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Original Research Article

Fishbowl Technique in Microbiology for Second Phase MBBS Students: Promoting Interactive Learning and Student Engagement

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Abstract

Background: Medical education is increasingly shifting toward interactive and learner-centered approaches to improve student engagement and higher-order thinking. In microbiology, where students must integrate theoretical knowledge with clinical application, traditional lecture-based teaching may be insufficient. The fishbowl technique, an active learning strategy involving structured group discussion and observation, has the potential to enhance understanding, participation, and critical thinking, but its use in undergraduate microbiology education remains limited.

Aim and Objectives: This study aimed to introduce and evaluate the effectiveness of the fishbowl teaching–learning method among second-phase MBBS students. The objectives were to implement the technique, assess its impact on learning outcomes, and evaluate student perceptions.

Materials and Methods: This interventional study was conducted over three months in the Department of Microbiology at CIMS, Chhindwara, after ethical approval. A total of 95 second-phase MBBS students were divided into two groups: conventional lecture (Group A) and fishbowl learning (Group B). The fishbowl sessions included an interactive lecture followed by structured discussion in inner and outer circles with role exchange. Pretest and posttest assessments using MCQs were conducted to evaluate learning outcomes. Student perceptions were collected using a validated Likert scale questionnaire. Data were analyzed using paired t-test, with $p < 0.05$ considered statistically significant.

Results: There was a highly significant improvement in posttest scores compared to pretest scores ($p < 0.0001$), indicating the effectiveness of the fishbowl technique. 76% agreed that objectives were clearly explained, 79% reported better understanding, and 81% experienced increased participation. Additionally, 82% noted improvement in communication skills, 78% in critical thinking, and 85% in confidence while discussing complex topics. A majority (88%) considered the method superior to traditional lectures, and 89% recommended its continued use.

Conclusion: The fishbowl teaching technique is an effective and well-accepted instructional method that improves academic performance and fosters essential skills such as communication, critical thinking, and confidence. Its incorporation into undergraduate microbiology teaching can enhance learning experiences and better prepare students for clinical practice.

Keywords: Fishbowl Technique, Interactive Approach, and Learner Centered Approach.

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Introduction

In recent years, medical education has moved away from predominantly lecture-based instruction toward learner-centered approaches that encourage active participation and analytical thinking. This shift is especially relevant in microbiology, where students must connect foundational scientific principles with clinical practice. Sole reliance on didactic lectures may not adequately support the development of advanced cognitive abilities, highlighting the need for more engaging instructional strategies in undergraduate training [1,2]. The fishbowl technique represents one such

interactive teaching method that promotes active involvement and reflective learning. It involves a small group of students participating in a focused discussion within an inner circle, while a larger group observes the interaction and later contributes their perspectives. This format supports attentive listening, collaborative learning, and critical evaluation, making it particularly valuable for addressing complex and concept-heavy topics in microbiology [3].

Students in the second phase of the MBBS program encounter paraclinical subjects such as microbiology at a stage where they begin applying theoretical knowledge to clinical contexts. The Competency-Based Medical Education (CBME) framework proposed by the National Medical Commission underscores the importance of skills such as effective communication, teamwork, and independent learning among Indian Medical Graduates [4]. The fishbowl approach complements these objectives by fostering shared learning experiences, enhancing responsibility among learners, and encouraging deeper conceptual understanding through dialogue and reflection.

Research in education has consistently shown that active learning methods lead to better academic outcomes, increased student engagement, and improved knowledge retention when compared with traditional teaching formats [1,5]. Techniques involving peer interaction, such as guided discussions and collaborative learning models, have also been associated with improved critical thinking and problem-solving skills [6]. Despite its recognized benefits in other disciplines, the use of the fishbowl technique in microbiology education for undergraduate medical students has not been extensively studied.

Therefore, the present study seeks to assess the effectiveness of the fishbowl technique as an instructional strategy in microbiology for second-phase MBBS students, with particular emphasis on its impact on student participation, understanding, and overall learning outcomes.

Aim and Objectives

To introduce and assess the effectiveness of the Fishbowl teaching-learning method in microbiology for second-phase medical students.

The objectives of this study include

1. To introduce the fishbowl teaching learning method in microbiology for second-phase medical students.
2. To assess the effectiveness of the fish bowl teaching learning method in microbiology for second-phase medical students.
3. To assess the student's feedback regarding the fish bowl teaching learning method.

