Original Article

Perspective of Team Based Learning among Undergraduate Medical Students of FRPMC in Integrated Modular System of Curriculum

Muhammed Faisal Rahim,[1] Shireen Qassim Bham,[2] Muhammad Ahmad,[3] Mussawir Khan,[4] Talha Saeed,[5] Masood Ahmed Shaikh[6]

[1]Department of Medical Education, Fazaia Ruth Pfau Medical College Karachi, Air University, Islamabad; [2]Department of Pediatrics, Fazaia Ruth Pfau Medical College, Air University, Islamabad; [3,4,5]Fazaia Ruth Pfau Medical College, Air University, Islamabad; [6] Department of Anatomy, Fazaia Ruth Pfau Medical College, Air University, Islamabad.

Abstract

Background: The shift towards student-centered learning in medical education has led to the adoption of innovative teaching strategies such as Team-Based Learning (TBL).

Objective: This study conducted at Fazaia Ruth Pfau Medical College aimed to explore the students` perception on TBL.

Methods: A descriptive cross-sectional study was carried out at Fazaia Ruth Pfau Medical College(FPRMC) from August 2023 to February 2024. The study encompassed a total of 400 participants which were undergraduate medical students from 1st year MBBS to 4th year M.B.B.S. program. Convenient sampling method was employed. To gather data, a questionnaire consisting of 5-point Likert scale was employed, comprising 13 closed-ended and 5 open-ended questions.

Results: 65 % students were satisfied for most of the categories with TBL being added to their curriculum. More than 74 percent of students acknowledging TBL helps in clarifying complex concept, critical thinking, collaborative learning and clinical practice readiness. Through Qualitative open ended questionnaire students` expressed satisfaction over the process of TBL while showing few concerns on technological issues like login, internet speed and lack of faculty training over the process of TBL.

Conclusion: The study's results underscore the importance of incorporating active learning strategies like TBL in medical curricula. By maximizing student engagement, promoting collaborative learning, and enhancing critical thinking skills, Further research and refinement of TBL approaches can continue to optimize its effectiveness in medical education.

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Corresponding Author | Dr. Shireen Qassim Bham, , Associate Professor Department of Pediatrics, Fazaia Ruth Pfau Medical College, Air University, Karachi, Pakistan. **Email:** drshbham@yahoo.com

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Introduction

Teaching and learning in the 21st century medical curriculum has been shifted towards student-centered learning with most of the content delivered in an integrated manner and emphasis is done on

application of knowledge, deviating from traditional format of teaching where emphasis was on traditional lectures and tutor led tutorials with little problem-based learning activities.[1] Furthermore, in the field of medical education, teaching strategies that promote active learning and problem-solving skills are increasingly being promoted.[2] TBL itself inculcate the various active learning principles, these principles are provides an effective educational strategy that promotes student-centered learning and problem-solving, particularly in medical education.[3,4] Developed by Michaelsen et al., TBL is structured into three phases: in the preparation phase, students review assigned pre-reading materials; in the readiness assurance phase, they take individual and team assessments (iRATs and tRATs) to demonstrate their understanding; and in the application phase, they engage in problem-solving exercises that apply course concepts.[5]

TBL enhances student engagement, encourages peer teaching, and fosters responsibility for learning. Its emphasis on collaboration and critical thinking positions it as a transformative approach in medical education, preparing students for effective teamwork in healthcare and improving patient care outcomes.[6,7]

A traditional curriculum is usually overloaded with heavy content in lectures and less discussion and less teacher and student interaction involved TBL provides an innovative teaching and learning strategy with resolving most of the critical issues present in traditional form of curriculum.[8-10]

At FRPMC the current teaching methodology heavily relies on lectures, tutorials and practical with less students` participation, problem solving activities and group discussions. To tackle this issue, in 2021 TBL was first introduced and implemented in our medical curriculum with a view to achieve better students` learning, achieving higher cognitive level knowledge and discussion in students` learning. TBL was implemented in all four years in basic sciences subjects since 2021. After running TBL for three academic years faculty was eager to find out the students` perception on the effectiveness and utility of TBL in the curriculum. Therefore this study was conducted to explore the different experiences and perceptions of TBL among undergraduate medical students. In addition to this, it also explores the different challenges faced by students during TBL session.

