International Journal of Contemporary Pediatrics
Rehna T et al. Int J Contemp Pediatr. 2019 Sep;6(5):2137-2142
http://www.ijpediatrics.com
pISSN 2349-3283 | eISSN 2349-3291

DOI: http://dx.doi.org/10.18203/2349-3291.ijcp20193740

Original Research Article

Effectiveness of case scenario-based learning over didactic lectures on teaching pediatric infectious diseases to undergraduate medical students

Rehna T., Robin Joseph Abraham*

Department of Pediatrics, Al-Azhar Medical College, Ezhalloor, Thodupuzha, Kerala, India

Received: 14 June 2019
Accepted: 03 August 2019

***Correspondence:**
Dr. Robin Joseph Abraham,
E-mail: drrjabraham@gmail.com

ABSTRACT

Background: Case scenario based learning offers an interactive approach in medical education. It can be either as case based or problem based. objectives of This study compared the effectiveness of Case scenario based learning (CBL) over didactic lectures (DL) among final year part II M.B.B.S students. It also compared the student's perception between the two methods.
Methods: This interventional study was done in the Department of Pediatrics, Al- Azhar Medical College, Kerala for a period of two months. The participants(n=120) were divided into two groups- A and B who had respectively attended three sessions of CBL and DL on Pediatric infectious diseases. A test was conducted at the end of each session and after 2 weeks in the form of SAQs. A questionnaire was given to the participants about their perception. The data was analysed in SPSS 16 using unpaired t test and Mann- Whitney U test.
Results: The mean exam scores for immediate tests were 26.04±1.9 and 19.47±2.8 for Batch A and Batch B respectively. The mean exam scores for the test conducted after two weeks showed significant result with 24.0±2.56 and 18.58±4.03 for Batch A and B respectively. Comparison of student's perception on Likert's scale about the teaching method yielded significant difference for CBL over DL with $p<0.001$.
Conclusions: Case scenario based learning is an innovative method which is sure to invoke more interest and academic excellence in medical students.

Keywords: Case scenario based learning, Didactic lectures, MBBS Students, Perception

INTRODUCTION

Innovative methods are the need of the hour. Scenario based learning offers an interactive approach where case scenarios are provided to students to support active learning. It can be either as case based or as problem based. The success of scenario-based learning depends on the quality of the scenarios.[1] Presenting clinical case scenarios are the starting point for learning in this method. By working through these problems, students think critically about the nature of the problem, generate ideas, and acquire the knowledge and skills required to become a doctor.[2] According to Kindley, learning takes place best in the context in which it is going to be used and that knowledge is best acquired and more fully understood when situated within its context.[3]

A recent medical graduates of problem based environments showed better competency in social and cognitive domains and in their application skills.[4] The results of the current meta-analysis done by Kong indicate that problem-based learning might help students

to improve their critical thinking.[5] Medical graduates who were exposed to learning problem based were more up to date that those exposed to traditional teaching.[6] Case based learning is an efficient teaching learning method in terms of retention of knowledge.[7] According to a study student in the problem based group gained more knowledge and had higher motivation toward learning compared to students in the lecture group.[8]

Sunil Nettath evaluated the efficacy of problem-based learning in 13 medical students using problem-case scenario. He found that the test scores and perception were good with the intervention group leading to the conclusion that it is an efficient teaching learning method.[9] In the study conducted by Parisa et al, students preferred case based learning because of motivation boost, quality learning, practical usefulness of contents and knowledge retention . It was also found that lecture method was considered more effective in answering exam questions.[10]

Case based learning was able to improve the medical educational environment.[11] Review of randomised control trials found online problem based learning is an useful method for continuing medical education, but there is limited evidence that it would enhance physicians' performance or improve health outcomes.[12] Khan on his study of problem based learning versus lecture on the knowledge and attitude of students found that both groups demonstrated a similar level of knowledge.[13]

Goodyear found that on his study on fourteen senior house officers in Birmingham, learning outcomes were similar in both groups.[14] Considering students' satisfaction, study done by Dehkordi showed that students prefer problem based learning.[15] Mohammads Zahid found that problem based curriculum students performed significantly better than the lecture-based curriculum students both in theoretical knowledge and clinical examination.[16]

There are many advantages of case scenario-based learning over traditional lectures. In didactic lectures, teachers are just providers of information. Interactive discussion is least in didactic lectures. Case based learning helps to invoke interest about the topic in students. It also gives them an idea about how a given patient may present to them in their practice and will help them to go about in a systematic manner to diagnose and treat a patient. Hence, the present study was undertaken with the objectives to know whether case scenario-based learning is more effective than didactic lecture in teaching undergraduates. The student's perception about the teaching learning method also was assessed.

