

Effectiveness of “case-based learning” in physiology

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ABSTRACT


Background: Physiology is the link between the basic sciences and medicine. Students learn human physiology by attending theory as well as practical classes. Some of the common clinical conditions such as anemia, jaundice can be discussed in the form of “case-based learning (scenarios),” which engages students in discussion. **Aims and Objective:** To know the effectiveness of case-based learning in physiology among first-year medical students and their perception toward case-based learning. **Materials and Methods:** Interventional study was conducted on 100 medical students, appearing for exam in the month of July and August 2015, dividing them into groups and subgroups. Pre- and Posttest were conducted for knowledge assessment and for perception questionnaire method was used, which was validated by pilot study. Results were analyzed using paired “t” test. **Result:** For some of the clinical conditions, students preferred case-based learning along with regular traditional teaching and there is a highly significant increase in scores of pre- and posttest. (*p* value < 0.001). **Conclusion:** With benefits of interactive teaching (case-based learning), this type of learning can be incorporated during teaching-learning methodologies.

KEY WORDS: Case-Based Learning; Lecture; Students; Physiology

INTRODUCTION

The aim of education process in medical colleges is to produce a competent practitioner having orientation of the health problems of the community.^[1] Human anatomy, human physiology, and clinical biochemistry are taught to the first-phase medical students in their medical course. Physiology is the link between the basic sciences and medicine.^[2] Students learn human physiology by attending theory as well as practical classes. For a large-group teaching, lectures are one of the oldest and most common forms of delivery of information to the students.^[2] Though lectures are generally used to teach new knowledge, the disadvantage is that the audience is usually passive and therefore may be unengaged.^[3,4]

Some of the common clinical conditions such as anemia, jaundice, diabetes mellitus, shock, and thyrotoxicosis can be discussed in the form of “case-based learning (scenarios),” which engages students in discussion. The students should understand the human physiology for better understanding of pathophysiology of diseases and clinical subjects and the Medical Council of India (MCI) has also advised that early exposure of the clinical case to medical students will benefit them to create interest in learning.^[5] As students are involved in the discussion of the cases, involvement creates interest among them, stimulates further reading, and will be easy for them to remember the things better. As there are less number of studies related to the case-based learning in physiology and it is already near to the end of the course, 95% of the portion being covered, so we have chosen this study to know the effectiveness of case-based learning in learning for the first-year medical students and their (student) feedback regarding their perception of case-based learning.

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MATERIALS AND METHODS

The interventional study was conducted in the Department of Physiology, Navodaya Medical College, Raichur, Karnataka, India,

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after obtaining ethical clearance certificate from the Institutional Research Ethical Committee (Human), during the period May till September 2015. The study included, 100 first-year medical students admitted to course during 2014 to 2015. The common clinical conditions such as anemia, jaundice, shock, hyperthyroidism, and diabetes mellitus (covered in portion with didactic lecture during their course) were selected for discussion.

All the volunteers, 100 medical students were divided in to five groups with 20 students in each group on random basis for each session. In each session, students were divided in to five subgroups with four students in each group and 2 hours of intra- and intergroup discussions were conducted. Such five sessions were conducted. Topic was informed 2 days prior to the discussion. Before the discussion, pretest was conducted to assess the knowledge, with the help of multiple choice questions. After the case-based learning, posttest was conducted to assess their knowledge with help of MCQS at the end of session. The scores obtained were compared to assess the knowledge with the effectiveness of case-based learning. At the same time, student feedback regarding perception was collected about the case-based learning.

The whole session was conducted as shown in Table 1. In this way, five sessions were conducted with 20 students in each group.

Statistical Analysis

The results were expressed in terms of mean \pm standard deviation (SD). The test of significance used was Student's "*t*" test (paired *t*-test) and a "*p*" value less than 0.05 was considered statistically significant. The data were analyzed by using SPSS statistical software, version 17.0. Microsoft Word and Excel have been used to generate graphs, tables, and so on.

RESULT

The interventional study was conducted in the Department of Physiology for the first-year medical students appearing for the exam in the month of July 2015 and feedback was collected. All the students were belonging to the age group 19 to 20 years. Among the 100 students, 40 students were belonging to common entrance test quota and 60 students were belonging

to management quota. A total of 30 female students and 70 male students participated in this study.

The scores of pre- and posttest are represented in Table 2.

There is statistically highly significant difference in the scores of pretest and posttest. A total of 95% students told that this type of teaching method is helpful for better understanding. Perception regarding the case-based learning is represented in Table 3.

DISCUSSION

The interventional study was conducted in the Department of Physiology, to know the effectiveness of case-based learning in learning for first-year medical students and to know their feedback regarding their perception of case-based learning. Case-based learning creates self interest in reading in the students. During the discussion, there will be interaction with other colleagues. It is helpful for understanding the concepts and it is a better method for obtaining the knowledge. As there is interaction with students, the students feel better and their active involvement can be seen. But there should be adequate time for conducting this study. This method can be used as a teaching tool for the students for learning some of the common clinical conditions during the first year, so that the students will get exposure to clinical case and it will also create interest in them.

