Use of test based on specific learning objectives during didactic lecture as an effective large group teaching learning method in undergraduate medical teaching

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Abstract

Introduction: The lecture is the most commonly used large group teaching learning method for transferring information in medical education.

Aims and objectives: To increase the effectiveness of lectures as a large group teaching learning method with the written test

Materials and methods: Present study is an observational study carried over a period of four months in the Department of Surgery. Didactic lecture of general surgery discipline taken for third year undergraduate students of first and second term was subjected to a written test during the lecture.

Observations: 61 students participated and gave the feedback. Out of 61 participants, 37 were female whereas 24 were male students. More than eighty percent of participants opined that they enjoyed lecture taken by the method.

Discussion: Thorough review of literature was done to find out various methods which increase effectiveness of didactic lecture. In the present study, written test was used during didactic lecture. Maximum students opined that the new method increased satisfaction, attention and acquisition of information.

Conclusion: Use of test based on specific learning objective during lecture makes it effective and interactive.

Keywords: Interactive lecture, Effective large group teaching learning method, Questionnaire design

1. Introduction

The lecture is the most commonly used large group teaching learning method for transferring information in medical education. Lecturing is frequently a one-way process resulting into disinterest amongst the students. Various methods have been described like questioning, media, small group activities, to improve effectiveness of the lecture so as to cause increased attention and acquisition of information by the students. In the present study, written test based on specific learning objective was used during undergraduate medical lecture making it interactive and effective in increased attention and acquisition of information.
1.2 Aims and objectives

To increase the effectiveness of lectures as a large group teaching learning method with the written test

2. Materials and methods

Present study was an observational study carried over a period of four months in the Department of Surgery, Rural Medical College, Loni. Didactic lectures of general surgery discipline taken for third year undergraduate students of first and second term were subjected to a written test during the lecture. Test contained questions in the form of objective or short answer questions based on specific learning objectives set for the lecture. Test was given 10 minutes before and 10 minutes after the lecture. Students were supposed to answer single response objective questions or write written answer for short answer questions. Prior sensitization of third year undergraduate students studying was done about the methodology. This modification was done for lecture series on oesophagus under upper gastrointestinal lecture series. Valuable opinions were taken from head of department and co-faculties preparing test. Tests were carried out during 8 lectures. After implementation, written answer papers were collected during each lecture in the form of before and after test. Assessment plan was made to take student’s perception. Instrument used was feedback with both the qualitative and quantitative format. Feedback included constructed response with open ended question and selected response with Lickert’s scale and Global Rating Scale for overall grading of the method. Feedback form was validated from expert senior faculty members of the department. Pretesting was done by taking feedback from 5 participants 10 days prior to the date of final administration. Finally, feedback forms were administered amongst the participant students and feedbacks were collected. Data were submitted to the data handling committee. Help of statistician was taken for data analysis.

3. Observations

Participant batch [Third year MBBS first and second term] of the present study were subjected to written test using specific learning objective for the topics on oesophagus. At the end of project, written feedback was taken from participants. 61 students participated and gave the feedback. Out of 61 participants, 37 were female whereas 24 were male students. Second part of questionnaire was selected response. Eighty seven percent participants reported that they enjoyed the method of introduction of written test based on specific learning objective. Eighty three percent participants reported that they were benefitted by topics taught by this method. Eighty two percent of participant opined that the new method increased their interest in the topic taught during the lecture. More than eighty percent participants felt method of introducing written test based on specific learning objectives caused increased their participation in the lecture. Eighty one percent participants opined that the method increased their involvement in the lecture. Level of attention during the lecture was reported by eighty six percent of participants. Huge agreement i.e. 91% was reported by participants for acquiring more information during the lecture taken by new method. Seventy four percent of participants reported that they could write answers to the most of the questions at the end of lecture. Eighty three percent of participants opined that department of surgery should continue using the method for future lectures [Table No. 1]. Statistical analysis was done to find out any difference in the opinions between male and female participants and t-value was calculated for each response item [Table No. 2 and 3]. No significant statistical difference was found between the responses of male and female participants. Response of the participants on Global Rating Scale showed maximum score from 7-9 indicated higher grading of the method [Fig. 1].

