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Original Article

Medical Education Section

Student Perceptions of Team Based Learning in Head and Neck Anatomy

VASUDHA KULKARNI, ASHWINI C. APPAJI, POONAM.D.N, RAMESH B.R

ABSTRACT

Background: Team based learning (TBL) is an active teaching learning strategy which amalgamates out of class preparation and in class group discussion.

Objective: To evaluate students' perceptions of their team based learning experiences in head and neck anatomy.

Study design: Cross sectional study.

Materials and Methods: We introduced team based learning to first year medical students for clinically oriented topics of head and neck anatomy. Anatomy lectures for gross anatomy and histology of thyroid and parathyroid gland were replaced with team based learning (pre class preparation, individual readiness and group readiness assurance test and instructor appeal). At the end of each session, feedback was collected from students about team based learning experience.The present study evaluates the students' perceptions about team based learning by using a structured feedback questionnaire. Respondents (n=47 for TBL session1 and n= 43 for TBL session2) were required to rate the extent to which they agreed about sessions- 4=strongly agree, 3= agree, 2= disagree, 1= strongly disagree.

Statistical Analysis: Descriptive statistics and Mann Whitney U-test

Results: Students perceived the importance of team based learning for critical thinking and analysis (median =4, mode =4) and application of knowledge in solving clinical problems(87%). Students found the sessions to be useful for recollecting the anatomical concepts in future.

Conclusion: Team based learning is preparation driven both for teacher and the student. Students appreciated team based learning sessions to be more constructive and interactive than lecture. The students perceived the importance of team interactions to foster critical analysis and problem solving skills.

Keywords: Active learning, Team based learning, TBL and feedback

BACK GROUND

Team based learning (TBL) is an interactive Teaching and learning strategy widely used in medical schools to promote critical analysis and enhance comprehension among student groups. TBL allows single facilitator to manage multiple small groups simultaneously. Thus, TBL has garnered interest due to its ability to promote active learning without requirement of large number of faculty facilitator [1].

Human anatomy understanding requires complex learning strategies for first year medical students. Common methods such as lectures with effective use of audiovisual aids, demonstration etc., have been tried to make understanding of human anatomy interesting.These methods mostly end up in a teacher centered instructive methodology leading to a passive learning experience than creating a stimulating environment to facilitate the process of critical thinking and analysis among the students. Further, various small groups teaching learning method do not emphasize on team interaction and individual accountability to team work. There is no accountability of critical thinking and analysis.

Team based learning module was introduced to first year medical students to overcome these flaws and to develop skills for correlating fundamentals of anatomy with clinical context.

The present study aims at obtaining perceptions of students about team based learning methodology. The objective is to compare the responses of students about TBL1 (Gross anatomy of thyroid and parathyroid gland) and TBL2 (histology of thyroid and parathyroid gland) sessions.

DESCRIPTION OF TEAM BASED LEARNING

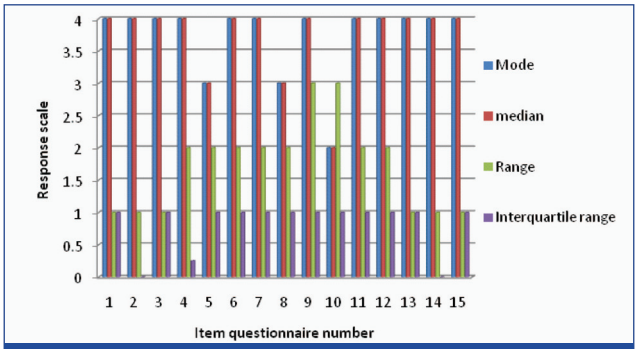
Team based learning is a small group teaching learning methodology. It was first adopted in business schools by Larry

