



## Original Research Article

## Evaluating the effectiveness of Physiology lectures by introducing pre-test and post-test in a medical college

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## ABSTRACT

**Background:** Traditional didactic lectures is one of the commonly followed method of teaching learning in most of the medical colleges to teach undergraduate medical students till now. This method is a passive method of learning in which teacher will be talking and students has to listen, this type of teaching is dominating our MBBS curriculum. Students find these lecture classes very boring. Also after the implementation of new competency based medical education (CBME) by Medical council of India, medical education for undergraduates needs lots of recent improvements to provide satisfactory changing demands in medical practice. Physiology lecture classes was restructured with introduction of pre and post-test, knowledge before and after the lecture were obtained by comparing the test scores before and after to evaluate the enhancement of learning after the lectures. Also feedback regarding the introduction of pre & post -test from the students were taken for evaluating the effectiveness of lectures with the introduction of the test before and after the lecture classes.

**Aims and Objectives:** 1. To provide Pre-test & Post-test questions before lecture and after lecture classes on the topic; 2. To evaluate the enhancement of Learning after lecture based on post-test scores; 3. To evaluate the effectiveness of physiology lecture among students in relation to feedback obtained.

**Materials and Methods:** The present study was conducted on 150 First year M.B.B.S during Physiology lectures, after obtaining Ethical clearance from the Institutional Ethical Committee, Adichunchanagiri Institute of Medical Sciences, Adichunchanagiri university.

150 MBBS(150) students after obtaining consent for voluntary participation were asked to take the pre-test questions containing 20 multiple choice questions on topic "Cardiac cycle & Cardiac output" and the same 20 multiple choice questions were provided to the students at the end of the four hour lecture classes on the topic. Performance of the students with the salient concepts on the topic were assessed by the pre-test & post-test scores. Feedback from all students were obtained regarding perception of students on the use of pre and post-test in learning the salient concepts in physiology were obtained by administering a questionnaire.

**Results:** Pre-test score of the students obtained before the start of the lecture was  $5.57 \pm 1.29$  and the Post-test score of the students obtained after the end of four hour lecture classes on the topic was  $15.26 \pm 9.7$  ( $p < 0.0001$ ) this was highly significant. Feedback obtained from the students was indicative of that most of the students felt that test was very interesting, innovative, they could focus more on the lecture classes, it helped them to learn the salient concepts in physiology, also most of them felt competitive aspect of the test contributed to their effectiveness and most of them wanted it during lectures.

**Conclusion:** From the present study we would like to conclude that introducing pre and post-test in lectures could enhance learning among students. Also we could evaluate the effectiveness of lectures by introducing pre and post – test based on feedback obtained from the students.

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## 1. Introduction

Didactic lectures with which major bulk of teaching is delivered is a traditional method of teaching in which the teacher will be talking and students has to listen, this is a passive method of learning which is still dominating in medical teaching. Most of the studies done on lectures have shown that students lose their concentration after 15-20 minutes of lecture.<sup>1</sup> Also by structuring the lecture classes by administering pre-test and post-test questions, teacher can evaluate what students have actually learned and whether it can enhance Learning among students.<sup>1</sup>

Pre-tests may benefit as it encourages the students for active participation, to actively involve by creating interest in the topic, also students will make effort to identify important information the teacher will be likely testing later.<sup>1</sup>

Pre- and post-tests are used to measure the enhancement of learning after the lectures based on their post-test scores, also we could analyse the effectiveness of lectures while involving themselves in a training course. In this method students can obtain feedback immediately from their instructor.<sup>2</sup>

Undergraduate medical education needs recent improvements and implementation to meet the demands of changes in medical practice. All though the complexities of medical care have increased over the recent years, the methods of teaching medicine have changed very little. Teachers need to learn more about the recent techniques and advances in medical education. Medical education should be given the same importance as research and patient care.<sup>2</sup>

Teaching is very demanding as well as it is a complex task. It is very much required thing for the present day teacher to know the recent changes in medical practice and become part of changes that is taking happened in medical education. Didactic lectures is among widely used methods in large group teaching in most of the medical colleges. The studies done are very limited to asses the effectiveness & evaluation of lectures by pre-and post-test.<sup>3</sup>

Hence we wanted to bring change in the routine didactic lectures which is a passive method of teaching by introducing pre-test and post-test for I year M.B.B.S students of Adichunchanagiri Institute of Medical sciences.