![Fig. 1 Distribution on Global Rating Scale](image-url)
Table No. 1 Distribution of responses with percentages

| Attribute                                                                 | Strongly agree (%) | Agree (%) | Not sure (%) | Disagree (%) | Strongly disagree (%) |
|---------------------------------------------------------------------------|--------------------|-----------|--------------|--------------|-----------------------|
| 1. I enjoyed the method of introducing specific learning objective based test during lecture | 17 (27.9)          | 36 (59)   | 05 (8.2)     | 03 (4.9)     | 00 (0)                |
| 2. I benefitted with the topics taught during lecture by this method      | 16 (26.2)          | 35 (57.4) | 07 (11.5)    | 01 (1.6)     | 02 (3.3)              |
| 3. The method increased my interest in lectures                           | 28 (45.9)          | 23 (37.7) | 08 (13.1)    | 02 (3.3)     | 00 (0)                |
| 4. It increased my participation in the lectures                          | 21 (34.4)          | 30 (49.2) | 05 (8.2)     | 05 (8.2)     | 00 (0)                |
| 5. It increased my involvement in the lectures                            | 18 (29.5)          | 32 (52.5) | 06 (9.8)     | 05 (8.2)     | 00 (0)                |
| 6. It raised level of my attention during lectures                       | 23 (37.7)          | 30 (49.2) | 05 (8.2)     | 03 (4.9)     | 00 (0)                |
| 7. I didn’t acquire more information during the lecture taken by the method | 11 (18)            | 45 (73.8) | 05 (8.2)     | 00 (0)       | 00 (0)                |
| 8. It helped me to focus and orient on what is important in the topic     | 19 (31.1)          | 33 (54.1) | 05 (8.2)     | 4 (6.6)      | 00 (0)                |
| 9. I couldn’t write answers to the most of questions in the test taken at the end of lecture | 15 (24.6)          | 31 (50.8) | 10 (16.4)    | 2 (3.3)      | 3 (4.9)               |
| 10. Department of surgery should continue using this method for subsequent lectures | 24 (39.3)          | 27 (44.3) | 08 (13.1)    | 00 (0)       | 02 (3.3)              |

Open ended feedback about the disadvantage of the new method was reported as no disadvantage by most of the participants but few participants suggested change of question set for the test taken after the lecture, allotment of marks for such tests, increase duration of lecture, use of more methods to boost recall ability, helping them develop habit of self directed learning, with few of the participants opined that use of question discussion rather than written test.

Table No. 2 Gender distribution of responses

| Attributes                                                                 | Male | Female | Male | Female | Male | Female | Male | Female | Male | Female |
|---------------------------------------------------------------------------|------|--------|------|--------|------|--------|------|--------|------|--------|
| 1. I enjoyed the method of introducing specific learning objective based test during lecture | 9    | 8      | 12   | 24     | 3    | 02     | 0    | 03     | 0    | 00     |
| 2. I benefitted with the topics taught during lecture by this method      | 9    | 7      | 11   | 24     | 3    | 04     | 01   | 00     | 0    | 02     |
| 3. The method increased my interest in lectures                           | 14   | 14     | 07   | 16     | 3    | 05     | 0    | 02     | 0    | 00     |
| 4. It increased my participation in the lectures                          | 12   | 09     | 10   | 20     | 1    | 04     | 01   | 04     | 0    | 00     |
| 5. It increased my involvement in the lectures                            | 09   | 09     | 11   | 21     | 3    | 03     | 01   | 04     | 0    | 00     |
| 6. It raised level of my attention during lectures                       | 11   | 12     | 10   | 20     | 3    | 02     | 0    | 03     | 0    | 00     |
| 7. I didn’t acquire more information during the lecture taken by the method | 6    | 05     | 17   | 28     | 1    | 04     | 0    | 00     | 0    | 00     |
| 8. It helped me to focus and orient on what is important in the topic     | 11   | 08     | 9    | 24     | 2    | 03     | 2    | 02     | 0    | 00     |
| 9. I couldn’t write answers to the most of questions in the test taken at the end of lecture | 05   | 10     | 11   | 20     | 6    | 04     | 01   | 03     | 0    | 01 (4.9) |
| 10. Department of surgery should continue using this method for subsequent lectures | 11   | 13     | 11   | 16     | 2    | 06     | 00   | 00     | 0    | 02     |
Table No. 3 Distribution of t-value

