

**Original research article**

**A study of perception of students towards PBL vs. the tutorials and their effectiveness when an interdepartmental topic of skin manifestations of peripheral vascular disease was taught to final phase MBBS students**

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**Abstract**

Dermatology holds significant importance in the curriculum of medical studies, encompassing various aspects of medical practice. Therefore, it is essential for medical graduates to acquire a proficient understanding of dermatological principles. This study endeavors to assess the impact of integrating problem-based learning (PBL) with traditional didactic lectures among final-year medical undergraduates. Methodology: A comparative study was conducted involving 150 final-year M.B.B.S. students who voluntarily participated. Initially, all students received didactic lectures. Subsequently, they were randomly assigned to two groups: Group A and Group B, with 75 students in each. Both groups participated in tutorial sessions and PBL activities focused on four selected dermatology topics. Pre-tests and post-tests were administered to evaluate the knowledge gained by the students. Additionally, self-administered feedback was collected to discern their preferred learning methodology.

**Keywords:** Dermatology, Tutorial, PBL, CBME

**Introduction**

In recent years, there has been a notable evolution in medical education, marked by ongoing research into innovative teaching methodologies <sup>[1, 2]</sup>. While conventional lectures have long been established as a cornerstone of education, their efficacy remains subject to scrutiny. Often characterized by passive listening, traditional lectures may not fully engage students in the learning process <sup>[3]</sup>. Recognizing the need for more effective approaches, medical schools have begun implementing various strategies aimed at fostering self-directed learning among students, thus better preparing them for long-term practice <sup>[4]</sup>. Becoming a proficient medical practitioner entails acquiring skills that blend clinical subjects with fundamental medical sciences. Lifelong learning is pivotal to achieving success in this field <sup>[5, 6]</sup>. Problem-based learning (PBL), introduced by Howard Barrows at McMaster University in Canada in 1960, engages students in exploring questions through investigations or clinical scenarios <sup>[7]</sup>. Recognized as a catalyst for lifelong learning, PBL enhances learner success, particularly in smaller class settings <sup>[8]</sup>. Tutorials, a form of small group teaching, foster collaborative learning among students, enabling them to grasp general concepts, clarify doubts, and cultivate problem-solving abilities <sup>[9-12]</sup>. In this study, we aim to assess the perceptions of final-year medical students regarding the effectiveness of didactic lectures combined with PBL versus didactic lectures paired with tutorials as teaching methodologies.

**Materials and Methods**

In this comparative study, Final-year M.B.B.S. students from Sikkim Manipal Institute of Medical Sciences participated. A total of 150 students were included after obtaining their written consent. Through a lottery method, they were divided into two groups, Group A and Group B, each comprising 75 students. These groups were further divided into smaller groups of 25 students for practical sessions, where they were exposed to tutorials and problem-based teaching-learning methodologies (TLM) for six

specified topics. Additionally, all students received regular didactic lectures on these topics. During practical hours, Group A received tutorial sessions for topics 1 and 2, while Group B engaged in problem-based learning (PBL) sessions for topics 3 and 4. Each small group session occurred on the same day as the corresponding didactic lecture. Facilitators leading the tutorial and PBL sessions were briefed on the plan and its implementation. Following the didactic lectures for the first two topics, Group A attended tutorial sessions, while Group B participated in PBL sessions. Both groups underwent pre-tests and post-tests with 10 objective questions to assess knowledge acquisition. The groups then swapped methodologies to ensure exposure to both teaching-learning approaches, though no statistical evaluation of this data was conducted.

For the third and fourth topics, Group A experienced PBL sessions, while Group B engaged in tutorial sessions after the didactic lectures. Similar to the initial topics, pre-tests and post-tests were administered to evaluate knowledge gain. Again, the groups swapped methodologies, but data collection for statistical analysis did not occur.

Data from 125 students who attended both teaching-learning methodology sessions were recorded and analyzed.

**Results**

**Table 1:** Pre-post-test Marks; Comparison of Tutorial and PBL

Teaching Methodology	No of students	Pre-test Marks (Mean ± SD)	Post-test Marks (Mean ± SD)	Stat. Test (T value)(P Value)
Tutorial	75	2.29±1.81	7.08±1.8	Paired T test (t=24.6) (P=0.001)
PBL	75	4.26±1.66	6.29±1.68	
				Paired T test (t=14.08) (P=0.001)

**Table 2:** Comparison of Marks gained in Tutorial and PBL

Teaching Methodology	Number of Students	Marks Gained (Mean ± SD)
Tutorial	75	2.37±1.7
PBL	75	4.28±1.83

Significant difference between the means of two independent groups. In this context, the "t=10.43" indicates the calculated value of the t-statistic for the test, and "P=0.001" represents the p-value associated with that t-statistic.