Objectives

- To compare the effectiveness of case scenario-based learning (CBL) over didactic lecture (DL) in teaching infectious diseases to medical undergraduates.
- To assess the student's perception about case scenario based learning and didactic lectures.

METHODS

An Interventional study conducted in the rural field practice area of Department of Pediatrics, Al-Azhar Medical College and Super Speciality Hospital, Thodupuzha, Kerala, India. Study was conducted for the period of two months and 120 students of final year part II M.B.B.S was enrolled into the study.

Inclusion criteria

Students of Final year part II M.B.B.S of Al-Azhar Medical College, Thodupuzha, Kerala, India.

Exclusion criteria

Students who were absent in any one of the classes were excluded from the study.

The study was conducted after obtaining clearance from the Institutional Research Board and Institutional Ethical Committee. 120 students of final year part II M.B.B.S was enrolled into the study after obtaining Informed consent. Students were divided into 2 groups of 60 by lottery method - Group A and Group B.

Group A was given case scenario based learning (CBL) and Group B was given power point aided didactic lectures(DL). Both groups were given three sessions of Case scenario based learning (CBL) and Didactic lectures (DL) on Pediatric infectious diseases at two different venues simultaneously. The duration of each session was one hour. The topics taken during three classes were Malaria, Dengue and Typhoid.

A written test in the form of Short Answer Questions (SAQs) was conducted immediately after the respective session and two weeks after the end of the intervention. A peer validated questionnaire with eight questions was also given to assess the student's perception based on a five point Likert scale at the end of intervention. Parameters were graded as follows. Parameters: 1-5 grading(1=Strongly disagree, 2=disagree, 3=Neutral, 4=Agree, 5=Strongly agree). A cross over between two groups was done after that to avoid ethical issues. A schematic representation of the research methodology is given in Figure 1.

Statistical analysis

The data was entered into Excel sheet and analysed using SPSS 16. Continuous variables will be expressed as mean±SD. Unpaired t test was done for descriptive variables. Mann-Whitney U test was done to analyse perceptions of the students. p value ≤ 0.05 will be considered as statistically significant.

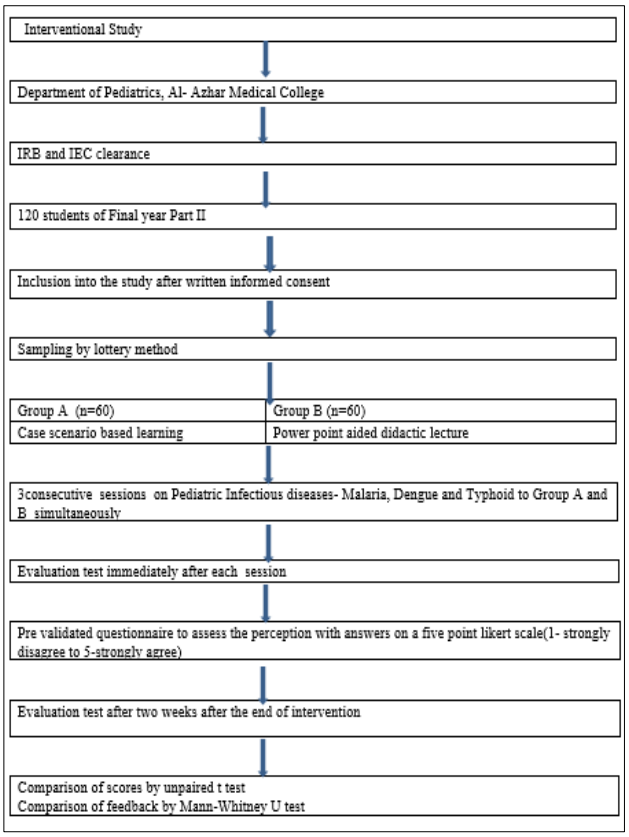

Figure 1: Schematic representation of research methodology.

RESULTS

There were 120 participants for the study - 60 in Group A (CBL) and Group B (DL). All students were present during all the three sessions.

Table 1: Comparison of marks of three immediate evaluation tests between the groups.

Topics	Groups	Marks (Mean±SD)	t	p-value
Malaria	Group A (n=60)	8.12±1.01	-6.8	0.009
	Group B (n=60)	6.5±1.42		
Dengue	Group A (n=60)	9.317±0.79	-9.84	0.001
	Group B (n=60)	6.82±1.79		
Typhoid	Group A (n=60)	8.6±1.29	-8.9	0.003
	Group B (n=60)	6.07±1.76		

An evaluation test was conducted immediately after the respective sessions on Malaria, Dengue and Typhoid. It is found that in all the three tests conducted after the respective sessions CBL group scored better than the DL group with statistically significant results of p <0.05.The comparison of marks of the three immediate evaluation tests were given in Table 1.

