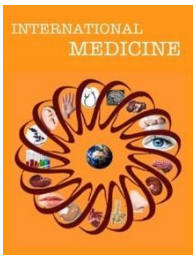
International Medicine 2025; 7(1): 19-21



International Medicine

https://www.theinternationalmedicine.com

Original Research

Flipped Classroom Vs Traditional Lecture While Teaching Acute Otitis Media

Dr Pooja D Nayak [1], Dr Shreeja D Nayak [2], Dr Nithin Deore [3], Dr Aishwarya tamne [4]

1. Associate Professor, Department of ENT, SMBT Institute of Medical Sciences & Research Cnetre, Dhamangaon, Igatpuri, Nashik
2. Associate Professor, Department of Pediatrics, Subbaiah Institute of Medical Sciences and Research Institute, Shimoga, Karnataka
3. Assistant Professor, Department of ENT, SMBT Institute of Medical Sciences & Research Centre, Dhamangaon, Igatpuri, Nashik
4. Senior Resident, Department of ENT, SMBT Institute of Medical Sciences & Research Centre, Dhamangaon, Igatpuri, Nashik.

Corresponding Author:
Dr Nithin Deore
Assistant Professor, Department of ENT, SMBT Institute of Medical Sciences & Research Centre
Dhamangaon, Igatpuri, Nashik
Email ID: nitin399@gmail.com

Received: 02 Feb 2025 / **Accepted**: 04 Apr 2025 / **Published**: 28th July 2025

Abstract

BACKGROUND: Traditional lecture-based teaching methods often limit student engagement and application of clinical concepts. The flipped classroom (FC) model, by inverting the conventional order of content delivery, promotes active learning and better retention. This study compares the effectiveness of the flipped classroom approach versus traditional lectures in teaching *acute otitis media* (AOM) to undergraduate medical students, based on student feedback and 3-month knowledge recall.

AIMS and OBJECTIVES: To study the prognostic role of platelet indices in assessing the severity of dengue infection in children.

MATERIALS AND METHODS: This quasi-experimental study involved 60 second-year MBBS students, randomized into two groups of 30 each. Group A received instruction on *acute otitis media* (AOM) via the flipped classroom model, including pre-class e-content and interactive in-class sessions, while Group B underwent conventional lecture-based teaching. Pre- and post-tests were administered to both groups. A follow-up test was conducted after 3 months to assess knowledge retention. Feedback was collected using a structured 18-item Likert-scale questionnaire and open-ended responses. Data were analysed using paired and unpaired t-tests and Chi-square tests with SPSS v25.

RESULTS: The mean post-test score immediately after the session was significantly higher in the FC group (17.9 ± 2.6) compared to the traditional group (14.1 ± 3.1, $p < 0.01$). At 3 months, the mean recall score remained higher in the FC group (16.3 ± 2.4) versus the lecture group (12.0 ± 2.8, $p < 0.01$), indicating better long-term retention. Positive feedback was reported from 86% of students in the FC group, with common themes including enhanced engagement, clearer understanding, and improved clinical application.

CONCLUSION: The flipped classroom model significantly improves both immediate learning outcomes and long-term retention in teaching acute otitis media. It fosters student engagement and may serve as an effective supplement or alternative to traditional lectures in medical education.

Keywords: *Flipped classroom, traditional lecture, acute otitis media, medical education, student feedback, knowledge retention*

Introduction

Acute otitis media (AOM) is a commonly encountered condition in paediatric Otolaryngology practice and an essential topic in undergraduate medical education. Understanding of its pathophysiology, diagnosis, and management is essential for medical students as they transition into clinical roles. Traditional lecture-based teaching, while historically dominant, often results in passive learning with limited student interaction and engagement (1). In contrast, innovative strategies such as the flipped classroom (FC) approach aim to enhance active learning by delivering theoretical content prior to class and utilizing classroom time for discussions, problem-solving, and application exercises (2).

The flipped classroom method is grounded in constructivist learning theory, which emphasizes active knowledge construction rather than passive reception (3). Several studies in medical education have demonstrated that FC models improve student performance, satisfaction, and participation compared to conventional lectures (4,5). Moreover, this model has been associated with improved long-term knowledge retention and the ability to apply theoretical concepts to clinical scenarios (6).

