

Applicability of team based learning in pharmacology

Amruta V Dashputra^{1,*}, Tript Srivastava², Suresh Chari³, Amit Date⁴, T R Shende⁵

¹Assistant Professor, ^{4,5}Associate Professor, Pharmacology NKP Salve Institute of Medical Sciences, Nagpur, Maharashtra, ²Professor, Physiology, Convener MCI Nodal Center for National Faculty Development, Jawahar Lal Nehru Medical College, Sawangi (Meghe) Wardha, Maharashtra, ³Professor Biochemistry and Director Research & MET NKP Salve Institute of Medical Sciences, Nagpur, Maharashtra

***Corresponding Author:**

Email: avdashputra@gmail.com

Abstract

Introduction: Working effectively within teams has been recognized by medical educators as an important competency for learners. While problem based learning was implemented year ago, Team based learning (TBL) is new strategy TBL allows a single instructor to manage multiple small groups simultaneously in one classroom and has the potential to promote small group, interactive learning without requiring large number of facilitators.

Objective: 1) Introducing TBL in Pharmacology in II MBBS students. 2) Evaluation and comparison of conventional teaching methods with Team based Learning.

Method: II MBBS students (n= 150) were randomly divided into two groups. Group A was allotted with conventional teaching; group B was exposed to team based learning method. Different clinical case scenario related to selected topic of pharmacology, were chosen for TBL. MCQ of topic was administered to the students as pre test and post test. After TBL feedback was taken.

Result: Comparison of scores of pre test and post test of both the group A and group B was done by applying paired t-test. This was significant in both groups (p< 0.001). Comparative data analysis by using paired difference between both groups, A and B was highly significant (p value <0.001). Results of attitude survey (Feedback) showed agreement towards most of the statement.

Conclusion: Team based learning (TBL) is an effective teaching method for medical students. Most of the students had positive attitude about TBL.

Keywords: Active learning, Team, Conventional teaching, Medical education.

Introduction

Medical education is changing rapidly, most of American medical schools engaged in curricular reforms. ⁽¹⁾ Among these modifications include focus on implementing self directed learning. Problem Based/Case based (PBL/CBL) and Team based learning (TBL) are example of self directed learning. Conventional teaching has its own limitations like passive nature of audience and lack of feedback. ⁽²⁾

As medical educator recognized the importance of active learning strategies, while problem based learning was implemented year ago, team based learning (TBL) is new strategy. Working effectively within teams has been recognized by medical educators as an important competency for learners. Groups of students in the form of team are frequently being used in medical education to enhance active learning and to develop better interpersonal communication skills. ⁽³⁾

Team based learning (TBL) is a student –centered but instructor –led method of learning. This method has incorporated strategies to have effectiveness of small group learning method like Problem based learning into large group lecture oriented sessions. ⁽⁴⁾ Team – Based Learning sessions provides many active learning sessions in small group format. ⁽⁵⁾ TBL allows a single instructor to manage multiple small groups' simultaneously in one classroom and has the potential to promote small group, interactive learning without requiring large number of facilitators. ^(6,7) Team based learning is a collaborative learning strategy that was

introduced to encourage students to become active learner rather than be passive recipients of information. Collaborative learning strategies are generally based on the principle that students working together as a cohesive team are able to achieve higher levels of learning. ⁽⁸⁾

Pharmacology is one of the subjects of curriculum of II MBBS (Bachelor of Medicine & Bachelor of Surgery). Team based learning (TBL) is more relevant and could be more useful in teaching of complex subject like pharmacology, which has important role in therapeutics. Conventionally teaching of undergraduate students is done by didactic lectures, practical's and tutorials in preclinical subject like pharmacology. However these teaching methods lack in the development of reasoning skills of the students. There is an emphasis in many Indian medical schools to decrease the quantum of rote memorisation and adopt learning strategies that enhance critical thinking among students. ⁽⁹⁾ Very few studies have been carried using this method of learning in pharmacology. ⁽⁷⁾ Hence it was thought pertinent to assess the usefulness of TBL in Pharmacology.

