

A COMPARATIVE STUDY OF TEAM-BASED LEARNING ON THE TRADITIONAL METHOD OF CONDUCTING TUTORIALS IN PHYSIOLOGY FOR FIRST YEAR MBBS STUDENTS

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ABSTRACT

BACKGROUND

In medical education, didactic lectures, tutorials, bedside clinics, etc. are some of the teaching-learning method incorporated in the curriculum. Most of the methods are teacher oriented where students are not involved much. Active participation of the students, i.e. student centered approach increases the understanding of the subject. In physiology, the tutorials are conducted to discuss the individual topics. It was observed that active participation of students in physiology tutorials is less. This study was undertaken to actively involve the students during tutorials and to assess their understanding by Team-Based Learning (TBL).

MATERIALS AND METHODS

In this study, the performance of the students in team-based learning was compared with the traditional learning. The pretest and post-test was conducted at the beginning and at the end of the tutorial in both the groups. In the study group, the tutorial topics were discussed in teams, whereas in control group, the tutorial was conducted by traditional method.

RESULTS

There was a significant increase in performance in post-test in study group compared to control group ($p < 0.001$). TBL sessions will be more interesting and interacting compared to traditional method. TBL method improves the student's understanding of the topics in detail and hence enhances the performance.

CONCLUSION

The different teaching-learning methods, which increase the student's involvement should be implemented in the medical education to facilitate the learning process.

KEYWORDS

Team-Based Learning (TBL), Physiology, Tutorial.

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BACKGROUND

Challenges within tertiary education include reductions in university funding, increasing student numbers and decreasing academic staff numbers. TBL is a teacher directed and student centered method for incorporating multiple small groups (generally five to seven learners per group) into a single classroom setting usually with a single instructor. Team-based learning involves the students in discussion and teamwork to improve knowledge. The curriculum leaders find TBL attractive because it requires fewer faculty than other small group instructional methods.¹

The traditional way of conducting the tutorials need the preparation of the topics by the students and the teacher will discuss that through the questionnaire. The traditional way of conducting the tutorials does not focus on the core syllabus, also the students as a whole group do not participate actively and a very limited, usually meritorious involve in the discussions during tutorials. This will affect the teaching-learning process and thereby the performance of most of the students. Team-based learning facilitates the student in increasing his responsibility for acquisition of knowledge. The team-based learning helps in learning the complicated topics and enhances the long-term retention and critical thinking in the physiology course.² TBL is a teacher-directed method that promotes application of knowledge using small groups in a single venue.³ A number of studies indicate that active learning, especially the use of small group activities improves student's performance and enthusiasm in diverse college courses.⁴⁻⁸ There are however conflicting data on whether TBL improves knowledge outcomes compared to other educational techniques. Hence,

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this study was conducted to assess the knowledge outcomes in TBL.

We hypothesised that TBL would be effective method of conducting tutorials in physiology to improve the involvement of learners and knowledge outcomes. This study was undertaken to compare the performance of the students in team-based learning with the traditional learners in tutorial and to assess the perception of TBL by students.

Aim of the Study

1. To compare the performance of the students in team-based learning with the traditional learners.
2. To assess the perception of TBL by taking feedback from students.

MATERIALS AND METHODS

This study was conducted after three months of admission, after the first internal assessment of the students when the students came to know their lacunas in the exams.

Our study population comprised first year medical undergraduates of Mahadevappa Rampure Medical College, Kalaburagi, Karnataka. Ethical clearance was obtained from institutional ethical committee and written consent was obtained from the students. All the willing candidates were included in the study.

This study was conducted in the Department of Physiology in three consequent tutorials. In each tutorial, fifty six students were involved. The control group contains twenty eight and the study group twenty eight students. One hundred and sixty eight (168) students of first year MBBS were involved throughout the study in three sessions of tutorial. In each tutorial, twenty eight students were taken as a study group and twenty eight as a control group and they were interchanged in next tutorial. The tutorial topics were displayed on the notice board one week before. In traditional way, the students were asked to come prepared for the tutorials on the same topics. A set of twenty five MCQ's was prepared and reviewed by peer group. The questions were framed from must to know, desirable to know and nice to know areas subscribed by Rajiv Gandhi University of Health Sciences, Bengaluru. The total duration of tutorial was two hours and thirty minutes. One hour for pre and post-test (thirty minutes each) and ninety minutes for team discussion.