Material and Methods

This educational interventional study was conducted over a period of 3 months at the department of Microbiology, CIMS, and Chhindwara. Phase II MBBS students who give consent to participate in this study were included in this study and all the students who remain absent on the day of intervention and those students who do not give consent for participation were excluded from this study. In our study, out of 100 students, 95 students were included in the study and 05 students were absent on the day of intervention and were excluded from the study. After obtaining the institutional ethical committee approval (No. CIMS/Ethics Committee/2024/14593 dated 20/12/2024) this study was conducted in the months of March and April 2025.

Methodology

Students were divided into two groups, conventional lecture group (Group A) and fishbowl teaching learning group (Group B). Students were first arranged in descending order of their marks in the first MBBS university examination and each alternate student was allocated to each group to ensure that two groups are containing students with approximately the same intelligence. Group B were further divided into sub groups (Fishbowl teaching learning group).

Facilitators were sensitized about the fishbowl technique and the methodology was explained to them before the conduction of the sessions. After sensitization of the students about the fishbowl technique, in the first session conventional teaching groups was exposed to traditional didactic lectures and pre and posttests which included MCQs for the topic conducted for students. Students in the Fish Bowl teaching learning group were explained about the design and purpose of study. These groups were informed about the topics to be discussed in advance. Students were instructed to read the topic before they come to lecture and note down the queries arisen while reading and bring the same to class.

The fish bowl teaching learning method intervention was a combination of 30 minutes of interactive lecture followed by discussion using fishbowl teaching learning method. After putting an equal number of students in the inner and outer circle, the inner circle was given a topic for discussion based on the lecture.

They were asked to hold a discussion with the representative members of their group for about 20 minutes. The outer circle was asked to observe the inner circle, and they were called the fish watchers. Fish-watchers were instructed to listen carefully to their fish and take notes on their fish's contribution to the discussion. Later, the places of the inner and

outer circles was reversed, and the same topic was given for discussion for 20 minutes. The discussion was guided by the facilitator and followed by a plenary presentation for 10 minutes. One student from each circle was asked to report on the active participation of the other circle in the discussion. Cross-over was done in the second session.

A pre and post-test, which included 10 multiple-choice questions (MCQs) was prepared and given to students to know the effectiveness of this technique. Same MCQ questions were used for pretest and posttest. A feedback form consisting of questions was employed to collect perspectives of students about the fishbowl teaching learning sessions. Questionnaire were validated by three external subject experts.

The data was entered in Microsoft Excel sheet and was analyzed separately using SPSS statistical software. Data was expressed as mean, standard deviation and percentages. Paired t-tests was used to compare pre-test and post-test scores and the "p" values <0.05 was considered as significant in this study. 5 point Likert scale was used for feedback analysis.

Results

A total of 95 second-phase MBBS students participated in the study and two sessions of fishbowl technique was introduced and conducted in the department of Microbiology. This technique was assessed by pretest and posttest MCQ test. The student's perception was recorded o the Likert scale using a validated feedback questionnaire.

Pretest and posttest scores showed that there is a significant statistical difference using paired t test (p value <0.0001). The gain i.e. difference between the pretest and posttest scores was also found to be significant (Table 1).

The students were in strong agreement (76% students) that the objectives of the fishbowl activity were clearly explained to them. Majority of the students (79%) strongly agreed this activity helped them to understand the topic in a better way. Eighty one percent students felt that this activity helped them to actively participate in the learning process. Most of the students (82%) were of the view that this activity helped them to enhance their communication skills. Many students (78%) strongly agreed that that this activity encouraged them to critically think about the topic. Students (85%) felt that this activity helped them to build their confidence in discussing complex topics. Students (88%) felt that the fishbowl technique was an effective teaching-learning method and was better than the traditional didactic lectures and 89% students would strongly recommended the use of fishbowl technique in future classes.

Table 1: Assessment score of Fishbowl technique

Session	Assessment tool	Number of students	Mean marks	Gain score (Posttest mean – Pretest mean	Standard Deviation	P Value (Statistical significance)
ONE	Pre-Test	95	4.10	4.03	0.7606	<0.0001
	Post Test	95	8.13		0.6746	
TWO	Pre-Test	95	4.67	4.09	0.6216	<0.0001
	Post Test	95	8.76		0.6282	

Table 2: Feedback questionnaires of students about fishbowl teaching sessions. (n = 95) 1 =Strongly Disagree 2 =Disagree 3 = Neutral 4 =Agree 5 =Strongly Agree