Sl no	Item	4	3	2	1	NA
1	**TBL sessions helped me understand anatomical concepts of thyroid gland**	**70%**	30%	0%	0%	0%
2	**TBL sessions motivated me to study**	**77%**	23%	0%	0%	0%
3	Individual readiness assurance test (IRAT) were useful learning tasks	51%	49%	0%	0%	0%
4	**The group discussions allowed me to improve my learning than individual learning**	**74%**	19%	4%	0%	2%
5	The questions in IRAT and GRAT were comprehensive	43%	51%	4%	0%	2%
6	**I have been able to apply factual knowledge to solve clinical problems during TBL**	**60%**	32%	4%	0%	4%
7	**TBL sessions encouraged interaction, discussions and clearance of doubts**	**68%**	26%	6%	0%	4%
8	The session (Gross anatomy of thyroid gland) provided a good content review	47%	47%	2%	0%	2%
9	I was actively engaged in critical thinking during TBL	57%	36%	2%	2%	2%
10	**I learn better in Lecture classes than in TBL sessions**	**21%**	17%	38%	21%	4%
11	The activities made effective use of my time	53%	34%	9%	0%	4%
12	**I feel TBL sessions are more enjoyable than lecture classes**	**64%**	28%	4%	0%	0%
13	**I require more TBL sessions for coverage of clinically oriented topics**	**72%**	28%	0%	0%	0%
14	**Solving problems in a team is an effective way to recollect what I have learnt**	**83%**	15%	0%	0%	2%
15	TBL format is helpful in developing my analytical skills	51%	49%	0%	0%	0%

[Table/Fig-1]: Rating(in percentage) of the TBL session 1 on gross anatomy of thyroid and parathyroid gland the extent to which they agreed about sessions- 4=strongly agree, 3= agree, 2= disagree, 1= strongly disagree , NA- not answered. Responses in favor of TBL have been highlighted

K Michaelsen at Oklahoma. It is a backward design learning strategy involving these core elements-

1 Preclass preparation – The students are given learning objectives and study material in advance. This step is also known as out of class preparation as students have to prepare themselves as a team prior to the session.



[Table/Fig-2]: Descriptive statistics (mode, median, range and interquartile range to statements responded by students for TBL Session

2 Individual readiness assurance test- The session usually starts with the students answering a set of questions about a topic already given in a stipulated time individually.

3 Group readiness assurance test- The same set of questions will be answered as a team by the students in the stipulated time. Both the readiness tests ensure that the students have already come prepared for the session. While answering in the group, there is critical analysis of the problem, team work and improvement in communication skills amongst students.

4 Immediate feedback- the scores of both individual and group readiness assurance tests are announced and feedback will be given.

5 Instructor appeal- the students can appeal to the instructor for difference in their opinion about the problems and the same would be clarified.

Thus, the crux of team based learning relies on 4 S's- Significant problem, Same problem, Specific choice and Simultaneous reporting.

6 Team application- The students in teams solve case vignettes akin to problems given during assurance tests [2].

METHODOLOGY

Two modules of team based learning were done for selected topics of Gross anatomy of thyroid and parathyroid gland and Histology of thyroid and parathyroid gland. Fifty students were introduced to these sessions. The students were divided into seven teams by randomized stratification method. Modules were scheduled at an interval of fortnight.Students underwent through process of Individual and Group readiness assurance test. We used features of team discussion to let the students discover correct answers. Further, because the teams were challenging each other (and not the teacher), the discussion was used to grant credit for an alternative answer in the same way as would normally be done with written appeals (i.e., declaring more than one "winner").

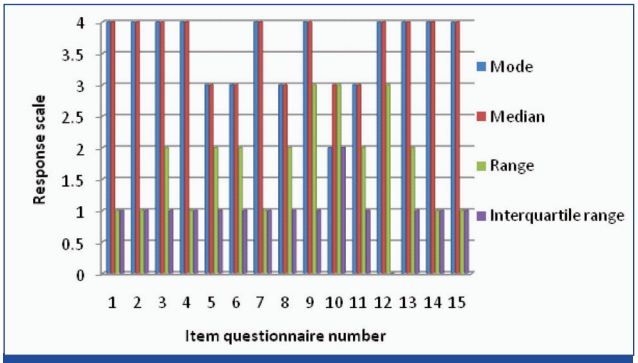
Sl no	Item	4	3	2	1	NA
1	**TBL sessions helped me understand anatomical concepts of thyroid gland**	**56%**	44%	0%	0%	0%
2	**TBL sessions motivated me to study**	**60%**	40%	0%	0%	0%
3	Individual readiness assurance test (IRAT) were useful learning tasks	49%	44%	5%	0%	2%
4	**The group discussions allowed me to be improve my learning than Individual learning**	**70%**	30%	0%	0%	0%
5	The questions in IRAT and GRAT were comprehensive	44%	51%	5%	0%	0%
6	**I have been able to apply factual knowledge to solve clinical problems during TBL**	35%	**51%**	12%	0%	2%
7	**TBL sessions encouraged interaction, discussions and clearance of doubts**	**65%**	35%	0%	0%	0%
8	The session(Gross anatomy of thyroid gland) provided a good content review	47%	49%	2%	0%	2%
9	I was actively engaged in critical thinking during TBL	56%	40%	2%	2%	0%
10	**I learn better in Lecture classes than in TBL sessions**	**28%**	**35%**	28%	16%	0%
11	The activities made effective use of my time	37%	51%	7%	0%	5%
12	**I feel TBL sessions are more enjoyable than lecture classes**	**77%**	16%	2%	2%	2%
13	**I require more TBL sessions for coverage of clinically oriented topics**	**56%**	40%	5%	0%	0%
14	**Solving problems in a team is an effective way to recollect what I have learnt**	**72%**	28%	0%	0%	0%
15	TBL format is helpful in developing my analytical skills	58%	42%	0%	0%	0%