Present study we tried to identify that by pre-test how much the students knew about the topic and wanted them to be more attentive & focused on the lecture to evaluate the effectiveness of lectures in learning the salient concepts of Physiology. The present study was undertaken to determine the perceptions of first year MBBS students about pre and post-test in evaluating the effectiveness of lectures in learning the salient concepts in Physiology.

## 2. Materials and Methods

The study was conducted on 150 First year M.B.B.S of Adichunchanagiri Institute of Medical Sciences, Adichunchanagiri university. Ethical clearance was obtained from the Institutional Ethical Committee, A.I.M.S, B.G Nagara.

150 First year MBBS students after obtaining consent for voluntary participation, were asked to take the pre-test containing 20 multiple choice questions on topic “Cardiac cycle & Cardiac output” and the same 20 questions were administered at the end of the four hour lecture classes on the topic. Effectiveness of Physiology lectures was assessed by the pre-test & post-test scores. Feedback were taken from the student’s regarding their perception on introducing pre and post –test in learning the salient concepts of physiology by administering a questionnaire.

A questionnaire based on the student’s perception about the use pre-test and post-test in Physiology lectures to evaluate effectiveness of lectures were obtained. A five point Likert scale with 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree and 1 = strongly disagree were used to compare the feedback regarding the effectiveness of Physiology lectures.

Mean and standard deviations were calculated. Paired students ‘t’ was used for comparing pre-test and post- test scores and p values were calculated using SPSS software, p value < 0.001 was considered as significant.

## 3. Results

Evaluation of pre-test & post-test score before and after the lecture classes were carried out on all the 150 students who participated in the study. The data obtained was tabulated, analysed and expressed as Mean  $\pm$  Standard Deviation (Mean  $\pm$  SD). To compare the pre-test and post-test score, the paired student’s ‘t’ test was applied and statistical significance was indicated by ‘P’ value less than 0.0001(p<0.0001).

### 3.1. Statistical methods

Results on continuous measurements are presented on Mean+/\_ SD and results on categorical measurements are present in number (%). Student’s ‘t’ test (Two tailed independent) has been used to find the significance of study parameters on continuous scale between two groups (same groups).

Statistical software: The statistical software, SPSS is used for the analysis of the data and Microsoft and Excel have been used to generate, tables etc.

## 4. Discussion

Present study was conducted to bring change in the didactic lectures which is a passive method of teaching

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**Table 1:** Questionnaire regarding the effectiveness of pre-test and post-test Tick in the appropriate box(✓)

S. No.	Questions	1	2	3	4	5
1	Interesting and innovative method					
2	Focus on the lecture classes					
3	Helped to learn the salient concepts in physiology					
4	Competitive aspect contributed to their effectiveness					
5	Would like to have more in Physiology lectures					
6	Not usefull					

Please Answer the Question: 1= Disagreestrongly 2= Disagree 3= Neutral 4= Agree 5= Agree strongly

**Table 2:** Comparison of the students score in the Pre-test and Post-test

Total Score (20)	Pre-test		Post-test		‘t’	Significance of ‘p’ Value
	Mean	S.D	Mean	S.D		
	5.57	1.29	15.26	9.7	12.06	0.000(p<0.0001)

**Table 3:** Feedback from the students regarding Effectiveness of pre-test & post –test in Physiology Lectures

		Disagree strongly	Disagree	Neutral	Agree	Agree strongly
1	Interesting & Innovative	15(10%)	20(13%)	20(13%)	40(26%)	55(36%)
2	Focus on the Lecture classes	11(7.3%)	10(6.6%)	26(17%)	45(30%)	60(40%)
3	Helped to Learn the salient concepts in Physiology	7(4.6%)	8(5.3%)	10 (6.6%)	50(33%)	75(50%)
4	Competitive Aspect contributed to their effectiveness	0(0%)	8(5.3%)	20(13.3%)	36(24%)	86(57.3%)
5	Would Like to have more in Physiology Lectures	4(2.6%)	6(4%)	16(10.6%)	26(17.3%)	98(65%)
6	Not usefull	58(38%)	48(32%)	30(20%)	9(6%)	5(3.3%)

by introducing pre-test and post-test before and at the end of lecture classes on the topic for I year M.B.B.S students of Adichunchanagiri Institute of Medical sciences, Adichunchanagiri University.