Case studies are scenarios that apply concepts learned in class to a "real-life" situation. They are usually presented in narrative form and often involve problem-solving, links to course readings or source materials, and discussions by groups of students, or the entire class. Usually, the case studies are most effective if they are presented sequentially, so that students receive additional information as the case unfolds, and can continue to analyze or critique the situation/problem.^[6] This is one of the most interactive teaching style.

Interactive lecturing promotes active involvement, increases attention and motivation, and acts as a different kind of learning. It gives feedback to teacher and students.^[7] Interactions allow discussion, reduce the monotony of passive learning, and enhance the student's level of understanding and their ability to synthesize and integrate material.^[8,9] The educational research has shown that students who are actively involved in learning will learn more than the students who are passive recipients of knowledge.^[10]

Table 1: Time duration of different activities of teaching aids

S no	Duration (min)	Activity	Teaching aids
1	12	Pretest conducted	
2	3	Dividing the 20 students into five groups with 3-4 students in each group and allotted one case scenario for each group (total six case scenarios)	
3	10	Intragroup discussion	
4	11	Intergroup discussion with facilitator for one case	Blackboard
5	3	Summary by the facilitator	Blackboard and PowerPoint presentation
6	12	Posttest conducted and students were allowed to the fill the feedback form for perception	

Table 2: Pre- and posttest scores to assess the knowledge (for 30)

Parameters	Pretest scores (Mean \pm SD)	Posttest scores (Mean \pm SD)	t value	p value	Significance
All students (N=100)	19.80 \pm 4.49	23.40 \pm 3.33	-17.08	0.0001 (<0.001)	Highly significant
Girls (N=30)	20.33 \pm 4.59	23.93 \pm 2.94	-9.57	0.0001 (<0.001)	Highly significant
Boys (N=70)	19.57 \pm 4.46	23.17 \pm 3.48	-14.06	0.0001 (<0.001)	Highly significant
CET students (N=40)	21.15 \pm 3.47	24.05 \pm 3.00	-15.36	0.0001 (<0.001)	Highly significant
Management students (N=60)	19.00 \pm 4.85	22.87 \pm 3.47	-13.22	0.0001 (<0.001)	Highly significant

Table 3: Perception regarding the case-based learning

		Yes	Not much	No
1	Is this teaching method in physiology helpful in better understanding?	95	05	00
2	Do you think your interest toward learning has increased?	90	08	02
3	Is it helpful to change your attitude while studying?	91	07	03
4	Does it give you encouragement for self-directed learning?	89	07	05
5	Is this process helpful to clear your doubts?	97	03	00
6	Do you think the facilitator was helpful?	98	02	00
7	Do you think this is conducted in systematic manner?	96	04	00
8	Do you think your colleagues are actively involved in discussion?	88	12	00
9	Can it be introduced as a new teaching-learning method for next batches?	90	10	00

Interactive teaching styles incorporate a multitude of goals beneath a single roof. Interactive classes are designed around a simple principle: Without practical application, students often fail to comprehend the depths of the study material. Whereas students often lose interest during lecture-style teaching, interactive teaching styles promote an atmosphere of attention and participation making it interesting, exciting, and creating fun. Telling is not teaching and listening is not learning. Case-based teaching enhances the development of skills in analytical thinking and reflective judgment by reading and discussing complex, real-life scenarios in students.

CONCLUSION

With the benefits of interactive teaching, this type of learning can be incorporated during teaching-learning methodologies.

REFERENCES

- Milaat WA, El-Gamal FM. Factors affecting the use and attitude towards medical resources and educational methods in a Saudi medical school. *Ann Saudi Med.* 1994;14(3):209-14.
- Bennal A, Itagi V, Taklikar RH. Role of audio-visual aids in physiology lecture. *Natl J Physiol Pharm Pharmacol.* 2014;4(2):109-11.
- Richardson D. Don't dump the didactic lecture; fix it. *Adv Physiol Educ.* 2008;32(1):23-4.
- Brown G, Manogue M. AMEE Medical Education Guide No. 22: Refreshing lecturing: a guide for lectures. *Med Teach.* 2001; 23(3):231-44.
- Medical Council of India. Vision 2015. New Delhi, India: Medical Council of India, 2011. p. 12.
- Concordia Online Education. Interactive teaching styles used in the classroom. *Education Technology.* November 2, 2012.
- Steinert Y, Snell LS. Interactive lecturing: strategies for increasing participation in large group presentations. *Med Teach.* 1999; 21(1):37-42.
- Rao SP, Dicarolo SE. Active learning of respiratory physiology improves performance on respiratory physiology examinations. *Adv Physiol Edu.* 2001;25(1-4):127-33.
- Chailwant KS. Comparison of two teaching methods, structured interactive lectures and conventional lecture. *Biomed Res.* 2012; 23(3):363-6.
- Butler JA. Use of teaching methods within the lecture format. *Med Teach.* 1992;14(1):11-25.

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