Despite growing evidence supporting the flipped classroom approach, its adoption remains limited in undergraduate otolaryngology education, especially in the Indian medical curriculum. Furthermore, comparative data examining the efficacy of FC versus traditional methods in teaching specific clinical conditions is scarce. The present study was undertaken to evaluate the effectiveness of the flipped classroom model against traditional lectures in teaching AOM to second-year MBBS students. The outcomes were assessed based on immediate post-session performance, 3-month knowledge retention, and student feedback.

Materials and Methods

A total of 60 second-year MBBS students were enrolled and randomly divided into two equal groups: Group A (flipped classroom) and Group B (traditional lecture). Written informed consent was obtained from all participants prior to the commencement of the study. Randomization was performed using a computer-generated simple random number sequence, and allocation was done using sealed opaque envelopes to ensure allocation concealment.

The topic selected for intervention was “Acute Otitis Media,” a clinically significant condition frequently encountered during otolaryngology

postings. For Group A, the flipped classroom approach was implemented. Pre-class materials, including a recorded video lecture with integration with pediatrics, PowerPoint slides, and a short quiz, were shared with students via email 48 hours before the classroom session. Students were instructed to review the materials before attending the in-person interactive session. The in-class session involved group-based case discussions, concept reinforcement exercises, and role-plays simulating doctor-patient interactions.

Group B received conventional didactic teaching through a 60-minute classroom lecture using slides and verbal explanation without prior distribution of learning materials. No active discussion or group activity was included in this group's teaching.

To evaluate knowledge acquisition, all students underwent a pretest comprising 20 multiple-choice questions (MCQs) related to AOM before the intervention. An immediate post-test using the same format was conducted after the teaching sessions. To assess long-term retention, a follow-up MCQ-based test was administered three months later.

Structured feedback was obtained from both Group A (flipped classroom) and Group B (traditional lecture) using an identical 18-item 5-point Likert scale questionnaire and open-ended questions. The items evaluated clarity of content, engagement, relevance, and perceived effectiveness of the teaching method. The responses were compared between the two groups to assess satisfaction and perceived impact on learning. Data were analyzed using SPSS version 25.0. Paired and unpaired t-tests were applied to compare pre- and post-test scores within and between groups, while Chi-square tests were used for categorical variables. A p-value of <0.05 was considered statistically significant.

Results

All 60 third-year phase 1 MBBS students completed the study. Group A (flipped classroom) and Group B (traditional lecture) consisted of 30 students each. Both groups were comparable in terms of baseline performance, as reflected in the pretest scores.

The mean pretest score in Group A was 9.8 ± 2.1, while Group B had a mean of 9.5 ± 2.4 (p = 0.62), indicating no significant difference at baseline. Following the intervention, the flipped classroom group showed a significantly higher mean post-test score (17.9 ± 2.6) compared to the traditional lecture group (14.1 ± 3.1, p < 0.001) (Table 1).

At 3-month follow-up, knowledge retention remained superior in Group A (mean score: 16.3 ± 2.4) versus Group B (12.0 ± 2.8), with the difference being statistically significant (p < 0.001) (Table 1).

Table 2 summarizes the performance categorization. A higher proportion of students in the flipped classroom group achieved scores ≥15 in the posttest (80%) compared to the lecture group (43%). Similarly, in the 3-month recall test, 70% of students in Group A scored above 14, while only 30% did so in Group B.

Student feedback from the flipped classroom group indicated high levels of satisfaction. 92% agreed that the format enhanced understanding, and 88% felt that it helped in applying knowledge clinically. However, 78% of students reported that the flipped model required more time commitment than regular lectures.

Student Feedback Comparison

Structured feedback was obtained from all 60 participants using an 18-item 5-point Likert scale. The mean overall satisfaction score was significantly higher in the flipped classroom group (4.4 ± 0.5) compared to the traditional lecture group (3.6 ± 0.6, p < 0.001).

In the flipped classroom group:

- 92% of students agreed or strongly agreed that the format enhanced understanding.
- 88% felt that it helped in applying knowledge clinically.
- 86% appreciated the interactive nature of the session.
- However, 78% indicated that the model required more time commitment.

In the traditional lecture group:

- 67% agreed the lecture was clear and well-structured.
- Only 52% reported the session improved their clinical application ability.
- 45% expressed a desire for more interaction and practical examples.
- 20% found it difficult to stay engaged throughout the session.

Open-ended feedback from the flipped group emphasized:

- "Case discussions made it easier to retain."
- "I could relate the content better after watching the video beforehand."