Aim

Implementing Team based learning in pharmacology in II MBBS students.

Objective

1. Introducing TBL in Pharmacology in II MBBS students.
2. Evaluation and comparison of conventional teaching methods with Team based Learning.

Methodology

After Ethical approval by institutional Ethics committee, questionnaire based interventional (before and after exposure) study was conducted at NKP salve institute of Medical sciences and Research centre, Nagpur, India. The students involved in this study did not have prior exposure to TBL. II MBBS students (n=150) were randomly divided into two groups. Group A was allotted with conventional teaching, which is didactic lecture. Group B was exposed to team based learning method (TBL). Students were given detailed information about plan and purpose of the study. After explaining study, written consent was taken. Selected Topic was a part of pharmacology syllabus for that term. Group B (TBL) was divided into small group (n=10). Different clinical case scenario related to selected topic of pharmacology, were chosen. Each small group was given one clinical case scenario one week prior to TBL session. Learning objectives were well defined before conducting session. MCQ (Multiple Choice Question) of particular selected topic was administered as pre and post test to the students of both the group. At the end of TBL session, the students were asked to fill a prevalidated feedback form to assess their attitude towards TBL. Validation of feedback form was done with help of faculty of MET unit of institute. Feedback form was rated against Likert scale. Which was scored from 1 (strongly disagree) to 5 (strongly agree). Likert scaling is a bipolar scaling method, measuring either positive or negative response to a statement.⁽¹⁰⁾

Statistical Analysis: Statistical analysis was done by using Epi -info 6 statistical software. Comparison of scores of pre test and post test of both the group A (Conventional teaching/ didactic lecture) and group B (TBL) was done by applying paired t-test. Paired

difference test and Z-test was applied between two groups conventional (A) and TBL (B), level of significance was < 0.01. Analysis of feedback forms was done by taking mean scores & standard deviation for each item.

Results

Present study was aimed at introduction of Team based Learning (TBL) and evaluation and comparison of conventional teaching methods with TBL. MCQ scores (pre test and post test) of both the groups were compared. Along with it perception of students to assess their attitude towards TBL was taken.

In this study, 64 students had participated in group A while 58 students participated in group B. Comparison of scores of pre test and post test of both the group A (Conventional teaching/ didactic lecture) and group B (TBL) was highly significant (p value < 0.001). There is knowledge gain by both the methods. In group A the mean difference score (pre-post) was increased by 3.58 ± 1.84 and in group B mean difference score was increased by 6.9 ± 1.91 , This difference in mean of both the groups was statistically significant (p value < 0.001). This indicates significant better gain in knowledge by TBL. Results of attitude survey (Feedback) showed agreement towards most of the statement. Students agreed that by TBL they get better knowledge (4.09 ± 1.064). Most of student agreed that they have better understood subject (4.14 ± 0.86) and its clinical relevance (mean 3.98 ± 1.44) by TBL. Agreement found among students regarding TBL helps in developing ability to work as a team (4.17 ± 1.16), increased discussion about topic (3.79 ± 1.167) and respect for opinion of others (3.84 ± 1.01). They opined that more topics should be covered by this method (4.03 ± 0.92) and it is helpful for diagnosis and treatment of patients (4.05 ± 1.05). It increased self confidence of student (3.76 ± 1.065). Students were neither agree nor disagree that by TBL, time required for self study is reduced (3.16 ± 1.43).

Table 1: Comparison of scores of pre and post test of Conventional (A) and team based learning (B)

		Paired Samples Statistics				
		Mean	Std. Deviation	Std. Error Mean	T value	P value
Group A (n=64)	pre	0.92	0.836	0.106	-15.30	<0.001
	post	4.50	1.586	0.201		
Group B (n=58)	pre	1.09	1.083	0.145	-27.22	<0.001
	post	8.00	1.502	0.201		

Table 2: Comparison between Conventional (A) and team based learning (B)

