

Evaluation of Case-Based Lectures for Teaching Medical Microbiology

Nazish Fatima¹, Mohammad Shameem², Nabeela³, Haris M Khan⁴

¹Assistant Professor, Department of Microbiology, Jawaharlal Nehru Medical College, U.P., India

²Associate Professor, Department of TB and Respiratory, Jawaharlal Nehru Medical College, U.P., India

³Research Assistant, Department of Microbiology, Jawaharlal Nehru Medical College, U.P., India

⁴Professor, Department of Microbiology, Jawaharlal Nehru Medical College, U.P., India

Abstract - Routinely for teaching large number of students, didactic lecture (DL) is used which is a teacher centered process, promotes passive learning and fails to motivate the students. Case based lecture (CBL) is an interactive student centered approach and promotes active learning. Hence the present study was undertaken to assess whether CBL is an effective teaching tool for the Medical Microbiology **and to evaluate students' perception about this new methodology.**

This study was conducted at department of Microbiology, JNMC, AMU, Aligarh. 30 students from second year MBBS were included in the study. First students had conventional didactic lecture (topic- Mycobacterium tuberculosis). feedback regarding didactic lecture topic was taken. Next time, these 30 students were exposed to case based lecture (topic- Mycobacterium leprae).

In the present study, same students participated in both the sessions. Students found CBL as a more effective tool for improving their learning, communication and analytical skills (99.9%, 99.9%, 99.6% respectively). Many students were (92.9%) neutral towards DL as regards clearance of their basic concepts. Indicating that case based lecture is an effective method in a large classroom setting than didactic lecture.

To improve the outcome of didactic lecture and to promote active learning, CBL can be an effective teaching tool.

Key Words: case based lecture, medical microbiology, active learning

1. INTRODUCTION:

In medical education, there are various methodologies of teaching and learning each having its own advantages and disadvantages. Routinely for teaching large number of students, didactic lecture (DL) is used. It is a teacher centered process, promotes passive learning and fails to motivate the students. Therefore in last few decades; concept of active learning has evolved (Sprawls et al, 2008). Case based learning is an interactive, student centered approach and promotes active learning (Thistlethwaite et al, 2012). It engages students in discussion of clinical case that resembles real life situation and provides information such as history, physical findings and laboratory results (Williams et al, 2005). Students interact with each other and work **together as a group to solve the case. The instructor's role is that of facilitator.** But this is a small group teaching method and requires large number of faculties.

In medical microbiology, students learn about various microorganisms and factors that lead to disease. In reality, patients present with various signs and symptoms which has to be correlated with **infectious agents and host's response** (Neal et al, 2012). In pure didactic lecture, this correlation is not possible. Incorporation of case in didactic lecture can solve this problem. Hence the present study was undertaken to assess whether interactive case-based lecture (CBL) is an effective teaching tool for the Medical Microbiology **and to evaluate medical students' perception about this new methodology.**

2. MATERIALS & METHODS:

This study was conducted at department of Microbiology, JNMC, AMU, Aligarh. Topic chosen for didactic and case based lecture were from must know area and of same difficulty index.

30 students from second year MBBS were included in the study. First students had conventional didactic lecture (topic-Mycobacterium tuberculosis). Feedback regarding didactic lecture topic was taken. Next time, these same 30 students were exposed to case based lecture (topic-Mycobacterium leprae).

Case Based Lecture

1. Case- 5 minutes
2. Faculty learner interaction- 10 minutes
3. Routine Lecture- 40 minutes
4. Faculty learner interaction on resolution of the case- 5 minutes.

Feedbacks regarding the methodology of DL & CBL and its usefulness were collected in the form of a feedback form from each student on Likert 5 point scale.

3. RESULTS:

In the present study, same students participated in both the sessions. Students found CBL as a more effective tool for improving their learning, communication and analytical skills (99.9%, 99.9%, 99.6% respectively) ($p < 0.001$). CBL was more helpful for rating the relevant information (99%) to the students ($p < 0.001$).

Many students were (92.9%) neutral towards DL as regards clearance of their basic concepts. Most students disagreed with DL as a tool for improving their learning and analytical skills (Table-1).

Higher percentage of students had given scores of 4 and 5 in CBL session than in DL session. Higher percentage of students had given scores of 4 and 5 in CBL session than in DL session. This indicates that CBL session was more effective than DL session in

understanding the topic and clearing the basic concepts (Table-2).

All these data indicate that case based lecture has significant positive impact and is superior to traditional lecture format with regards to achieving of learning objective, understanding of course content and retention of information. Also there are several positive outcomes like improved learning skills, independent learning abilities, analytical skill etc. Indicating that case based lecture is an effective method in a large classroom setting than didactic lecture.

4. DISCUSSION:

Most of Medical Microbiology Curriculum at undergraduate level in India is being taught through didactic lectures. A one hour theory class of 100-150 students is very monotonous with no active involvement of the students. In medical education, various teaching methods are adopted to increase student motivation and enhance active learning. The introduction of an interactive student-centered approach has dramatically changed the way students learn.