Also we tried to identify by pre-test that how much the students were aware of the topic, also their prior knowledge on the topic and wanted them to be more focused on the lecture classes and by post-test scores at the end of four hour lecture classes could evaluate the effectiveness of lectures in learning the key concepts of Physiology. The present study was also undertaken to determine the perceptions of first year MBBS students about pre and post-test in evaluating the effectiveness of lectures in learning the key concepts in Physiology.

The present study showed that pre-test score of the students before the start of the lecture was  $5.57 \pm 1.29$  and the post-test score of the students after the four hour lecture classes on the topic was  $15.26 \pm 9.7$  ( $p < 0.0001$ ) this was highly significant. Feedback obtained from the students regarding effectiveness of lectures was indicative of that most of the students felt the tests as very interesting, new innovative method of teaching. They could focus more on the lecture classes since they were aware the knowledge

which will be tested later. Most of the student felt that it helped them to learn the salient concepts in physiology, also felt that competitive aspect contributed to their effectiveness and most of them wanted it more during lectures, very few felt it as not usefull.

The present study is similar to study done by Muthukumar S et.al which showed perception of 136 students (93.79%) was that pre-test was a useful method for focussing on the lecture classes and therefore students can be still more attentive and helps them to learn the important salient points of the lecture, which was indicated by their performance on the post-test score which showed a significant improvement with an overall mean score in post-test ( $4.32 \pm 0.9$ ) compared to overall mean score in pre-test ( $0.41 \pm 0.6$ ) which showed a very high statistical significance with a p value  $< 0.001$ .<sup>1</sup>

The present study is similar to study done by Janaki Mandla et.al which showed that out of all eight classes study conducted the mean post-test scores showed significantly higher than the mean pre-post test scores. The feedback obtained from the students about the tests the mean Likert score of the 80 students was  $3.42 \pm 1.001$ . This was indicative of that all students found the tests were very

useful. Most of the students gave comments that the tests helped them to focus better in lecture classes as well as they could also assess how much knowledge, they gained from the lecture.<sup>3</sup>

The present study is similar to study conducted by Padmanabha Thiruganahalli Shivaraju et al. which showed that, 2nd year MBBS students (4th and 5th term) were asked to take up the pretest containing 10 questions on antiamebic drugs, and the same 10 questions were tested at the end of the lecture class. A post-test questionnaire were given to all the students to assess the effectiveness of the teaching as well as the receptive power of students and their pre- and post-lecture knowledge. Results showed that there was significant improvement in the recipient knowledge after post-lecture assessment in comparison to pretest. Out of 156 students, only 56 (35.90%) obtained scores between 5 and 8 and 100 (64.10%) were below 5. These scores were improved in post-test by 78.21% (122) obtained scores between 5 and 8, while 21.79% (34) got scores more than 8 indicating the high recipient group reflecting good improvement in cognitive structure. In their study they have concluded that voluntary participation in such tests provides feedback on teachers as well as teaching effectiveness and adequacy of knowledge gained by learners.<sup>2</sup>

Hamaker in their study conducted have suggested that pretest may lead to better recallment of the previously tested information because as it directs attention to the need to encode that information when encountered again during subsequent study. Pre-tests can give students a preview of what will be expected of them. This helps students to start focusing on the salient topics that will be covered.<sup>4</sup>

Kornell, N in his study has observed that even if students could not retrieve correct answers in pre-tests, it can enhance knowledge in subsequent learning.<sup>5</sup>

Steven Cramer and Martin C Mahoney have observed that the introduction of a pre-test/post-test instrument supports the achievement of the learning objectives with a better understanding and utilization of the concepts of evidence based medicine in journal clubs.<sup>6</sup>

The present study conducted in department of Physiology during didactic lectures we tried to identify the effectiveness of lectures classes by introducing pre & post -test. Based on the post- test scores we could evaluate the enhancement of learning after the lecture classes. Also we could evaluate the effectiveness of lectures with the tests based on the feedback obtained from the students regarding learning the key concepts of Physiology.

The present study we could determine the perceptions of first year MBBS students about pre and post-test in evaluating the effectiveness of lectures in learning the key concepts in Physiology.

## 5. Conclusion

From the present study we conclude that introducing pre and post-test in lecture classes could enhance learning

among students. Also we could evaluate the effectiveness of lectures by introducing pre and post-test by obtaining feedback from the students which was indicative of that most of the students felt it as interesting, innovative, could focus on the lecture classes, Helped them to learn the key concepts in physiology, also felt that competitive aspect contributed to their effectiveness and most of them wanted it during lectures.

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## 7. Conflict of Interest

None.

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