		Paired Differences			Z test	P value
		Mean Difference	Std. Deviation	Std. Error Mean		
Group A (n=64)	pre - post	-3.581	1.843	0.234	-9.65	<0.001
Group B (n=58)	pre - post	-6.911	1.900	0.254		

Table 3: Showing feedback of students about Team based learning (n=58)

Sr. No	Questionnaire	Mean	Std. Deviation	%
1	I have gained better knowledge by this method	4.09	1.064	81.7%
2	I have better understanding of subject with Team based learning.	4.14	.868	82.8%
3	By this method time required for self study is reduced.	3.16	1.436	63.1%
4	Clinical relevance of subject is well understood by this method	3.98	1.034	79.7%
5	I feel TBL has increased my self confidence.	3.76	1.065	75.2%
6	This method has encouraged subject (study) discussion among us.	3.79	1.166	75.9%
7	I want more topics should be covered by this method.	4.03	.917	80.7%
8	I thing other departments should conduct this type of teaching session.	3.74	1.193	74.8%
9	I thing method is helpful for learning diagnosis and treatment of patients	4.05	1.050	81.0%
10	I feel that TBL help me learn topic better than I just studied alone.	3.97	1.123	79.3%
11	Being part of a team discussion has improved my ability to think through a problem.	4.00	.858	80.0%
12	I feel that working with a team helps me develop skills in working with others.	4.17	1.157	83.4%
13	I feel that working with a team has helped me develop more respect for opinion of others.	3.84	1.005	76.9%

Discussion

Team based learning is relatively new in medical education, although it has been implemented in other educational curricula for years.^(11,12)

In present study if we compare results of conventional with TBL, it showed that though learning occur by both the methods, more significant learning with TBL. It is generally accepted that the chances of retaining the learned material will be better if the learning is expected to occur around a realistic problem. TBL in the form of case scenario moves beyond the basic acquisition of facts to focus on real life situations. Case scenario used in TBL help them to apply knowledge and solve the problem. This would cultivate analytic skills and develop their decision making ability. TBL allow a single instructor to manage multiple small groups simultaneously in one classroom. TBL has garnered interest within the medical education community because of its potential to promote active learning without requiring large numbers of faculty facilitators.⁽¹²⁾ There are potential benefits from TBL like increased student engagement, higher quality communication processes and increased examination scores.^(13,14)

In this study performance of students who were exposed to TBL found significantly better than students who exposed to didactic lecture. Same results were found in other study also.^(8,15,16) Results of another study on resident doctors reported that TBL helped clinically, but this does not necessarily translate into improved performance in examination.⁽¹⁷⁾ Results of another study showed that supplementing didactic lectures with team based learning has the ability to improve student engagement and mastery of course content and also enhance student's performance in examination.⁽⁸⁾

Student's attitude towards TBL by survey questionnaire (feedback) appeared positive attitude. Results of feedback in this study were in agreement with study conducted by other investigators on undergraduate MBBS students.^(8,17) Most of student agreed that they have better understood subject and its clinical relevance by TBL. Agreement found among students regarding TBL helped in developing skills in working in team, increased discussion and it had improved ability to think through a problem.

TBL is a collaborative learning that encourages students to become active learner than be passive recipient of information. It also encourages students to

be more accountable for their own learning process. TBL promote better understanding and application of course content and improved interactivity.^(8,17)

In this study students were neither agree nor disagree that by TBL, time required for self study was reduced. Although there is better learning by TBL, but students have to do self study, had to prepare topic before class. Advantages associated with TBL that it reinforces concepts and aid in application utilising the active participation of students by providing pre -class preparation and in class group discussions. Guidance by faculty during session has additional advantage for improved learning.⁽²⁾

For success of TBL, attitude of faculty towards method is very important, because TBL represented a leap from both typical (e. g. Lectures) and more recent (e. g. Problem based learning) forms of teaching. In another study faculty were positively influenced to use TBL due to improvement in students' preparations and attendance, quality of in class discussion, and academic performance of students. After repeated sessions students feel more involved in their learning with the group. It helped students to think more critically. Also there was increased collaboration among faculty members.⁽¹²⁾

Conclusion

Team based learning (TBL) is an effective teaching method for medical students. Most of the students had positive attitude about TBL It improves knowledge acquisition and had benefits regarding learner engagement and teamwork skills.