Methods

A descriptive cross-sectional study was carried out at Fazaia Ruth Pfau Medical College from August 2023 to February 2024. With the assistance of a subject matter expert, a pilot research was conducted on 30 students to validate the questionnaire prior to the actual study's sampling. The study encompassed a total of 400 participants which were undergraduate medical students from 1st year MBBS to 4th year MBBS program. Estimation was done with a convenient sampling technique, as this is educational research. Convenient sampling allowed us to take all samples whichever is available from students of four classes i.e 1st to 4th year MBBS of FRPMC . Participation in the study was voluntary and separate content form was filled by each participant who expressed willingness to take part in this study. Inclusion criteria for the study was more than 75 percent attendance in TBL sessions and those who have less than 75 percent attendance were excluded from the study. To gather data, a questionnaire consisting of 5-point Likert scale was employed, comprising 13 closed-ended and 5 open-ended questions. The main reason to use this scale is that it allows for a range of responses, providing more nuanced data compared to a binary scale. This enables researchers to capture the intensity or strength of attitudes or traits being measured.[11] The questionnaire was distributed among the total cohort of 400 students, resulting in 304 completed responses, yielding a response rate of 76%. The collected data underwent analysis utilizing SPSS version 29, a powerful statistical tool commonly used for questionnaire data analysis. It offers a range of features for data manipulation, visualization, and statistical testing. In this study, it analyzed mean, mode, median, standard deviation, and created frequency tables and charts.

In addition to 5 point likert scale questionnaire, 5 open ended questions were also asked to know students` perception on their experiences, utility and challenges faced them during TBL sessions. These questions were related to problem solving skills, group discussion skills, application of knowledge, translation of questions asked in TBL in summative exam, practical application of case and questions and were also about different challenges faced by students during TBL sessions. These open ended questions allows authors to gain insight into responders` understanding and measuring satisfaction over predefined response.[12]

Table 1: *Result obtained on 5-point Likert Scale Questionnaire*

S.No:	Questions	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Std. Deviation
1	TBL is an effective way of learning.	140 (35.0%)	152 (38.0%)	53 (13.3%)	30 (7.5%)	25 (6.3%)	3.88	1.155
2	TBL provides core information about a topic as compared to lecture.	110 (27.5%)	151 (37.8%)	70 (17.5%)	38 (9.5%)	31 (7.8%)	3.68	1.195
3	Questions in TBL sessions were helpful in exam preparation.	115 (28.8%)	141 (35.3%)	67 (16.8%)	37 (9.3%)	40 (10.0%)	3.64	1.263
4	Number of TBL sessions conducted in a module/block were enough.	113 (28.3%)	176 (44.0%)	59 (14.8%)	28 (7.0%)	24 (6.0%)	3.82	1.104
5	TBL helped me in clearing complex medical concepts more easily.	110 (27.5%)	180 (45.0%)	68 (17.0%)	22 (5.5%)	20 (5.0%)	3.85	1.046
6	iRAT is a useful exercise for assessment of your preparation for TBL?	103 (25.8%)	176 (44.0%)	64 (16.0%)	34 (8.5%)	23 (5.8%)	3.76	1.104
7	Team work in TRAT is an effective way of learning.	144 (36.0%)	164 (41.0%)	47 (11.8%)	30 (7.5%)	15 (3.8%)	3.98	1.057
8	TRAT helps in getting/building new knowledge by discussion in TBL groups.	154 (38.5%)	147 (36.8%)	47 (11.8%)	30 (7.5%)	22 (5.5%)	3.95	1.14
9	Application exercise enhances clinical/practical knowledge.	133 (33.3%)	170 (42.5%)	55 (13.8%)	28 (7.0%)	14 (3.5%)	3.95	1.032
10	Are you satisfied with TBL methodology of teaching by your experience of TBLs you have attended?	117 (29.3%)	150 (37.5%)	80 (20.0%)	32 (8.0%)	21 (5.3%)	3.78	1.112
11	Do you think that your marking of TBL papers was fair?	99 (24.8%)	172 (43.0%)	86 (21.5%)	26 (6.5%)	17 (4.3%)	3.78	1.028
12	Is power point presentation a part of application exercise in TBL methodology of your institute?	133 (33.3%)	150 (37.5%)	76 (19.0%)	22 (5.5%)	19 (4.8%)	3.89	1.077
13	Are you allowed to challenge the key of TBL questions if you think key is wrong?	32 (8.0%)	99 (24.8%)	90 (22.5%)	157 (39.3%)	22 (5.5%)	2.91	1.083
	Total number of Students				**n=400**			

