

Research Article

Introduction of pre and post lecture multiple choice question for second year undergraduate medical students in microbiology: a technique to assess knowledge acquired from the lecture

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ABSTRACT

Background: Didactic lectures are the most commonly used method of teaching in many medical institutes. There are certain disadvantages in this method. It is essential to evaluate whether the learning objectives have been accomplished. In the present study pre and post lecture MCQs (Multiple choice questions) are introduced for second year medical students in microbiology lectures and to assess the effect on gaining and retention of knowledge acquired at the end of the lecture.

Methods: The fourth semester medical students were divided into two groups of 35 each (study and control group). Both the groups were administered the pre and post lecture MCQs for two topics in parasitology. For the Study group the Pre test MCQs were prepared in such a way incorporating the learning objectives of the lecture. The pretest questions for the control group were prepared from an unrelated topic. Both the groups were administered the common post test questions. The mean, standard deviation and correlation coefficient (by spearman correlation coefficient) and p values were analysed.

Results: The post test mean scores of both the groups were compared by unpaired t test and the p value was found to be statistically significant (less than 0.0001). The study group had a considerably higher mean score compared with the control group for both the lecture classes. There was a positive correlation between the pre and post lecture MCQS.

Conclusions: Testing by introducing Pre and post lecture MCQ in lecture has an impact on retention of knowledge.

Keywords: Didactic lectures, Pre and post test, MCQs

INTRODUCTION

The Lecture is the most commonly used method for teaching clinical microbiology classes in many medical institutes. The lecture classes are teacher centred process with providing the students who are passive listeners with minimum analytical and evaluative power. It is important to appraise whether the learning objectives have been accomplished. Testing assesses what students have learned and also improves long-term memory. Multiple-

choice questions (MCQs) are being used nowadays as a tool of assessment.¹ MCQS help in retention of information acquired from classes.² Valuation techniques have a significant effect on learning and directs the students in a scrupulous manner.³

The present study aims at introducing MCQS in didactic lecture classes and to assess whether the introduction of Pre lecture MCQS followed by a Post test have any effect on gaining and retention of knowledge acquired at the end of the lecture.

METHODS

This Prospective study was conducted at the Department of Microbiology, involving the fourth semester undergraduate medical students for two lecture topics in Parasitology. The study was approved by the institutional ethical committee. Before the start of lecture classes the students were informed in detail about the study and that the participation was voluntary. Those students who volunteered to were included in the study and consent was obtained from them. Students disinclined to participate were excluded from the study. The students were divided into two groups, study group and control group of 35 students randomly. A total of fifteen MCQS were prepared for both the lecture class. (Lecture 1 – laboratory diagnosis of parasitic infections, lecture 2 - Hook worm infections). Two separate sets of pretest questions were prepared. The pretest MCQs for the study group was prepared in such a way that all the important aspects of the lecture (specific learning objectives) that are must to be learnt by the students were incorporated. For control group a different set of MCQ was prepared for pre lecture test involving the previous lecture topic. For the post lecture test, the same set of questions from the pretest was given for both the groups. Before the start of the lecture class the respective sets of pre test MCQ was administered to both groups. The lecture was commenced and continued for about 30 minutes. After that both the groups were given post test questions.

At the end of the classes the students were asked about their opinion regarding the approach of introducing MCQS pre and post lecture classes. The pre and post lecture scores of both the groups were analysed.

Statistical analysis

The mean, standard deviation and Correlation coefficient were analysed for pre and post test for both the study and control groups. The p value was analysed by comparing the post test scores of both the groups for statistically significant differences by unpaired t test.

RESULTS

The Mean and Standard deviation with the confidence interval of pretest and post test scores were compared for both the Study and Control groups as depicted in (Table 1). The highest score was in the post test for lecture 2. The mean post test scores of Study and control group were compared (Table 2). The post test mean scores of both the groups were compared by un-paired t test and the p value was found to be statistically significant (less than 0.0001). The study group to whom the pretest was given had a considerably higher mean score compared with the control group for both the lecture classes. When we compared the post lecture scores with the pretest scores for study group, we observed that there was a 28% and 37.4% increase in the mean score of post test for lecture 1 and lecture 2 respectively which was a higher percentage in comparison with the control group (Table 3). The correlation between the pretest and post test scores was calculated using spearman correlation coefficient by comparing the mean values of pre and post lecture test scores. There was a positive correlation between both the scores (Table 4).

