuous activity which should be designed simultaneously with curriculum development. [1-7] A well-designed system of assessment and evaluation is a powerful educational device. [1-7] In 1997, the Medical Council of India (MCI) made an announcement regarding the assessment pattern of medical graduates. In a major departure from earlier regulations, the 1997 MCI regulations on Graduate Medical Education (GME) made it mandatory for undergraduate students to pass their internal assessment (IA) before they could appear for their final university examinations. [1-7]

Curriculum is a formal plan of educational experiences and activities offered to a learner by an educational institution, where knowledge, skill and values are to be developed during the MBBS course. Formative assessment has a major influence on learning and needs to be formulated with extra effort. The educational utility of a summative or year-end examination is limited since it usually involves a single encounter with assessment of a limited number of competencies, mostly knowledge-based, with no opportunity for feedback and improvement. Internal assessment provides a very useful opportunity to not only test acquisition of knowledge but also provide feedback to make learning better. Feedback to students remains one of the most important aspects of teaching learning process. [6-8]

The draft of the 2012 revised Regulations on Graduate Medical Education (GME) released by the Medical Council of India (MCI) stipulates that undergraduate students should have passed in their IA to be eligible to appear in the final university examinations. [1-8] The recommendation is for IA to be based on day-today records. Also, regular assessments conducted throughout the course shall relate to assignments, preparation for seminars, clinical case presentations, participation in community health care, proficiency and skills required for small research projects etc. Also, electives and skills should be assessed as part of internal assessment. [1-8]

In-training Assessment (ITA) has the potential to test a wide range of competencies which are not testable by the yearend examination. However, despite high validity, educational impact and feasibility; its implementation is flawed. A paper proposed a "quarter model of in-training assessment" for implementation in the undergraduate medical curriculum in India. The model proposed that assessments be carried out at least quarterly; no teacher should contribute more than 25% of the marks for any student; no single assessment tool should contribute more than 25% marks; and no assessment should contribute to more than 25% of the total marks. Structuring the implementation using multiple tests on multiple content areas by multiple examiners using multiple tools in multiple settings in the proposed quarter model will not only improve the reliability

and validity of internal assessment, but also its acceptability. [1-8]

Despite its obvious strengths, internal assessment has not been used to its full potential in India. Often trivialized as a replica of the final examination, IA is restricted only to theory and practical tests, while its potential to test other competencies is seldom exploited. The major issues with internal assessment in India are: improper implementation, lack of faculty training, misuse or abuse, lack of acceptability among all stakeholders and perceived lack of reliability. [1-9]

It is evident that well designed formative assessment can focus students on effective learning and divert them away from summative assessment, which focuses attention on grades and reproductive thinking. Whether one decides to utilize summative or formative assessment methods, both methods of assessment are useful when applied in the correct setting and at an appropriate stage of learning. It is apparent that assessment is the gatekeeper of higher learning. Novel assessment methods such as self and peer assessment are growing in popularity. Students who participate in these forms of assessment may initially feel that it is challenging but worthwhile overall, as it helps to develop their critical thinking skills. [1-8]

Incorporating complimentary assessment components could benefit student's learning without sacrificing the integrity of the course. Continued research is needed into this area and it is clear that assessment will remain at a central position in the literature surrounding medical education. Traditionally in undergraduate medical education, the focus was on summative assessment with one exam at the end of the year worth 100%. However, some universities are adopting a continuous assessment approach with an assignment after each module. [1-8]

Although, the formative assessment approach embodies a more desirable ethos of assessment for learning, it is evident that it requires a substantial amount of time and a commitment from staff to provide timely and detailed feedback. However, it is this valuable feedback that makes the learning encounter engaging and worthwhile. Modern formative assessment methods are more time consuming, as they demand a sustained engagement with a focus on feedback, the crucial advantage is that students are aware of their performance and standard at regular intervals and receive guidance as to how to improve. [1-9]

The present study was conducted to assess the effects of continuous weekly assessment along with providing feedback on the final performance of first MBBS students in examination in Physiology.

MATERIALS AND METHODS

The study was conducted over a period of 2 years in the Department of Physiology at Burdwan Medical College and Hospital, West Bengal, India. This was an interventional study involving 300 students, who took a comprehensive internal assessment and final examination in Physiology in 2016 and 2017. The study commenced after approval from the Institutional Ethical Committee (IEC).

Inclusion criteria: Medical students in the age group of 17–21 years of first MBBS batch were selected.

The entire population consisted of the two batches of first MBBS students in consecutive years of a tertiary care teaching hospital of Eastern India. Data collection was carried out from the students' score sheet of internal assessment and final summative examination in Physiology and the marks obtained in them were considered for our study. IA was strictly based on continuous evaluation (weekly) of the students as well as periodical examinations. Nature of continuous assessment was through item cards after completion of a system. Each test was objectively assessed and recorded. Assessment for practical was done through day to day evaluation of the students' performance in the practical

record book. There were two periodical internal assessment examinations.