The mean of the consolidated marks of three immediate evaluation tests were 26.04±1.9 for group A and 19.47±2.8 for Group B (out of 30 marks).

The results were statistically significant for CBL group in all the exams with p value of 0.002. (p<0.05 is taken as significant). The comparison of the consolidated marks of the three immediate evaluation tests were given in Table 2.

Table 2 : Comparison of consolidated marks of three immediate evaluation tests between the groups.

Group	Marks(Mean±SD)	t value	p value
Group A (n=60)	26.04±1.9	-14.95	-0.002
Group B (n=60)	19.47±2.8		

The marks of the test conducted 2 weeks after the end of intervention were compared between two groups.

The mean exam scores for the test conducted after two weeks were 24.0±2.56 for group A and 18.58±4.03 for group B (out of 30 marks). It is found that the mean marks for CBL group was better than DL group. The results were statistically significant with a p value of <0.001. The results are given in Table 3.

Table 3: Comparison of marks of evaluation test conducted after 2 weeks between the groups.

Group	Marks (Mean±SD)	t value	p value
Group A(n=60)	24.0±2.56	-8.8	<0.001
Group B(n=60)	18.58±4.03		

The perceptions of the students about the two teaching learning methods were assessed with a peer validated questionnaire using five-point likert scale. The perceptions of two groups are given in figures 1 and 2. The analysis of the perceptions of both groups are summarised in table 4.

The analysis of perceptions between two groups was done using Mann Whitney U test.

Perception of students regarding the two teaching learning methods using 5-point Likert scale yielded a favourable response for CBL over DL. In all the questions asked to the students, CBL group scored over the DL group. The results were statistically significant with p value of <0.001.

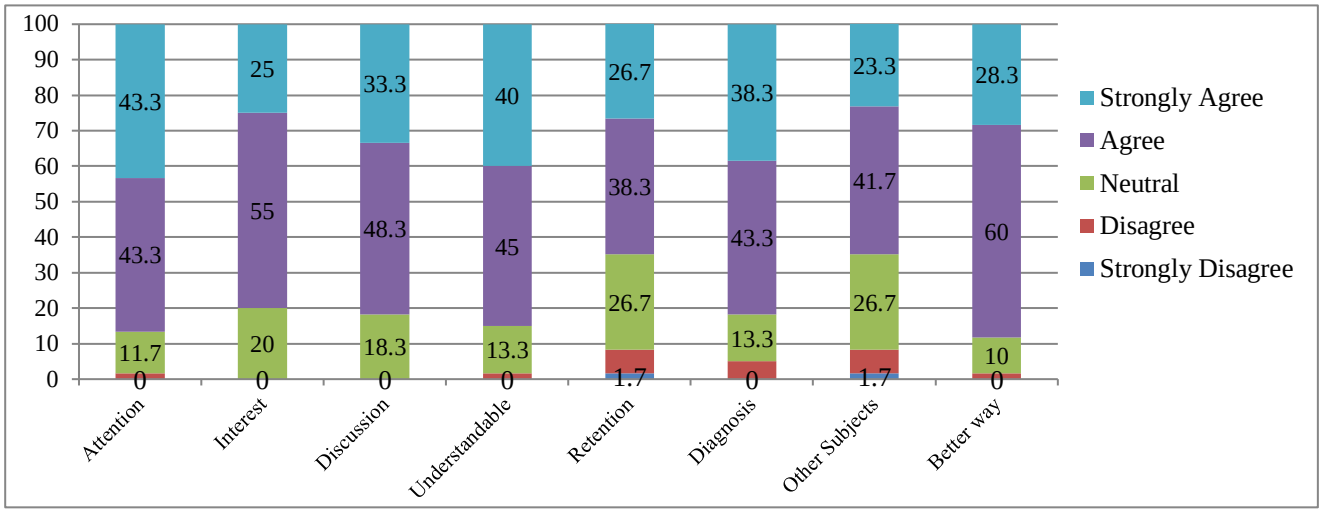

Figure 2: Perception of CBL group students.