Table 1: Pre lecture vs Post lecture scores of study and control group.

Groups	Parameter	Pre lecture test scores		Post lecture test scores	
		Mean Score	Standard deviation with 95% confidence interval	Mean score	Standard deviation with 95% confidence interval
Study group	lecture 1	6.5	2.32 (1.87 to 3.03)	10.7	2.46 (1.98 to 3.22)
	lecture 2	5.8	1.82 (1.47 to 2.38)	11.4	2.09 (1.69 to 2.73)
Control group	lecture 1	5.05	1.3 (1.05 to 1.7)	5.6	1.9 (1.53 to 2.48)
	lecture 2	5.2	1.21 (0.97 to 1.58)	5.8	1.5 (1.21 to 1.96)

Table 2: Comparison of the post lecture test scores of the study and control group.

Parameter	Post lecture test scores Study group		Post lecture test scores Control group		p value unpaired t-test
	Mean	Standard deviation	Mean	Standard Deviation	
Lecture 1	10.7	2.46	5.6	1.9	less than 0.0001
Lecture 2	11.4	2.09	5.8	1.5	less than 0.0001

Table 3: Percentage increase in post test mean scores compared to the pre-test scores of the study and control group.

Parameter	Percentage increase in post test scores Study group	Percentage increase in pre test scores Control group
lecture 1	28%	3.67 %
lecture 2	37.4%	4%

Table 4: Spearman correlation coefficient for the test scores.

Parameter	Correlation coefficient	Inference
Mean pre lecture test score vs mean post lecture test score (lecture 1)	0.3652	Positive correlation (weak)
Mean pre lecture test score vs mean post lecture test score (lecture 2)	0.3125	Positive correlation (weak)

DISCUSSION

Didactic lecture plays an important role as a teaching tool in medical colleges. It is a passive method of learning. Though many institutes have replaced it with problem based and case based learning didactic lectures still remains as the main methodology of teaching Microbiology. Teaching method involving Lecture classes has its advantages and disadvantages.³

Testing assesses student's knowledge and improves long-term memory. Such retention of class related information ensuing from taking a test is called the 'testing effect'.^{4,5} Multiple choice tests promote retention learning of the details present in it.⁶

In the present study we have introduced MCQs as a learning and assessment tool in microbiology lecture classes. We found out that there was a significant (28% to 37%) increase in the post test scores of the study group in contrast to the control group.

The post test mean scores of the study group were considerably higher than the control group. The reason could be that the study group was administered the pre lecture MCQs highlighting the objectives of the lecture. The unpaired t test also showed highly significant differences between the post test scores of both the groups (P value less than 0.0001).

We observed that the pretest helps to indicate to the students the important aspects to be concentrated and learnt from the lecture. Students were of the opinion that pretest helped them to focus better in the lecture classes and post-test helped them to recall and retain the subject better similar to Dhawan et al and Nachiket et al.^{7,8} A study by Hill has observed that pretest does not have an assessable increase in the learning which was contrast to our study.⁹

Over all there was a positive correlation between pre-test and post test scores Similar to Nachiket et al. This denotes that introduction of pre and post lecture MCQS have an impact on the students learning and short term retention of the subject. Testing by MCQS is an effective method to promote the retention of the subject knowledge gained during a particular session like lecture classes.

Lecture classes being a more passive method of teaching, can be made more dynamic by introducing certain activities like MCQs in lecture. Such actions will have a positive influence on learning.¹⁰ Few limitations in our study are that only the short term benefit gained by the student is assessed. However introduction of pre and post lecture MCQS that highlight the specific learning objectives will have a positive effect on learning and will stimulate the students to recall the points highlighted in lecture which might help in the long term retention of the knowledge.

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