[Table/Fig-3]: Rating (in percentage) of the TBL session 2 (histology of thyroid and parathyroid gland) the extent to which they agreed about sessions- 4=strongly agree, 3= agree, 2= disagree, 1= strongly disagree , NA- not answered. Responses in favor of TBL have been highlighted

After each session, a validated structured questionnaire was completed by the students. The anonymous Likert-scale Survey of team based learning sessions was given to delve into level of agreement/ degree with TBL.

RESULTS [Table/Fig-1-7]

Response of students to structured questionnaire was treated as ordinal data and results were evaluated [Table/Fig-4] using descriptive statistics (median, mode, range and interquartile range).Thus central tendency was summarized by median and mode, variability was summarised by range and interquartile range [3].



[Table/Fig-4]: Descriptive statistics (mode, median, range and interquartile range to statements responded by students for TBL session 2

TBL session	N	Rank average	Sum of ranks	U	Z
Gross anatomy of thyroid and parathyroid gland	47	41.74	1920	1090	-1.2274
Histology of thyroid and parathyroid gland	43	48.49	2085		

[Table/Fig-5]: Mann Whitney U test result for the statement "I learn better in Lecture classes than in TBL sessions"

The differences between medians of responses of TBL1 and TBL2 for specific items "I learn better in Lecture classes than in TBL sessions" and "The activities made effective use of my time" was analysed using Mann Whitney U test(Nonparametric test) [4, 5, 6]. Here, the opinion of students on these statements were compared for TBL1 and TBL 2.This method is used to test the null hypothesis that there is equal probability that responses of students for the statements "I learn better in Lecture classes than in TBL sessions" and "The activities made effective use of my time" of TBL1 will exceed from responses of TBL 2.

An examination of the findings in [Table/Fig-5] reveals that the results of Mann Whitney U test for the TBL responses of the students in the first and second session did not show any statistical difference (Z=-1.2274; p=<0.05). As the sample included more than 20 responses the z-approximation was calculated.The rank average of the responses of the students of TBL 1 session1 is 41.74 whereas of TBL session 2 is 48.49. The results, therefore, showed no statistically significant differences in the responses for the statement "I learn better in Lecture classes than in TBL sessions" for TBL1 and TBL 2. The analyses had shown no significant difference between the rank averages of the groups' responses; however, an

TBL session	N	Rank average	Sum of ranks	U	Z
Gross anatomy of thyroid and parathyroid gland	45	46.4	2090	1437	1.1413
Histology of thyroid and parathyroid gland	42	40.2	1651		

[Table/Fig-6]: Mann Whitney U-test result for the statement "The activities made effective use of my time"

examination of the rank averages of their TBL session 2 demonstrates that the students rated TBL session 2 to be less than a lecture.This result indicates that students scored TBL 1(Gross anatomy of thyroid and parathyroid gland) higher than TBL session 2 (Histology of thyroid and parathyroid gland).

An examination of the findings in [Table/Fig-6] reveals the results of Mann Whitney U test for the TBL responses of the students "The activities made effective use of my time"in the first and second session showed statistical difference (Z=1.1413; p=<0.05). The rank average of the responses of the students of both TBL1 session and TBL 2 was 46.4 and 40.2. The similarity of rank averages of the sessions' TBL session 1 and 2 indicates equal responses.

DISCUSSION

Feedback is the crux of any educational intervention to promote active learning and to ensure that standards are met. The present module attempts to obtain perceptions of Students regarding lectures and team based learning for topics of anatomy and histology of thyroid and parathyroid gland. Feedback questionnaire administered to students n= 47 and 43 for TBL1 and TBL2 respectively gave us an insight to their views. Over all, the students have rated the TBL sessions positively in terms of understanding of anatomical concepts, motivation to study and applied learning. They have preferred team based learning to be better than traditional lecture method. TBL stimulates critical thinking and analysis correlative to clinical anatomy.