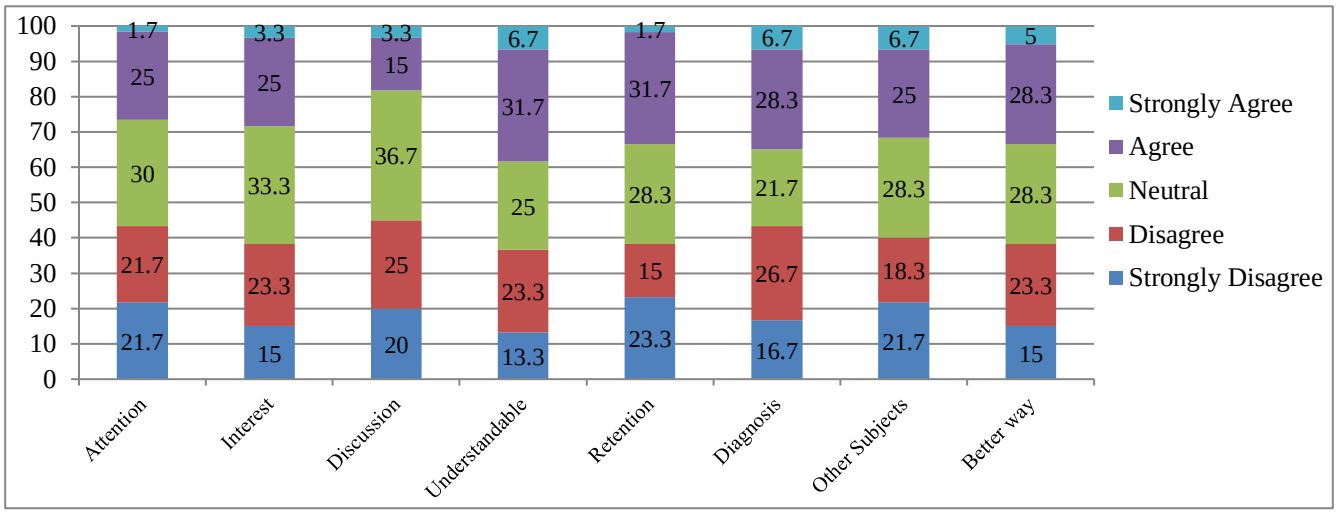

Figure 3: Perception of DL Group student.

Table 4 : Comparison of perceptions of students between two groups.

Perception	Mean rank		Z	p
	CBL	DL		
This teaching method can maintain the attention of the students throughout.	83.01	37.99	-7.323	<0.001
This teaching method can generate genuine interest in the subject	79.62	41.38	-6.306	<0.001
This method can generate interactive discussion	82.99	38.01	-7.312	<0.001
This teaching method is suitable to make infectious diseases easily understandable	78.81	42.19	-6.005	<0.001
This method helps in retaining the knowledge for a long time.	75.09	45.91	-4.764	<0.001
This method of teaching helps in better diagnostic abilities	78.55	42.45	-5.886	<0.001
This method can be adopted for teaching other subjects	74.25	46.75	-4.477	<0.001
This method is a better way of learning	79.59	41.41	-6.338	<0.001

DISCUSSION

This study was carried out with the objectives of comparing case scenario-based learning with didactic lectures in teaching pediatric infectious diseases to medical undergraduates. The student's perception about these two teaching learning methods was also compared and analyzed.

In this era of Competency Based Medical Education, newer innovative methods for medical undergraduates are required. Patient oriented problems stimulate students to critically analyse the problems and find out the answers rationally.17 Our study found that the participants of Case scenario-based learning had better scores than the lecture group in the tests conducted immediately after the session. This proves the point that the CBL group gained better knowledge from the session. The results were consistent with the study.[6]

The fact that the mean marks of CBL were significantly higher in the test conducted after 2 weeks compared to DL group. The results were consistent with the study by Imran et al, where case-based learning group had more retention of knowledge.[7] This is one of the few studies that showed that the Problem based learning had better outcome than other methods of learning.

Case based learning makes the topic interesting and easily understandable as shown in this study. The results were statistically significant with p value <0.001. Problem based group gained more knowledge and had higher motivation than the students in traditional lecture group.[8]

In this study it was found that CBL group had better attention span and interest in learning as compared to DL group. Test scores and perception were good with the Problem based learning group leading to the conclusion that it is better learning method.[9]

The students felt Case scenario-based learning was able to maintain their attention, generate interest and have interactive discussion. They also opined that CBL helped in understanding the infectious diseases more easily and helped in better diagnostic abilities. They felt that CBL can be adopted for teaching other subjects and it is a better way of learning. In short, it was statistically proven in our study that Case scenario-based learning was preferred over didactic lectures as a better way of learning with p value<0.001.

Limitations of this study was done on a single semester participant of a single institution. Hence it cannot be generalised to the entire population of students. Only three sessions were done in both groups due to time constraint. Self- answered feedback may not be reflective of actual learning process.