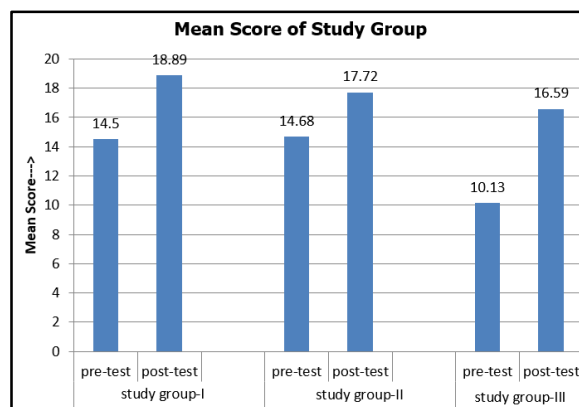
The pretest was conducted for both the groups (control and study group) before the tutorial, which included 25 MCQ's on the scheduled topic. The duration of test was thirty minutes. The pretest papers were collected. The tutorial for control group was conducted in traditional way, whereas the tutorial for study group was conducted by TBL method. The students of study group were divided into five teams, 5-6

students in each team. In the control group traditionally, the teacher has asked questions on the assigned topics, the student will answer the question, if not, it will be passed to next or otherwise answered by the teacher. In study group, the students were instructed to discuss the tutorial topics and the subtopics were given to them under which they have to discuss among team for healthy discussion. One teacher was allotted for two to three groups separately and teacher was acting as a facilitator. This discussion of subtopics continued around one and a half hour. During this period, the groups approached to facilitators regarding their doubts.

At the end of tutorial, post-test was conducted, which included the same 25 MCQ's in both the groups. The duration of test was again same, i.e. thirty minutes. The score of MCQ's was evaluated in both the control and study groups. There was no negative marking. The performance was assessed by statistical analysis. The students' perception for TBL was collected in the form of feedback. At the end of post-test, the feedback was taken by giving the questionnaire to study group, which contains a set of ten questions.

RESULTS

After evaluating the MCQ's, the results were analysed by comparing pre and post-test performance in study and control group by paired t-test. The score of MCQ's in the post-test in study group was increased compared to the pretest in all the three sessions. The difference was highly significant ($p < 0.001$).



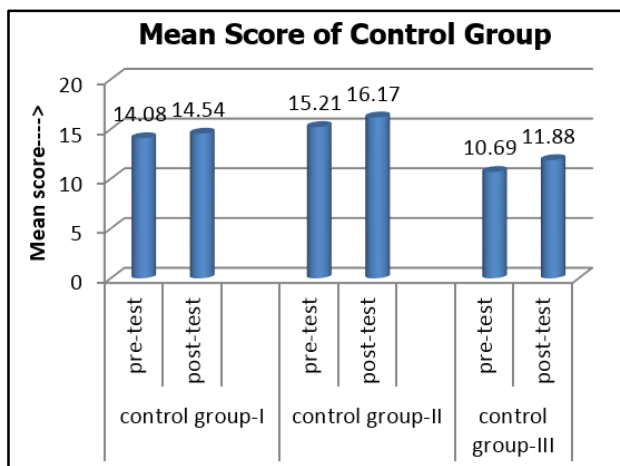
Graph 1. Pretest and Post-Test Score in Study Group

The score in MCQ's in the post-test in the control group is slightly increased compared to pretest, but the difference is not statistically significant.

Score in MCQ's	Session I		Session II		Session III	
	Study Group (n=28)	Control Group (n=28)	Study Group (n=28)	Control Group (n=28)	Study Group (n=28)	Control Group (n=28)
Pretest (mean ± SD)	14.5 ± 3.19	14.08 ± 3.78	14.68 ± 3.94	15.21 ± 2.32	10.13 ± 2.37	10.69 ± 2.52
Post-test (mean ± SD)	18.89 ± 3.11*	14.54 ± 3.18	17.72 ± 2.78*	16.17 ± 2.71	16.59 ± 2.91*	11.88 ± 2.87

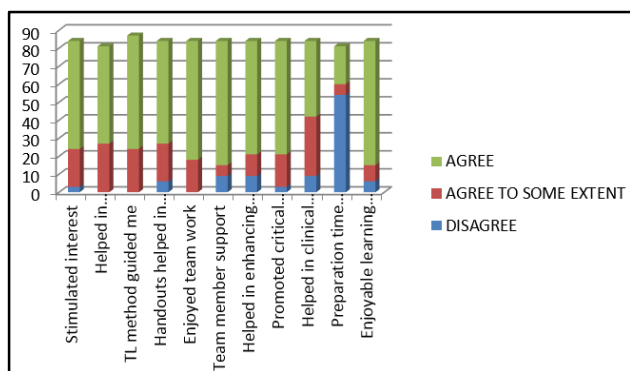
Table 1. Score of Study and Control Group

*Highly Significant.



