

IMPACT OF CASE-BASED LEARNING ON ACADEMIC PERFORMANCE AND ENGAGEMENT IN UNDERGRADUATE PEDIATRIC EDUCATION: A MIXED-METHODS STUDY FROM A NORTH INDIAN MEDICAL COLLEGE

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ABSTRACT

Background: Traditional lecture-based teaching often fails to promote critical thinking and engagement in undergraduate medical education. Pediatrics, being complex and context-dependent, benefits greatly from interactive approaches such as Case-Based Learning (CBL). **Materials and Methods:** This mixed-methods prospective educational intervention was conducted over six months in the Department of Pediatrics, Dr. S.S. Tania Medical College, Sriganganagar. Final-year MBBS students were oriented to CBL, and four pediatric topics were delivered through structured clinical scenarios and guided discussion. Faculty received in-house training. Quantitative outcomes (assessment performance, attendance) and qualitative feedback (student and faculty perceptions) were analyzed. Ethics approvals were obtained. **Result:** Assessment pass rates rose from 51.03% (2021–22 batch) to 93.62% (March 2024 cohort). Attendance improved by over 50%. Student feedback (n > 100) highlighted increased clarity, engagement, and clinical reasoning. Faculty feedback showed 100% satisfaction and support for CBL. Thematic analysis revealed four key themes: contextual learning, confidence building, improved application, and sustained motivation. **Conclusion:** CBL significantly improved academic performance, engagement, and satisfaction in pediatric education. With structured implementation, it offers a scalable model across Indian medical curricula.

INTRODUCTION

Competency-Based Medical Education (CBME) has transformed the landscape of undergraduate medical training in India. Emphasis has shifted from passive knowledge acquisition to active learning that fosters critical thinking, diagnostic reasoning, and clinical application. Traditional lectures, though foundational, often fall short in achieving these aims. Case-Based Learning (CBL) offers an engaging alternative by simulating real-life clinical challenges and prompting collaborative problem-solving.^[1–3] CBL is particularly well-suited for Pediatrics, a discipline that demands contextual decision-making, communication skills, and an appreciation for developmental nuances.^[4–6] Global studies have demonstrated that CBL improves engagement, deep learning, and learner satisfaction.^[1,3,5,7] However, structured implementation of CBL in Indian undergraduate pediatric curricula remains limited.

This study evaluates the academic impact and acceptability of CBL in undergraduate pediatric teaching at a newly established North Indian medical college. It documents changes in student performance, attendance, and perceptions, and outlines the challenges and facilitators encountered during implementation.

MATERIALS AND METHODS

Study Design and Setting: A prospective mixed-methods educational intervention was conducted between March 2025 and May 2025 in the Department of Pediatrics at Dr. S.S. Tania Medical College, Sriganganagar, Rajasthan. The college is a newly established teaching institution affiliated with the Rajasthan University of Health Sciences.

Participants: All final-year MBBS students (Phase 3, Part 2) attending pediatric lectures were included. A total of 147 students were eligible for participation.

Intervention: CBL sessions were introduced as a replacement for four didactic lectures. Faculty underwent internal orientation on CBL methodology. Students were sensitized through an introductory session. Each CBL session involved a clinical case scenario, facilitated group discussion, and post-session MCQ-based formative assessment.^[8,9]

Evaluation Metrics:

Academic Performance: Pre- and post-intervention assessment scores were compared with historical control batch.

Attendance: Session-wise attendance was tracked.

Feedback: Anonymous structured feedback forms were collected from over 100 students and all participating faculty. Qualitative responses were analyzed thematically.

Ethical Approval: Institutional Research Committee clearance was obtained on 6th March 2025 and Ethics Committee approval on 28th March 2025. Participation was voluntary, and all data were anonymized for analysis.

RESULTS

1. Improvement in Academic Performance A substantial improvement in assessment outcomes was observed. While only 51.03% of students passed in the 2021–22 control batch, the pass rate rose to 93.62% following the CBL intervention.

Table 1: Comparison of Pass Rates Before and After CBL Implementation

Cohort	Total Students	Students Passed	Pass Rate (%)
2021–22 (Control)	145	74	51.03%
March 2024 (CBL)	145	136	93.62%

2. Attendance Trends Lecture attendance showed a steady rise throughout the intervention period, with average participation increasing from ~90 to over 140 students per session.
3. Student Feedback Analysis Over 100 feedback forms were analyzed thematically. Recurring positive themes included improved clarity, contextual learning, clinical correlation, and higher motivation to attend classes.^[10,11]

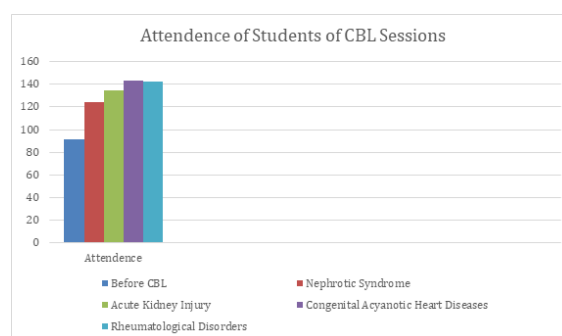


Table 2: Thematic Summary of Student Feedback.

Theme	Frequency (n=100)
Contextual Learning	88
Clinical Application	81
Improved Confidence	74
Motivation to Attend	69
Desire for Expansion to All Topics	61

4. Faculty Feedback All participating faculty (n = 5) reported satisfaction with the CBL format, highlighting improved student interaction, better concept retention, and higher enthusiasm among learners.^[9]

DISCUSSION

Our findings demonstrate that the implementation of Case-Based Learning (CBL) in undergraduate pediatrics significantly improved academic performance, student attendance, and engagement. The results mirror earlier reports from both Indian and international contexts, suggesting that well-structured CBL can serve as a potent pedagogical tool.^[1,3,6]

The dramatic improvement in pass rates—from 51.03% to over 93%—is particularly notable and supports the hypothesis that CBL enhances conceptual understanding and clinical reasoning.^[1,5,9] The concurrent increase in lecture attendance further

indicates that students found the format engaging and valuable, perhaps due to the relevance and interactivity of case discussions.

Qualitative feedback reinforced these outcomes. Students appreciated the contextual nature of learning and reported increased motivation, a stronger sense of clinical preparedness, and a desire for broader application of CBL across subjects. Faculty feedback echoed these sentiments, citing improved interaction and knowledge retention among learners.^[6,8,10]

This aligns with existing literature that positions CBL as superior to traditional didactic methods in terms of learner-centeredness and knowledge transfer.^[1,4,7] However, challenges in our setting included initial faculty unfamiliarity and time constraints in preparing quality cases. These were mitigated through departmental collaboration and gradual implementation.

Limitations of our study include its single-center design, lack of a contemporaneous control group, and

reliance on subjective feedback for qualitative analysis. Nonetheless, the consistent trends across quantitative and qualitative domains suggest robust educational benefits.

CONCLUSION

This study highlights the effectiveness of Case-Based Learning in improving educational outcomes in undergraduate pediatric education. Beyond academic performance, CBL enhanced student engagement, attendance, and faculty satisfaction. In resource-limited, newly established institutions, structured CBL interventions can be a viable and scalable strategy to align with CBME goals. Broader institutional adoption and longitudinal evaluation are recommended.

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