CONCLUSION

Student's perception regarding the learning experience was superior for the Case scenario-based learning than the traditional didactic lectures. Participants of cases-based learning scored better in the immediate evaluation test. There was significant increase in evaluation test conducted after 2 weeks proving that case scenario-based learning helped students in retaining the knowledge and applying the concepts. Case scenario-based learning methods can make the subjects more interesting and appealing to medical students.

Recommendations

Innovative teaching learning methods such as case scenario based learning must be encouraged to improve the learning process in undergraduates.

ACKNOWLEDGEMENTS

This study was undertaken as part of the Advance course in Medical Education. Authors hereby wish to acknowledge the MCI Nodal centre, Kottayam for all the guidance. Authors also wish to thank all faculty of Department of Pediatrics, Al-Azhar Medical College where the study was carried out for all their help and support. Authors also want to thank Department of Community Medicine for the help rendered to us in statistical analysis.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee(IEC) with reference to IEC. No AAMC/IEC/2018-19/6 dated 08 -02- 2019.

REFERENCES

1. Wood DF. ABC of learning and teaching in medicine Problem based learning. BMJ. 2003;326(7384):328.
2. Onyon C. Problem-based learning: a review of the educational and psychological theory. Clin Teach. 2012;9(1):22-6.
3. Kindley, Randall W. Scenario-based e-learning: a step beyond traditional e-learning. ASTD Magazine. Available at: http://www.astd.org. Accessed 29 October 2018.
4. Koh GC, Khoo HE, Wong ML, Koh D. The effects of problem-based learning during medical school on physician competency: a systematic review. CMAJ. 2008;178(1):34-41.
5. Kong LN, Qin B, Zhou YQ, Mou SY, Gao HM. The effectiveness of problem-based learning on development of nursing students' critical thinking: A systematic review and meta-analysis. Int J Nursing Studies. 2014;51(3):458-69.
6. Shin JH, Haynes RB, Johnston ME. Effect of problem based self-directed undergraduate education on lifelong learning. CMAJ. 1993;148:969-76.
7. Imran M, Shamsi MS, Singh A, Goel S, Sharma P, Panesar S. Problem-based learning versus lecture-based learning in pharmacology in a junior doctor teaching program: a crossover study from northern India. Int J of Research in Medical Sciences. 2015;3(11):3296-9.
8. Shin SJH, Haynes RB, Johnston ME. Effect of problem-based, self-directed undergraduate

education on life-long learning. CMAJ. 1993;148: 969-76.
9. Nettath S. Problem based learning as an efficient teaching and learning method for small group teaching-its evaluation and medical student's perception. IOSR J Dental and Medical Sciences. 2013;11(4):83-6.
10. Khoshnevisasi P, Sadeghzadeh M, Mazloomzadeh S, Feshareki RH, Ahmadiafshar A. Comparison of Problem-based Learning with Lecture-based Learning; Iran Red Crescent Med J: May 2014; 16(5):5186.
11. Qin Y, Wang Y, Floden RE. The Effect of Problem-Based Learning on Improvement of the Medical Educational Environment: A Systematic Review and Meta-Analysis: Med Pract. 2016;25(6):525-32.
12. Azri AH, Ratnapalan S. Problem-based learning in continuing medical education: review of randomized controlled trials: Can Fam Physician. 2014 Feb;60(2):157-65.
13. Khan H, Taqui AM, Khawaja MR, Fatmi Z. Problem-based versus conventional curricula: influence on knowledge and attitudes of medical students towards health research. PLoS One. 2007;2(7):5186.
14. Goodyear HM. Problem based learning in a junior doctor teaching programme. Arch Dis Child. 2005;90(3):275-8.
15. Dehkordi AH, Heydarnejad MS. The impact of problem-based learning and lecturing on the behavior and attitudes of Iranian nursing students. A randomised controlled trial. Dan Med Bull. 2008;55(4):224-6.
16. Zahid MA, Varghese R, Mohammed AM, Ayed AK. Comparison of the problem based learning-driven with the traditional didactic-lecture-based curricula:Int J Med Educ. 2016;7:181-7.
17. Indla R, Chinnathambi T, Roy R, Kuruvilla A. Introduction to concept of personal drugs, essential drug list and awareness of cost of drugs. Int J Basic Clin Pharmacol. 2014;3(4):696-700.

Cite this article as: Rehna T, Abraham RJ. Effectiveness of case scenario based learning over didactic lectures on teaching pediatric infectious diseases to undergraduate medical students. Int J Contemp Pediatr 2019;6:2137-42.