The majors themes will be identified from students` responses are given in the table 2.

Results

73.1% of respondents agreed that TBL is an effective way of learning. 65.4% of participants replied that TBL provides more information about a topic as compared to lectures. 35.4% of students used YouTube, 29.6% used PowerPoints, 16.1% used handouts, 9.2% used research articles, and 9.9%

favoured books as their learning resource for TBL preparation. Seventy-two percent of students acknowledged that the TBL questions helped them prepare for their exams. 69.8% of colleagues responded that, in comparison to lectures, learning a subject is easier in TBL. IRAT is a helpful technique for self-assessment, according to 77% of respondents. Of the undergraduates, 75.6% stated that TRAT facilitates the development of new information through group discussions during TBL. 66.8% of students claimed that application exercises are helpful for gaining clinical knowledge, and 67.8% said they were happy with the way TBL is taught as shown in Table 1.

Reliability of 5-point Likert Scale calculated through Cronbach alpha value came out to be 0.94 for all the items cumulatively which is considered as decent value for the overall reliability of this questionnaire. In addition to these 5 open ended questions were also distributed among 70 medical students to explore the shortcoming in Likert scale questionnaire shown in Table 2, these open ended questions addresses the issues and difficulties to achieve problem solving activities in TBL. These open-ended questions helped identify the main causes, which included a lack of time, brief clinical scenarios, student lack of preparation for problem-solving activities, facilitator lack of preparation for creating thought-provoking case scenarios, and a general lack of training for leading productive TBL sessions.

Table 2: *Major Themes identified through 5 Open ended Questions on questionnaire*

S.No	THEMES
1	Difficulties to achieve problem solving activities.
2	Lack of time for discussions in group activity.
3	Clinical and Practical knowledge is attained.
4	Bridge between basic sciences knowledge and application of knowledge was achieved
5	Improvement required in the role Facilitators during TBL
6	Lack of Group dynamics.
7	Lack of Students` preparedness before coming to TBL session

Discussion

The overwhelmingly positive perceptions expressed by medical students regarding team-based learning (TBL) underscore its multifaceted utility and align with previous research highlighting its effectiveness in various educational settings. The resonating consensus among students on the positive aspects of TBL suggests its potential as a cornerstone pedagogical strategy within medical education.

In our study, the majority of students preferred TBL over lectures in providing more information to the topic. The same preference was noted in study by Bleske et al in which a significantly higher overall examination score was observed for TBL as compared to lecture.[13-14]

The collaborative nature of TBL was a recurrent theme in students' feedback in our study. Participants consistently praised TBL for fostering an environment conducive to teamwork, peer interaction, and constructive engagement. Study by Burgess et al reported that the facilitators' and students' collaborative efforts, reciprocal participation, and common repertory enhanced the learning environment and promoted learning in a TBL class.[15]

In a study, Rezende et al found that students concurred that TBL encourages greater student interaction, acceptance, motivation, and accomplishment.[16] Similar results was observed in a study by Amit Kumar which states that through discussion with peers and faculty members, TBL provides an opportunity for students to improvise responses to minor uncertainties, topic errors, and/or inadequate subject understanding.[17]