The advantages of the case-based method are the promotion of self-directed learning, clinical reasoning, clinical problem-solving, and decision making by providing repeated experiences in class with a collegial infrastructure and by focusing the student on the complexity of clinical care (Richards & Inglehart 2006, p284). The present study was carried out to determine whether interactive, case-based lecture is an effective teaching tool for the Medical **Microbiology and to measure medical students'** perception about this new methodology.

Our study shows that student feedback further supports continued use of the case based tutorials. In our study we observed that CBL had improved learning skills & abilities. CBL integrates the students learning in the context of authentic clinical scenarios involving individual or groups of patients (Bair 1980). However these benefits come with the cost of changing traditional roles and responsibilities of

student and teacher to make the most of CBL (Sutyak et al. 1996).

More reliable however are the studies that have shown that students enjoy CBL and are better able to connect theory to clinical practice (Hansen 2005) as well as improvements in the engagement of students, with CBL fostering more active and collaborative learners (Hakkarainen et al. 2007).

In the present study, most of the students felt that CBL had enhanced their communication & analytical skills. Similar to our study, Suvarna S.T. & A.L. Singh found that CBL improves communication skills. Retention of learned material is better if the learning course occurs around the realistic problems (Ciraj AM et al, 2010). The students make interactions with each other & with the faculty to solve the problem.

Teaching Medical Microbiology through CBL would help the students to link the knowledge of basic science and its clinical application (Neal et al, 2012; Ciraj et al, 2010; Blewett et al, 2009). In situation like our where the student class size is large (~ 150 students) CBL can be an effective teaching tool at the hands of the teacher.

However, our study was limited in comparing the effect of CBL on academic performance. We did not assess the students in the form of a theory exam after the DL & CBL.

5. CONCLUSIONS:

Our data showed that, case based lecture was more effective than didactic lecture in understanding the topic, clearing the basic concepts and in retention of knowledge. Also there are several positive outcomes like improved learning skills, independent learning abilities, analytical skills and communication skills etc. Indicating that case based lecture is an effective method in a large classroom setting than conventional didactic lecture to promote active learning among the students. We suggest Case Based Lectures should be incorporated as a teaching method in the undergraduates (MBBS &

BDS) curriculum for medical microbiology classes.

REFERENCES:

1. Sprawls P. Evolving models for medical physics education and training: a global perspective (2008). *Biomed Imaging intervention J.* 4:e16.
2. Thistlethwaite JE, Davies D, Ekeocha S, Kidd JM, MacDougall C, Matthews P, et al (2012). The effectiveness of case-based learning in health professional education. A BEME systematic review: BEME Guide No. 23. *Med Teach.* 34: e421-4.
3. Williams B (2005). Case based learning: A review of the literature: Is there scope for this educational paradigm in prehospital education? *Emerg Med J.* 22: 577-81
4. Neal R, Chamberlain, Melissa K, Stuart, Vineet K, Singh, Neil J, Sargentini (2012). Utilization of case presentations in medical microbiology to enhance relevance of basic science for medical students. *Medical Education Online* vol.17.
5. Richards P. S, Inglehart M. R. (2006). An interdisciplinary approach to case-based teaching: does it create patient-centered and culturally sensitive providers? *J Dent Educ* 70(3): 284-291.
6. Bair C W. (1980). Teaching community diagnosis to medical students: evaluation of a case study approach. *Journal of Community Health* 6(1): 54-64.
7. Sutyak J. P., Lebeau R. B, Spotnitz AJ, O'Donnell AM, Mehne PR. (1996). Role of case structure and prior experience in a case-based surgical clerkship. *American Journal of Surgery* 172(3): 286-290.
8. Hansen W F, Ferguson K J, Sipe CS, Sorosky J. (2005). Attitudes of faculty and students toward case-based learning in the third-year obstetrics and gynecology clerkship. *American Journal of Obstetrics & Gynecology* 192(2): 644-647.

9. Hakkarainen P, Saarelainen T, Ruokamo H. (2007). Towards meaningful learning through digital video supported, case based teaching. *Australasian Journal of Educational Technology* 23(1): 87-109.
10. Suvarna S. T., A.L.Singh (2014). Case based lectures versus conventional lectures for teaching medical Microbiology to undergraduate students. *IJCRR* 06 (04): 35-41.
11. Ciraj AM, Vinod P, Ramnarayan K (2010). Enhancing active learning in microbiology through case-based learning: Experiences from an Indian medical school. *Indian J Pathol Microbiol.*53:729-33.
12. Neal R.Chamberlain, Melissa K.Stuart, Vineet K.Singh and Neil J.Sargentini (2012). Utilization of case presentations in medical microbiology to enhance relevance of basic science for medical students.*Medical Education Online* vol.17.
13. Blewett EL, Kisamore JL (2009). Evaluation of an interactive, case-based review session in teaching medical microbiology. *BMC Med Educ.*9:56.