The students have felt that during the process of TBL, they have learnt how to behave in a team, to communicate and be accountable for their learning (16.28%). They also have acknowledged the contribution of the facilitators. All these comments indicate that TBL has been appreciated as a good learning tool except for a few shortcomings like selection of topic.

They have perceived that sessions of histology of thyroid and parathyroid gland to be less interesting and preferred lectures for the session. They also have felt that TBL can be a good adjunct for the lectures and not replacement. They strived in drawing diagrams (37.59%) and needed more time for the IRAT [Table/Fig-7]. The inability to draw diagrams cannot be addressed in TBL as this was not the objective of the session at all.

Content	N	%
What I liked the most		
Problem based learning - It helps us to think critically and to apply our knowledge in solving clinical problems, learnt anatomical concepts.	57	44.19%
Retention of knowledge – This helps in recollecting in future.	26	20.16%
Communication skills - I interacted with peers whom I have spoken to before, group interaction helped me recollect the content and I feel more confident about topic now.	21	16.28%
Small group learning - This was an effective way to utilize time, encourage us to study, motivates to read	14	10.85%
Learning skills	12	9.30%
Learning accountability - Helps me to prepare as I have the responsibility that if I go wrong my team will suffer	05	3.88%
Acknowledgement to the instructor – thanks for making learning more enjoyable	4	3.10%
Suggestions for improvement		
Instructor - need lecture class in addition, team based learning after lecture/ dissection, Review after Team based learning, Certain topics which can be taught in one hour 45 minutes in a lecture class are extended for more than 2 hours during Team based learning.	63	55.75%
Problem based learning- unable to learn to draw diagrams, difficult to comprehend, need more time for Individual readiness assurance test	48	37.59%
Large group teaching – preferred	02	1.76%

[Table/Fig-7]: Analysis of open ended questions about Team based learning sessions
Discussion

83% of students in [Table/Fig-1] and 72% of students in [Table/Fig-2] strongly agree that solving problems in a team is an effective way to recollect what they have learnt. This infers that when team members work face- to – face, the impact of interaction is immediate. The students will have vested interest in the outcome of their teams thus are motivated to engage in a high level of interaction [7].

64% of students in [Table/Fig-1] and 77% of students in [Table/Fig-2] strongly agree that Team based learning sessions are more enjoyable than lecture classes.This is because unlike lectures, the contents of the facilitator/ instructor's comment at the end of session are determined by students' choices and actions during individual and group readiness tests. Students are not only having an exposure to solid content but increase their ability to solve difficult problems.In team based learning sessions, there is a process of building intellectual competence of the students.Here, there is one to one relationship between student and instructor [8].

The lower interest level and preference of the lectures could be explained by two reasons. This analysis gives an insight that the choosing of the topic is very critical for the success of a team based learning session. They also have felt that TBL can be a good adjunct for the lectures and not replacement. They strifed in drawing diagrams (37.59%) and needed more time for the IRAT. The inability to draw diagrams cannot be addressed in TBL as this was not the objective of the session at al.

Hence, there are many intrinsic and extrinsic factors which can influence the success of team based learning.

Thus team based learning addresses special areas of small group learning such as communication skills, leadership, teamwork and improves active learning experience for students [9].

CONCLUSION

Feedback questionnaire was administered to collect views of students about team based learning sessions. For both the sessions, students strongly agreed for statements such as: Team based learning sessions helping them in understanding the concepts, motivating them to study, requiring more such sessions, Solving problems effectively and requiring more such sessions.

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AUTHOR(S):

1. Dr. Vasudha Kulkarni
2. Dr. Ashwini C. Appaji
3. Dr.Poonam .D.N
4 Dr. Ramesh .B.R

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Anatomy, DR. B. R. Ambedkar Medical College, Kadugondanahalli, Bengaluru, India.
2. Associate Professor, Department of Anatomy, M S Ramaiah Medical College, Kadugondanahalli, Bengaluru, India.
3. Assistant Professor, Department of Anatomy, DR. B. R. Ambedkar Medical College, Kadugondanahalli, Bengaluru, India.
4. Professor and HOD, Department of Anatomy, DR. B. R. Ambedkar Medical College, Kadugondanahalli, Bengaluru, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Vasudha Kulkarni
Assistant professor, Department of Anatomy,
DR. B. R. Ambedkar Medical College, Bengaluru,
Karnataka - 560045, India.
Phone : 9008825690
E-mail: vasu_anil77@rediffmail.com

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