The interdependent nature of healthcare practice, where efficient teamwork is essential, is reflected in this collaborative dynamic of TBL. The same was highlighted by Harminder et al who observed that over 50% of students were accustomed to learning individually before they encountered the TBL as a high-achieving learning resource.[18] Undoubtedly, there is growing recognition of the importance of individuals who can collaborate well on academic assignments in groups. Students and facilitator from Pakistan reflected better results in group discussion in trat and encouraged engaging in peer to peer teaching

and learning.[19]

Moreover, the exposure to diverse perspectives within teams enriched discussions and broadened students' understanding of medical concepts, enhancing their critical thinking skills—a pivotal asset in clinical decision-making. Studies conducted by Jost et al.[20] and Ong et al.[21] evaluated clinical decision-making abilities and confirmed that participants' performance had improved noticeably following TBL.

The positive correlation between TBL and increased engagement levels is a significant finding. Active participation and peer interaction are fundamental components of TBL, contributing to a more dynamic and immersive learning experience. Studies by Carpenter et al.[22] and Roossien et al [23] revealed higher levels of student engagement in TBL in comparison to conventional teaching methods.

While the findings overwhelmingly favor TBL, acknowledging its strengths, it's crucial to address potential limitations. Some students highlighted challenges related to group dynamics, occasional disparities in individual contributions, or time management within team activities. However, these concerns were largely overshadowed by the perceived benefits of TBL, suggesting that with proper facilitation and guidance, these challenges can be mitigated.[24] The roles that teachers and students play must drastically change when TBL is implemented, with students taking on a more active role and teachers acting as facilitators.[25]

Therefore, the integration and refinement of TBL in medical curricula hold promise in not only enhancing academic outcomes but also in shaping well-rounded healthcare professionals capable of navigating the complexities of modern healthcare systems.[26]

On the basis of these results, future studies might investigate the usefulness and efficacy of TBL in other medical education contexts. A more thorough understanding can also be obtained by investigating faculty viewpoints and spotting possible implementation hurdles. This will allow for the creation of focused initiatives to maximize TBL's incorporation into the medical curriculum.

The study highlights, how well Team-Based Learning (TBL) fosters student involvement, critical thinking, and teamwork. Results indicate that TBL complements contemporary competency-based medical education by promoting greater comprehension, collaboration, and problem-solving abilities. The study offers insightful information about how students perceive knowledge retention and application in clinical settings.

Sampling technique, facilitators training and group dynamics are important factors while conducting research on TBL effectiveness. Our study has utilized convenience sampling which carries inherent bias, resulting in skewed results and an inability to extrapolate findings to the larger group under study. This can show up as underrepresentation of particular demographics or points of view within the population. This is because the sample is not representative of the general population because participants are selected based on their availability. In conducting TBL common group dynamics issues like dominance, disengagement, disputes, or unequal contributions can be lessened by establishing clear guidelines, promoting fair participation, and cultivating accountability through organized exercises and peer reviews. Taking care of these issues guarantees a cooperative learning atmosphere that supports reaching the intended learning goals. On the basis of these results, future studies might investigate the usefulness and efficacy of TBL in other medical education contexts. A more thorough understanding can also be obtained by investigating faculty viewpoints and spotting possible implementation hurdles. This will allow for the creation of focused initiatives to maximize TBL's incorporation into the medical curriculum.

Conclusion

This study highlights how TBL is well-received by medical students and shows how it can improve critical thinking, collaborative learning, and clinical practice readiness. This study give a foundation basis of future research as this study only depicts the initial perception about TBL from students 'perspective, future research could explores the actual effectiveness and its utility to improve clinical competence of medical students through TBL in the medical curriculum.

Ethical Approval: The Institutional Review Board, Fazaia Ruth Pfau Medical College (FRPMC), Karachi, approved this study vide Ref No: FRPMC-IRB-2023-06.

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Authors' Contribution:

MFR: Conception & design, analysis & interpretation of data, manuscript writing

SQB: Drafting of article, revising it critically for important intellectual content, final approval of the version to be published

MH: Acquisition of data, drafting of article

MK: Acquisition of data, drafting of article

TS: Acquisition of data, drafting of article

MAS: Revising it critically for important intellectual content

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