| Attribute                                                                 | Gender | Number | Mean | Std. deviation | Std. error mean | t-value |
|---------------------------------------------------------------------------|--------|--------|------|----------------|-----------------|---------|
| 1. I enjoyed the method of introducing specific learning objective based test during lecture | Male   | 24     | 4.2500 | .67566        | .13792          | 1.285   |
|                                                                           | Female | 37     | 4.0000 | .78174        | .12852          |         |
| 2. I benefitted with the topics taught during lecture by this method       | Male   | 24     | 4.1667 | .81650        | .16667          | 1.093   |
|                                                                           | Female | 37     | 3.9189 | .89376        | .14693          |         |
| 3. The method increased my interest in lectures                           | Male   | 24     | 4.4583 | .72106        | .14719          | 1.531   |
|                                                                           | Female | 37     | 4.1351 | .85512        | .14058          |         |
| 4. It increased my participation in the lectures                          | Male   | 24     | 4.3750 | .76967        | .15711          | 2.053   |
|                                                                           | Female | 37     | 3.9189 | .89376        | .14693          |         |
| 5. It increased my involvement in the lectures                            | Male   | 24     | 4.1667 | .81650        | .16667          | 0.984   |
|                                                                           | Female | 37     | 3.9459 | .88021        | .14471          |         |
| 6. It raised level of my attention during lectures                        | Male   | 24     | 4.3333 | .70196        | .14329          | 1.087   |
|                                                                           | Female | 37     | 4.1081 | .84274        | .13855          |         |
| 7. I didn’t acquire more information during the lecture taken by the method| Male   | 24     | 4.2083 | .50898        | .10389          | 1.375   |
|                                                                           | Female | 37     | 4.0270 | .49925        | .08208          |         |
| 8. It helped me to focus and orient on what is important in the topic      | Male   | 24     | 4.2083 | .93153        | .19015          | 0.852   |
|                                                                           | Female | 37     | 4.0270 | .72597        | .11935          |         |
| 9. I couldn’t write answers to the most of questions in the test taken at the end of lecture | Male   | 24     | 3.7500 | .98907        | .20189          | -0.751  |
|                                                                           | Female | 37     | 3.9459 | .99850        | .16415          |         |
| 10. Department of surgery should continue using this method for subsequent lectures | Male   | 24     | 4.3750 | .64690        | .13205          | 1.494   |
|                                                                           | Female | 37     | 4.0270 | 1.01342       | .16661          |         |

Maximum response was given by participants to an open ended question of suggestions to increase effectiveness of lecture. Comments received included use of chalk and blackboard, use of hand made diagrams, flowcharts, videos of cases and operative procedures, five minute break during the lecture, reference of the book for further reading and test with 25 MCQs at the end of module.