Graph 2. Pretest and Post-Test Score in Control Group

Feedback from TBL batch was taken and validated (>80% agreed, <20% and >0% disagreed, >20% and <80% agreed to some extent). Majority of students expressed that TBL has stimulated interest, helped in understanding handouts, helped in thinking and helped in critical thinking. Most of the students expressed that the time to prepare the topic was also very less in team learning.



Graph 3. Students Perception for TBL

DISCUSSION

Self-directed learning involves the learner as an active participant and encourages the development of a deep approach to learning. Self-directed learning is the educational strategy most likely to produce doctors who will be prepared for lifelong learning and are able to meet the changing needs of their patients.⁹ In tutorial, the students preparation on the topic and participation is a must for the healthy discussion. In the traditional way of conducting tutorials, students are asked the questions one by one and the answers will be discussed with the faculty. Generally, it is observed that the preparation of the students for the tutorials is not satisfactory for the discussion. Most of the time, the tutorial turns into a lecture class, again a passive learning. The students’ attendance also becomes less.

We introduced this newer method of conducting tutorial by team-based learning. As the students were given the subtopics for discussion from must to know, desirable to know and nice to know areas. The discussion among the team members covered the whole topic in detail moreover

applied aspects were covered in discussion. The facilitators helped students in understanding by clarifying their doubts. It was a student centered approach where the student’s doubts were discussed rather than teacher’s view. The student’s performance was assessed by MCQ score in post-test. There was an improvement of score in post-test in TBL group, which clearly shows that the discussion among team members has improved their learning and reasoning skills. The tutorial hours of around two and a half hours can be utilised in better way by TBL method to improve the students understanding of the subject. Students and facilitators felt the sessions to be more interesting and interacting compared to traditional method as less number of students are involved in TBL method. It proved to be the superior method for small group learning. The same TBL method has given the good results in learning of gross anatomy and embryology.¹⁰

Nigel C K Tan et al observed that team-based learning helps in understanding the subjects like neurology, which creates a fear in most of the undergraduate and postgraduate students. They also observed that TBL shows improvement in academically weaker students compared to strong students.¹¹

Scott D Zimmerman and Benjamin F Timson have assessed the effect of TBL on student performance in the laboratory and observed that TBL group outperformed in the examination and commented that TBL provides an incentive to come to laboratories prepared.¹²

Team-based learning enhances long-term retention and critical thinking in an undergraduate. TBL with challenging projects improves the student’s comprehension and retention of information, critical thinking and attitudes about the course. This coincides with our results of student’s feedback.

The final criterion was whether the students felt that the team activities were useful. The graph shows significantly greater number of students thought that they learned more, they have been encouraged in critical and independent thinking when team learning activities were included. From the facilitators point of view, the team learning activities has changed the dynamics in tutorial hour and is an excellent way to engage students for in depth learning and reasoning. TBL has the potential to engage students in learning, develop a deep understanding of concepts, develop a sense of responsibility towards their teammates and improve course performance.

The outcome of TBL, of course, also depends on student and moreover the facilitators interest and the art of facilitator to engage the students. To ensure maximal participation and optimal learning essential guidelines maybe followed for facilitating TBL.¹³

There is a conflicting data on TBL, whether TBL improves knowledge outcomes compared to other educational techniques. Haidet and colleagues did not find a significant difference in knowledge outcomes between TBL and lecture,¹⁴ whereas Levine RE found improved examination scores in the TBL group.¹⁵ Thomas PA found improvement in some topics, but not all topics.¹⁶

The tutorial of around two and a half hour can be utilised in better way by TBL method to improve the students understanding. The TBL showed significant increase in student's performance. Students and facilitators felt the sessions to be more interesting and interacting compared to traditional method. The different teaching learning methods, e.g. TBL, problem-based learning, etc. can be implemented in the medical education to facilitate the learning process in the medical students.

CONCLUSION

TBL is the best method to utilise the two hours of tutorial in physiology. TBL method improves the students understanding. The TBL shows significant increase in students' performance. The students and facilitators felt the sessions to be more interesting and interacting compared to traditional methods. Students favoured many aspects of the TBL process particularly motivation to do the prereading, and better engagement in the process. Additionally, the application of TBL principles meant the sessions were not reliant upon a large teacher to student ratio. Students, however, highlighted the need for more time within TBL for clinical problem solving. The different teaching learning methods, which increase the student involvement should be implemented in the medical education to facilitate the learning process.

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