From the lecture group, comments included:

- "Lecture was informative but felt rushed."
- "More examples and student involvement would help."

The comparative analysis highlighted a clear preference for interactive and engaging formats in the flipped classroom over passive didactic lectures. (Table 3)

Table 1. Comparison of test scores between flipped classroom and traditional lecture groups

Time Point	Group A (Flipped Classroom) Mean ± SD	Group B (Traditional Lecture) Mean ± SD	p-value
Pretest	9.8 ± 2.1	9.5 ± 2.4	0.62
Immediate Posttest	17.9 ± 2.6	14.1 ± 3.1	<0.001
3-Month Recall	16.3 ± 2.4	12.0 ± 2.8	<0.001

Table 2. Distribution of students based on posttest and recall scores

Score Range	Group A (n=30)	Group B (n=30)
≥15 (High Score)	24 (80%)	13 (43%)
10-14 (Average)	5 (17%)	12 (40%)
<10 (Low Score)	1 (3%)	5 (17%)

Table 3. Comparison of Likert-Scale Feedback Between Groups

Feedback Item	Group A (Flipped Classroom) Mean ± SD	Group B (Traditional Lecture) Mean ± SD	p-value
The session improved my understanding of the topic	4.6 ± 0.5	3.8 ± 0.6	<0.001
The teaching method was engaging	4.5 ± 0.6	3.2 ± 0.7	<0.001
I was able to apply the knowledge clinically	4.4 ± 0.5	3.4 ± 0.6	<0.001
The session encouraged critical thinking and discussion	4.3 ± 0.6	3.1 ± 0.8	<0.001
I was satisfied with the overall quality of the session	4.4 ± 0.5	3.6 ± 0.6	<0.001
The time and effort required for preparation were reasonable	3.2 ± 0.7	4.1 ± 0.5	<0.001
I would prefer this teaching method for future sessions	4.5 ± 0.5	3.4 ± 0.7	<0.001

Discussion

The present study demonstrates that the flipped classroom (FC) model significantly enhances both immediate learning and long-term knowledge retention when compared to the traditional lecture method in teaching acute otitis media (AOM) to undergraduate medical students. These findings are consistent with previous studies in medical education that report improved academic performance and greater engagement among students exposed to flipped learning environments (1-3).

Students in the FC group achieved significantly higher post-test and recall scores, suggesting that pre-class preparation and in-class active learning reinforce conceptual understanding and support long-term memory consolidation (4,5). This observation aligns with the principles of Bloom's taxonomy, where flipped teaching strategies encourage higher-order cognitive skills such as analysis, application, and evaluation during classroom sessions (6).

Multiple studies have emphasized that flipping the classroom allows for greater student-teacher interaction and peer collaboration, both of which contribute positively to learner outcomes (7,8). In our study, structured group discussions and case-based activities appeared to enhance analytical thinking and clinical application, especially during the role-play and concept reinforcement exercises. These approaches support a shift from passive learning to active participation, which is more effective in adult learning models (9).

Feedback from the FC group showed strong approval, with the majority of students reporting that the method increased their understanding, interest, and confidence in applying knowledge to real-life clinical scenarios. Similar feedback has been reported in studies from diverse medical specialties including pharmacology, anatomy, and pediatrics, where flipped classrooms were implemented with success (10-12).

Interestingly, some students expressed concern about the time investment required for pre-class preparation. This aligns with findings from other reports that highlight increased workload as a common challenge in flipped learning models (13). However, this trade-off appears justified by the superior learning outcomes and the development of critical clinical competencies.

The use of digital tools such as videos, quizzes, and interactive case studies further augmented learning efficiency in our flipped sessions. These tools cater to varied learning styles—visual, auditory, and kinesthetic—making them inclusive and effective in heterogeneous classrooms (14). Moreover, technology-based learning has been shown to increase student autonomy and foster self-directed learning habits (15).

Despite these advantages, the study has limitations. It was conducted at a single institution with a relatively small sample size. Additionally, faculty involvement and technological support were significant factors that may limit generalizability. Future studies with larger multi-center cohorts and diverse topics are warranted to validate these findings and refine implementation strategies.

Conclusion

The flipped classroom model proved more effective than traditional lectures in teaching acute otitis media, resulting in higher immediate and long-term knowledge retention among medical students. This approach also received positive student feedback for enhancing engagement and practical understanding. Integrating flipped learning into medical education may improve both academic performance and clinical preparedness.