**Questionnaire and Their Results**

**1. Which Teaching Methodology was Helpful in Better Understanding of the Topics Taken?**

- Didactic Lecture + Tutorial: 14.
- Didactic Lecture + PBL: 25.
- Yes, to Both TLM: 59.
- No to Both TLM: 50.
- Neutral: 02.

**2. Which Teaching Methodology helps in Bridging Gaps in Learning?**

- Didactic Lecture + Tutorial: 16.
- Didactic Lecture + PBL: 28.
- Yes, to Both TLM: 56.
- No to Both TLM: 50.
- Neutral: Nil.

**3. Which Teaching Methodology Helps Concept Building?**

- Didactic Lecture + Tutorial: 14.
- Didactic Lecture + PBL: 69.
- Yes, to Both TLM: 17.
- No to Both TLM: Nil.
- Neutral: 50.

**4. Which Teaching Methodology Evoked Critical Thinking?**

- Didactic Lecture + Tutorial: 03.
- Didactic Lecture + PBL: 78.
- Yes, to Both TLM: 19.
- No to Both TLM: Nil.
- Neutral: 50.

**5. Which Teaching Methodology Helped Interaction between Staff and Students?**

- Didactic Lecture + Tutorial: 08.
- Didactic Lecture + PBL: 43.
- Yes, to Both TLM: 48.
- No to Both TLM: 49.
- Neutral: 02.

**6. Which Teaching Methodology Helped Interaction among Students?**

- Didactic Lecture + Tutorial: 05.
- Didactic Lecture + PBL: 86.
- Yes, to Both TLM: 08.
- No to Both TLM: 41.
- Neutral: 10.

**7. Which Teaching Methodology helped in Better Retention of the Topics Taken?**

- Didactic Lecture + Tutorial: 14.
- Didactic Lecture + PBL: 45.
- Yes, to Both TLM: 39.
- No to Both TLM: 41.
- Neutral: 11.

**8. Which Teaching Motivated the Students to Learn?**

- Didactic Lecture + Tutorial: 15.
- Didactic Lecture + PBL: 44.
- Yes, to Both TLM: 35.
- No to Both TLM: 50.
- Neutral: Nil.

**9. Which Teaching Methodology do you want in the Future Classes?**

- Didactic Lecture + Tutorial: 13.
- Didactic Lecture + PBL: 17.
- Yes, to Both TLM: 70.
- No to Both TLM: 21.
- Neutral: 29.

**10. Which Teaching Methodology do you suggest for Learning Other Subjects?**

- Didactic Lecture + Tutorial: 04.
- Didactic Lecture + PBL: 10.
- Yes, to Both TLM: 85.
- No to Both TLM: 19.
- Neutral: 32.

**Discussion**

A solid understanding of Dermatology is essential for the development of competent Indian medical graduates. Incorporating methods like Problem-Based Learning (PBL) and Tutorials alongside traditional lecture-based learning can offer advantages in clinical settings. Amir *et al.*,<sup>[12]</sup> in their research, affirmed that PBL enhances anatomy learning and improves scores. In our study, students demonstrated significant knowledge gains after participating in both PBL and tutorial sessions following lectures. Specifically, PBL sessions yielded greater knowledge acquisition compared to tutorials. Most students preferred a combination of small-group teaching methods alongside lectures, indicating that such approaches enhance academic performance. Zuzana *et al.*<sup>[13]</sup> similarly found that small-group teaching enhances learning satisfaction. Ratnakar *et al.*<sup>[14]</sup> emphasized that effective teaching-learning experiences require not only small-group sessions but also robust faculty-student and student-student interactions. In our study, students acknowledged interacting with faculty in both PBL and tutorial sessions, yet they perceived more student-student interaction in PBL sessions. Nyemb's study on PBL in anatomy highlighted its role in fostering clinical perspective understanding, critical thinking, and better subject retention-findings echoed in our study<sup>[15]</sup>. When asked about their preferences, students in our study favored combinations of didactic lectures with either PBL or tutorials, depending on the topic's demands in anatomy. Shetty *et al.*<sup>[16]</sup> Found that students preferred PBL alongside conventional lectures, while Gino's study indicated a preference for small-group tutorials with lectures. This preference for combined teaching methods extends beyond anatomy, as shown in studies by Shetty *et al.*<sup>[16]</sup>, Gino<sup>[17]</sup>, and Margaret<sup>[18]</sup> in Biochemistry, Physiology, and Pharmacology, respectively.

Our study advocates for integrating smaller group PBL or tutorial sessions with regular lectures to enhance understanding of core anatomical concepts. Such an approach not only improves subject retention but also promotes the clinical application of learned concepts—a crucial aspect for medical education.

### Conclusion

In summary, our study underscores the necessity of Problem-Based Learning (PBL) sessions for effectively grasping dermatological concepts in an engaging manner. PBL serves as a valuable tool for fostering student interaction and encouraging self-directed learning.

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