S. No.	Question	5 (%)	4 (%)	3 (%)	2 (%)	1 (%)
1	The objectives of the Fishbowl activity were clearly explained.	76	15	2	0	2
2	The Fishbowl technique helped me understand the topic better.	79	13	1	1	1
3	The Fishbowl technique helped me to actively participate in the learning process.	81	10	1	2	1
4	It enhanced my communication skills	82	8	3	2	0
5	The Fishbowl technique encouraged me to think critically about the topic.	78	9	4	3	1
6	The Fishbowl technique helped build my confidence in discussing complex topics.	85	6	2	2	0
7	The Fishbowl technique was an effective teaching-learning method and was better than the traditional didactic lectures.	88	6	1	0	0
8	I would recommend using the fishbowl technique in future classes	89	4	1	1	0

Discussion

The findings of the present study indicate that introducing the fishbowl teaching–learning approach among second-phase MBBS students led to a marked improvement in cognitive performance, as reflected by the highly significant rise in posttest scores compared to pretest scores ($p < 0.0001$). This observation is in line with current directions in medical education that prioritize learner-centered and interactive strategies over conventional lecture-based teaching. Evidence suggests that such active learning approaches contribute to better retention of knowledge, improved conceptual clarity, and development of higher-order cognitive skills among medical undergraduates [2, 5].

The observed improvement in scores can be explained by the interactive and participatory design of the fishbowl technique. This approach encourages students to engage in dialogue, observe peers, and reflect on discussions, thereby facilitating deeper understanding of the subject matter.

Comparable outcomes have been reported with other interactive educational models such as problem-based learning and team-based learning, where student involvement plays a crucial role in enhancing comprehension and retention [7, 6].

Feedback from students further supports the utility of this teaching method. A majority of participants (76%) strongly agreed that the learning objectives were communicated clearly, indicating effective planning and delivery of the sessions. Clearly defined objectives are known to positively influence both engagement and academic achievement [8].

Moreover, 79% of students felt that their understanding of the topic improved, highlighting the value of collaborative learning and peer interaction in knowledge construction. This observation is consistent with constructivist principles, which emphasize learning through active engagement and social interaction [9].

A substantial proportion of students (81%) reported increased participation during the sessions, underscoring the role of fishbowl discussions in promoting active involvement.

Engagement is especially important in subjects like microbiology, where complex concepts require sustained attention and interaction. Prior studies have similarly demonstrated that interactive teaching formats are more effective in maintaining student interest and motivation than traditional lectures [5,10].

The study also revealed notable improvements in soft skills, with 82% of students perceiving enhancement in communication abilities and 78% acknowledging better critical thinking. These skills are integral to competency-based medical education and essential for future clinical practice. The fishbowl format offers a platform for students to express their viewpoints, engage in constructive debate, and analyze different perspectives, thereby strengthening both communication and analytical skills [11,12].Increased confidence was another important outcome, with 85% of participants indicating greater confidence in discussing complex topics. This may be attributed to the relatively safe and interactive environment of small-group discussions, which reduces anxiety often associated with large classroom settings. Similar benefits have been documented in studies evaluating interactive teaching methods, where students reported improved self-confidence and clinical reasoning abilities [13].

The overall perception of the fishbowl method was highly favorable, with 88% of students recognizing it as an effective teaching–learning strategy and 89% recommending its inclusion in future sessions. These findings reinforce the growing body of evidence supporting the acceptability and effectiveness of active learning approaches in medical education [2,10].

However, certain limitations should be acknowledged. The study was limited to a single institution and involved a relatively small sample size, which may affect the broader applicability of the results. Furthermore, the lack of a comparison group restricts the ability to definitively attribute the observed improvements to the intervention alone. Future research should consider larger, multi-center studies with controlled designs and also evaluate long-term knowledge retention.

Conclusion

The present study demonstrates that the fishbowl teaching technique is an effective and engaging instructional approach in microbiology education for undergraduate medical students. It led to a significant improvement in students' academic performance, as reflected by higher posttest scores, and was well received by the learners.

Beyond knowledge gain, the technique fostered active participation, improved communication skills, encouraged critical thinking, and enhanced student confidence in discussing complex topics. The high level of student satisfaction and their willingness to recommend its use in future sessions further highlight its acceptability and relevance in modern medical education.

In summary, the fishbowl technique emerged as an effective and well-received instructional strategy in microbiology teaching. It not only enhanced academic performance but also contributed to the

development of essential competencies such as communication, critical thinking, and confidence.

Integrating such interactive approaches into the undergraduate medical curriculum could significantly enrich the learning experience and educational outcomes. Overall, the fishbowl method offers a valuable alternative to traditional lecture-based teaching by promoting interactive and student-centered learning. Its integration into the microbiology curriculum can contribute to more effective learning outcomes and the development of essential competencies required for medical practice.

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