.

References

1. Peterson J, Louden DT, Gribben V, Blankenburg R. Teaching residents clinical practice guidelines using a flipped classroom model. *MedEdPORTAL*. 2017;13:10548. doi:10.15766/mep_2374-8265.10548. PMID: 30800750.
2. Martinelli SM, Chen F, DiLorenzo AN, Mayer DC, Fairbanks S, Moran K, et al. Results of a flipped classroom teaching approach in anesthesiology residents. *J Grad Med Educ*. 2017;9(4):485-90. doi:10.4300/JGME-D-17-00128.1. PMID: 28824763.
3. Chick RC, Adams AM, Peace KM, Kemp Bohan PM, Schwantes IR, Clifton GT, et al. Using the flipped classroom model in surgical education: efficacy and trainee perception. *J Surg Educ*. 2021;78(6):1803-7. doi:10.1016/j.jsurg.2021.05.008. PMID: 34210646.
4. Allenbaugh J, Spagnoletti C, Berlacher K. Effects of a flipped classroom curriculum on inpatient cardiology resident education. *J Grad Med Educ*. 2019;11(2):196-201. doi:10.4300/JGME-D-18-00543.1. PMID: 31024653.
5. Young TP, Bailey CJ, Guptill M, Thorp AW, Thomas TL. The flipped classroom: a modality for mixed asynchronous and synchronous learning in a residency program. *West J Emerg Med*. 2014;15(7):938-44. doi:10.5811/westjem.2014.10.23515. PMID: 25493157.
6. Riddell JC, Sawtelle S, Jhun P, Comes J, Tabatabai R, Joseph D, et al. Low back pain in the emergency medicine department: a flipped classroom module. *MedEdPORTAL*. 2016;12:10458. doi:10.15766/mep_2374-8265.10458. PMID: 31008236.
7. Chokshi BD, Schumacher HK, Reese K, Bhansali P, Kern JR, Simmens SJ, et al. A "resident-as-teacher" curriculum using a flipped classroom approach: can a model designed for efficiency also be effective? *Acad Med*. 2017;92(4):511-4. doi:10.1097/ACM.0000000000001534. PMID: 28030417.
8. Rose E, Claudius I, Tabatabai R, Kearl L, Behar S, Jhun P. The flipped classroom in emergency medicine using online videos with interpolated questions. *J Emerg Med*. 2016;51(3):284-91.e1. doi:10.1016/j.jemermed.2016.05.033. PMID: 27381954.
9. Gillispie V. Using the flipped classroom to bridge the gap to Generation Y. *Ochsner J*. 2016;16(1):32-6. PMID: 27046401.
10. Lu R, Dodge RE 3rd, Lam J, Enyedi L, Yanovitch T, Gandhi N, et al. Flipped classroom approach to global outreach: cross-cultural teaching of horizontal strabismus to Chinese ophthalmology residents. *Int J Ophthalmol*. 2023;16(2):280-5. doi:10.18240/ijo.2023.02.16. PMID: 36816208.
11. Tan E, Brainard A, Larkin GL. Acceptability of the flipped classroom approach for in-house teaching in emergency medicine. *Emerg Med Australas*. 2015;27(5):453-9. doi:10.1111/1742-6723.12454. PMID: 26235786.
12. Tainter CR, Wong NL, Cudemus-Deseda GA, Bittner EA. The "flipped classroom" model for teaching in the intensive care unit. *J Intensive Care Med*. 2017;32(3):187-96. doi:10.1177/0885066616632156. PMID: 26912409.
13. Kurup V, Sendlewski G. The feasibility of incorporating a flipped classroom model in an anesthesia residency curriculum—pilot study. *Yale J Biol Med*. 2020;93(3):411-7. PMID: 32874146.
14. Frankl S, Newman L, Burgin S, Atasoylu A, Fishman L, Gooding H, et al. The Case-Based Collaborative Learning Peer Observation Worksheet and Compendium: an evaluation tool for flipped classroom facilitators. *MedEdPORTAL*. 2017;13:10583. doi:10.15766/mep_2374-8265.10583. PMID: 30800785.
15. Sudario G, Hana G. Fracture Detectives: a fracture review match game. *J Educ Teach Emerg Med*. 2020;5(1):SG36-SG47. doi:10.21980/J8F06W. PMID: 37465601.