The first MBBS students of batch 2015-16 (Group A) were exposed to weekly assessment which comprised of written tests on every Thursday starting from the month of September till April. Time allotted for each test was one hour and marks allotted were 20. The questions were short answer type of structured questions and they were formulated by senior faculty members of the department. The topics on which the examinations were conducted were declared to the students one week ahead of the examinations so that they had time for their own preparation. All important and difficult topics were covered in these weekly examinations. The papers were corrected by the faculty members and residents and randomizations of allocation of the answer sheet to the examiners were done using an online randomizer. A model answer was also prepared by the paper setter and it was distributed to all examiners. The examined papers were handed over to the students and the shortcomings were discussed in details by the teacher who had examined the papers. Two semester examinations were also conducted as per university guidelines and periodical tutorial classes were conducted as usual.

There were continuous interactions between the students and the faculties in this batch of MBBS students so they were able to approach the teachers with all their difficulties throughout the year. These students became so friendly with the faculties of the department of Physiology that even in other years of the professional MBBS course whenever they faced any problem in their study they came to the Physiology department to clear their doubts. The faculty members also spent a lot of their valuable time to clear their doubts.

During conduction of the study we observed that it was very difficult for faculty members of the department of the Physiology department to weekly assess students and give their feedback to the students in addition to their regular duties and classes. The number of faculty members available in the department needs to be increased if the students are to be assessed so regularly and given feedback to improve the teaching learning process. Burdwan Medical College is a peripheral medical college and all peripheral medical colleges have their own constrain. So we had to limit this study within one batch of MBBS students.

The first MBBS students of batch 2016-17 (Group B) were not exposed to weekly assessment. Two semester examinations were also conducted as per university guidelines and periodical tutorials were conducted as usual.

The results of semester examinations were taken into consideration while comparing the two groups as the second group was not exposed to continuous weekly assessment and feedback.

Statistical analysis:

The computer software "Statistical Package for the Social Sciences (SPSS) version 16 (SPSS Inc. Released 2007. SPSS for Windows, Version 16.0. Chicago, SPSS Inc.)" was used to analyze the data, $P < 0.05^{*}$ was considered as significant and $P < 0.01^{**}$ was considered as highly significant.

RESULTS

This study was conducted in a time span of two years on three hundred students. Mean and SD value of age was 18.62± 1.28 years consisting of 2 batches of first MBBS students Group A and Group B. Learner satisfaction was high with an overall score of 4.8 on a 5-point Likert scale in Group A while in Group B it was 3.9. In written comments, students reported that repeated internal assessments with weekly feedback in small groups with faculty involvement provided a safe learning environment. They felt that weekly internal assessment was more effective than traditional methods of assessment. Faculty reported that students remained engaged and required minimal oversight. The Percentage of marks obtained by Group A in semester I was 65.26 $\pm$ 12.67

and by Group B was58.69 ± 10.45; P value <0.01 (Table1, Figure1). The Percentage of marks obtained by Group A in semester II was 76.24 ± 7.5 and by Group B was 65.3± 16.7; P value <0.01 (Table 2, Figure 2). The results demonstrated that Group A had a significantly better performance as compared to Group B in both the semester examinations.

Table 1: Shows comparison of marks of Group A and Group B in first semester.

PARAMETER	GROUP A MEAN±SD	GROUP B MEAN±SD	P VALUE
SEMESTER I (MARKS%)	65.26 ± 12.67	58.69 ± 10.45	<0.01**

Results significant difference in marks obtained by the two groups.
P-value <0.05* (significant)
P-value <0.01** (highly significant)

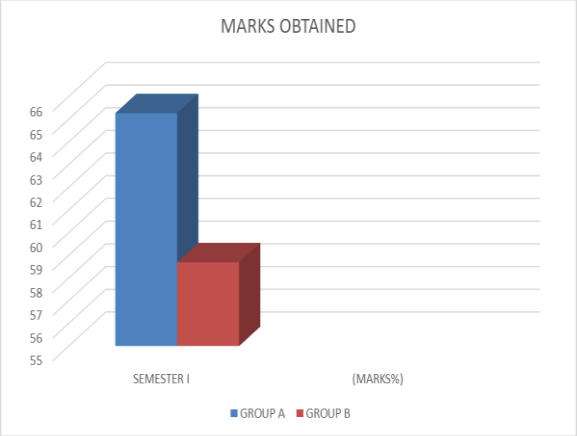

Figure 1: Shows comparison of marks of Group A and Group B in first semester.

Table 2: Shows comparison of marks of Group A and Group B in second semester.