Challenges and Limitations

- Support from higher authority and departmental staff is essential. Negative attitudes of faculty can present a significant barrier to implement TBL.
- Time has to be devoted by faculty to make topic in format of TBL.
- TBL has to be taken in existing teaching schedule of students.
- In present curriculum diadectic teaching is popular. Replacing diadectic lecture with active learning may make students as well as faculty uncomfortable.
- Learner has to prepare for TBL.

Acknowledgement

Authors acknowledge Mr Jaydeep Nayase, Statistician & Assistant Professor, Department of Preventive and Social Medicine for solving Statistical hurdle.

Reference

1. Hollander H, Loeser H, Irby D. "An anticipatory quality improvement process for curricular reform." *Academic Medicine.* (2002) 77(9), 930.
2. Hashmi NR." Team Based learning (TBL) in undergraduate medical Education." *Journal of the college of Physician and Surgeons Pakistan.* (2014) 24 (8), 553-556.
3. Thompson BM, Levine RE, Kennedy F, Naik AD, Foldes CA, Coverdale JH." Evaluating the Quality of Learning – Team Processes in Medical Education. Development and Validation of a Measure". *Acad Med* (2009) 84 (10), 124-7.
4. Shankar N. Roopa R. "Evaluation of a modified team based learning method for teaching general embryology to 1st year medical graduates students." *Indian J Med Sci* (2009) 63,1-9.
5. Shankar N. Roopa R, Borges NJ. "Medical student's attitudes about team based learning in pre –clinical curriculum". *Med Educ* (2009)14,1-5.
6. Wiener H, Plass H, Marz R. "Team-based learning in intensive course format for first year medical students." *Croat Med J* (2009)50, 69-76.
7. Rao YK, Shenoy GK. "Introducing team based learning in undergraduate pharmacology." *Indian J Pharmacology* (2013) 45 (1), 102-103.
8. Punja D, Kalludi S N, Pai KM, Rao RK, Dhar M. "Team based learning as a teaching strategy for first year medical students." *Australasian medical Journal.*(2014)7(12), 490-499.
9. Ghosh S. "Combination of didactic lectures and case oriented problem solving tutorials towards better learning: perception of students from a conventional medical curriculum." *Advan Physiol Educ*(2007) 31,193-197.
10. Likert R. "A technique for the Measurement of Attitudes. *Archives of Psychology* ". (1932) 140, 1-55.
11. Michaelsen LK, Bauman Knight A, Fink LD. "Team based learning: a transformative use of small groups in college teaching." *Sterling (VA): Stylus Publishing* (2004).
12. Thompson BM, Schneider VF, Levine RE, McMahon KK, Perkowski LC, Richards BF. "Team –based learning at ten medical schools: two years later". *Medical Education* (2007) 41, 250-257.
13. Levine RE, OBoyle M, Haider P, Lynn D, Stone MM, Wolf DV, Paniagua FA. "Transforming a clinical clerkship through team learning." *Teach Learn Med* (2004) 16 (3), 270-5.
14. Haidet P, Richards B, Morgan RO, Wristers K, Moran BJ. "A controlled trial of active versus passive learning strateging in a large group setting". *Av Health Sci Ed* (2004) 9 (1),15-27.
15. Kolluru S, Roesch DM, Mishra P, Akhtar de la Fuente A. "A multi –instructor, team based, active learning exercise to integrate basic and clinical science content". *Am J Pharm Educ.* (2012)76 (2), 33-9.
16. Vasana NS, DEfouw DO, Compton S. "Team based learning in anatomy: an efficient, effective and economical strategy". *Anat Sci EDUC.* (2011) 4(6), 333-9.
17. Mullen IM, Cartledge J, Levine R, Iversen A. "Team based learning for psychiatry residents: a mixed methods study". *BMC Medical Education* (2013)13,12-4.