4. Discussion

The lecture is the most commonly used method for transferring information in medical education. Lecture is one of the established methods of large group teaching learning. Lectures in medical education often have a poor reputation. Lecture is frequently a one-way process unaccompanied by discussion, questioning or immediate practice, which makes it a poor teaching method. Lectures are generally described from the instructor’s point of view, and the student’s need for interaction with the instructor is not addressed. In fact, lack of interaction is considered one of the major limitations of the traditional lecture. Furthermore, when students have copies of the lecture notes or a text, a significant percentage would prefer reading them rather than attending classes that offer little or no interaction. Although, the lecture method is used extensively in medical education, academic physicians often are not trained in giving effective lectures. The lecture was established formally centuries ago as a teaching process that began with a literal reading of important passages from the text by the master, followed by the master’s interpretation of the text. Students were expected to sit, listen and take notes. Lectures are appropriate for motivating students, presenting overviews of broad areas of a subject and material not easily available otherwise. The lecture is simply an oral pre-sensation of instructional material.

Clinical teaching and learning must be an intellectually challenging experience whereby students, through extensive interactive teaching, are able to gain thorough conceptual understanding. Interactive learning is enhanced through the effective use of key teaching skills including questioning, demonstrating, providing positive reinforcement and reviewing. In the effective, active lecture the instructor involves students through a highly interactive and participatory approach using a variety of teaching techniques. Because of the questioning, interaction and involvement, students are actively engaged and connected to the educator. By contrast, in an ineffective, passive lecture, the instructor stands at a lectern and speaks with minimal student interaction. Not surprisingly, after a few minutes students find it difficult to
concentrate, as there is little or no stimulation. One of the most effective techniques an educator can use during a lecture to help ensure interaction is to ask and encourage questions. Questions can be used to introduce lectures, stimulate interaction throughout the lecture and summarize content. Involving students through questioning helps to maintain their attention, which is critical when topics are complex and lectures are long. There is need to move away from the traditional lecture to interactive computer learning systems that allow students access to information when and where they need it. Use of variety of teaching styles is also recommended with an emphasis on participatory and experiential learning.

Review of literature showed that use of written test during didactic lecture is rarely used in undergraduate medical teaching. With this background, present study was planned using written test during lecture and observing whether that results into increased interaction, attention, acquiring more information and ability to recall the gathered information.

The pre-test and post-test are designed using the learning objectives established for the module or topic. Both tests consist of the same test items. The pretest is given to students before beginning of lecture to measure how much they know about the topic. Pretests help measure true learning. By comparing pre and posttests, teachers can see what students actually learned from the lessons that were developed. Pretests can give students a preview of what will be expected of them. This helps students begin to focus on the key topics that will be covered.

In the present study, written test was given to the students using specific learning objectives before and after the lecture. Analysis of answer sheets showed marked improvement in ability of students recall the information and write proper answer.

Maximum number of participants reported satisfaction about the method of introducing test based on specific learning objectives during the surgery lecture. Maximum number of students opined that lecture taken with use of written test has increased their participation and involvement in the lecture which is one of the most important aspects of lecture as a large group teaching learning. Ability of new method resulting into more attention and acquisition of information during the lecture highlights key aspects of its effectiveness. Students also appreciated that they could write answers to the most of questions at the end of lecture taken by this method. Concrete evidence of success of this method was proved by participants wish to use this method for future lectures. This is substantiating evidence to our belief of this method making lecture more effective, interactive, two way communicative and active learning large group teaching method. This is beyond doubt proved as majority of participants reported no disadvantage of the present method.

Most important feedback was received to open ended questions. To the open ended questions of suggestions to improve effectiveness of lecture, participants responded by various thoughts. Majority of them suggested use of black board, hand made diagrams, video, procedures, case demonstrations can be added as one of the methods to make lecture more interesting and effective. This should overall, result into incorporating this habit into day today practice and improved learning amongst students and resulting into improved performance in the course end examinations. Few of the participants opined to allot marks to the tests. This can be the part of Classroom Assessment Techniques (CATs), which are generally simple, non-graded, anonymous and in-class activities designed to give useful feedback on the teaching-learning process as it is happening.

5. Conclusion

Lecture remains one of the established methods of large group teaching and learning. Use of test based on specific learning objective during lecture makes it effective and interactive.

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