PARAMETER	GROUP A MEAN±SD	GROUP B MEAN±SD	P VALUE
SEMESTER II (MARKS%)	76.24 ± 7.5	65.3± 16.7	<0.01**

Results significant difference in marks obtained by the two groups.
P-value <0.05* (significant)
P-value <0.01** (highly significant)

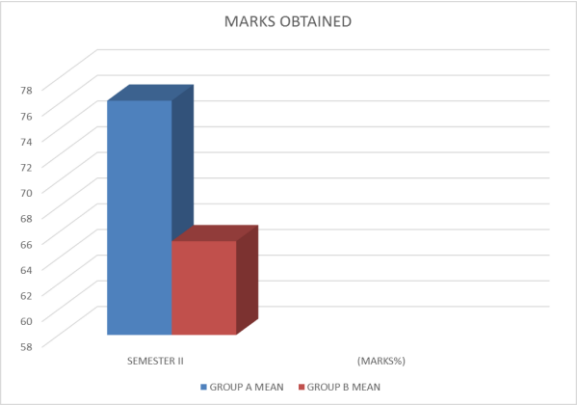

Figure 2: Shows comparison of marks of Group A and Group B in second semester.

DISCUSSION

Single assessment does not fulfill all aspects of assessment and there is a need for having a relook at the strategies followed in the existing assessment system in MBBS curriculum.

The belief that IA is not reliable often stems from confusion between the terms 'objectivity' and 'reliability'. Objectivity refers to the consistency of marking between different examiners and is, therefore, a measurement issue. Reliability, on the other hand, refers to the confidence that we can place in the judgements we make and is, therefore, a decision-making issue. In the present study both these issues were carefully taken into consideration during weekly assessment of students. Medical educators are placing increasing emphasis on reliability, even though it may be less objective. [1,7-10]

Internal assessment can compensate for many of the drawbacks of the year-end examination and enrich the assessment process. Even in the best of settings, the conventional final summative examination has a number of limitations: [1-8]

a. It limits the assessment process to only the 'end of the course' setting, with chance and 'luck' of the student playing major roles.

b. Clever students may bluff examiners into believing that they know the subject matter, even when they do not.

c. Such an examination fails to make any distinction between a student who is very studious and regular and one who studies only a month before the examination.

4. Practical skills cannot be evaluated for want of time, material and other logistics.

5. There is no emphasis on the assessment of attitudes, communication skills, ethics and interpersonal skills.

In the present study we provided continuous feedback to the students during the weekly examinations and this factor adds strength to this study. The students were allowed to discuss their doubts with the examiners as well as allowed to take

their evaluated answer scripts along with them for self-assessment and improvement. A meta-analysis of meta-analytic studies indicates that feedback is the single most important factor in promoting learning. [10] Another review enumerates a number of studies that demonstrate the utility of feedback in the process of learning. Feedback should be available to students while they still have the time to improve upon their performance by acting on that feedback. [11]

More important than the product of assessment is the framework that the task of assessment provides for structured learning. In the present study these aspects of assessment were well taken care of by the senior faculty members of the department.

Validity relates to the relation between what we intend to measure and what is actually measured. We need to identify the competencies that we wish to assess during IA and then use appropriate tools to assess them. The MCI guidelines provide a detailed description of the competencies (in addition to the knowledge) which should be evaluated. [7-8] But in the present study we only assessed knowledge of the students and the other aspects were neglected which adds a limitation to the present study.

A study was conducted by Santra R in 2014 [12] to assess whether performance in the continuous assessment method as determined by internal assessment, correlates to the final summative evaluation in 2nd professional MBBS students in Pharmacology. This study was conducted over a period of three months at Nilratan Sircar Medical College and Hospital, Kolkata. It was a retrospective non-interventional record-based study based on the students' score sheets of 2nd MBBS Pharmacology examinations. The strength of correlation between internal assessment marks and total summative examination was found to be highly significant at $p < 0.0001$. This study revealed that performance in the internal assessment and final examination have a direct correlation although not completely linear, thereby indicating that other possible variables would have influenced the final result of the 2nd MBBS Pharmacology curriculum.

Within the arena of medical education, it is generally acknowledged that assessment drives learning. Assessment is one of the most significant influences on a student's experience of higher education and improving assessment has a huge impact on the quality of learning. Ideally we want to enhance student's capacity for learning and engagement with the curriculum. However, this doesn't always happen as it is heavily dependent on the form of assessment used and whether or not timely comprehensive feedback is given. Regular feedback in the present study helped the students to improve their performances which are reflected in the comparison of the results of the two groups in both the semester examinations. [7-11]

This model of assessment followed in the present study may demand more effort and work from the faculty members. However, we feel that that the added benefits of this model would be a better distribution of student assessment tasks within the department and also an opportunity for the tutors/senior residents to be trained in assessment methods under supervision. It must be reiterated here that assessment requires as much preparation, planning, patience and effort that research or teaching does.

CONCLUSIONS

The present study revealed a definite better performance of medical students in internal assessment and final summative examination in First MBBS Physiology examination with weekly regular examinations and feedback. Emphasis should also be laid upon the assessment of attitudes, communication skills, ethics and interpersonal skills in order to improve the level of performance in continuous assessments as well as in the final examinations of the undergraduate medial students.

Limitations and future scope: We had to limit this study within one batch of students due to lack of faculty members, future studies involving greater number of faculties and students needs to be implemented for betterment of medical education.

Conflict of interest: Declared none.

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