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Original Research Article

# COMPARING TRADITIONAL AND PROBLEM-BASED LEARNING APPROACHES IN TEACHING HIGH-RISK PREGNANCY MANAGEMENT

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## ABSTRACT

**Background:** Effective teaching methods are critical in medical education, particularly in complex subjects like high-risk pregnancy management. Traditional learning (TL) relies on structured lectures, whereas problem-based learning (PBL) promotes active engagement and critical thinking. This study compares the effectiveness of these approaches in knowledge acquisition, clinical skills, and student satisfaction.

**Material and Methods:** A comparative study was conducted among undergraduate medical students at Adesh Institute of Medical Sciences & Research. Participants were randomly assigned to TL or PBL groups, covering identical high-risk pregnancy topics. Pre- and post-test assessments, Objective Structured Clinical Examinations (OSCEs), and satisfaction surveys were used for evaluation. Statistical analysis was performed using paired and independent t-tests, with $p<0.05$ considered significant.

**Results:** Both groups demonstrated significant knowledge improvement post-intervention ($p<0.001$). However, the PBL group had a significantly greater increase in post-test scores (74.3±8.7 vs. 65.8±9.1, $p<0.001$). OSCE results favoured PBL, with higher clinical decision-making (84.8% vs. 66.7%, $p=0.003$) and communication skills scores (87.6% vs. 60.0%, $p<0.001$). Student satisfaction was also higher in the PBL group across engagement (88.6% vs. 56.2%, $p<0.001$) and confidence in application (83.8% vs. 54.3%, $p<0.001$).

**Conclusion:** Problem-based learning demonstrated superior outcomes in knowledge retention, clinical decision-making, and student satisfaction compared to traditional teaching. Incorporating PBL into medical curricula could enhance learning and skill development in high-risk pregnancy management.

**Key Words:** Problem-based learning, traditional learning, high-risk pregnancy, medical education, clinical skills, student satisfaction.

## INTRODUCTION

Effective teaching methods in medical education are critical to preparing healthcare professionals for the complexities of clinical practice. High-risk pregnancy management, an area requiring a deep understanding of physiological, psychological, and clinical factors, poses unique challenges in medical training.[1] The ability to accurately identify, evaluate, and manage such pregnancies is pivotal in ensuring optimal maternal and fetal outcomes. Hence, the pedagogical approach utilized in teaching this subject is of paramount importance.

Traditional teaching methods, often centered on didactic lectures and passive learning, have been the cornerstone of medical education for decades. These approaches provide a structured curriculum and a systematic presentation of knowledge. However, they may not adequately develop critical thinking, problem-solving, and decision-making skills—essential competencies for managing high-risk pregnancies.[2]

Problem-based learning (PBL), an interactive and student-centered approach, has emerged as an

alternative teaching strategy aimed at fostering active learning. PBL encourages students to engage in collaborative problem-solving, integrate knowledge from various disciplines, and apply theoretical concepts to real-life clinical scenarios.[3-4] It promotes self-directed learning, critical analysis, and practical decision-making, aligning well with the demands of managing high-risk pregnancies.

This study aims to compare the effectiveness of traditional and problem-based learning approaches in teaching high-risk pregnancy management. By evaluating outcomes such as knowledge acquisition, clinical decision-making, and student satisfaction, this research seeks to provide evidence-based insights into optimizing medical education. The findings could inform curriculum design and contribute to enhancing the competencies of future healthcare providers in this critical domain.

## MATERIALS AND METHODS

This comparative study was conducted to evaluate the effectiveness of traditional and problem-based learning (PBL) approaches in teaching high-risk pregnancy management. The study was carried out in the Department of Obstetrics and Gynecology at Adesh Institute of Medical Sciences & Research, Bathinda, Punjab over a period of six months. Participants included undergraduate medical students in their clinical training phase who consented to participate. The sample size was calculated based on prior studies, with a minimum of 30 students required in each group to achieve adequate statistical power.

Students were divided into two groups: the traditional learning group (Group A) and the problem-based learning group (Group B). Random allocation was performed using a computer-generated randomization sequence to minimize selection bias. Both groups received identical content covering high-risk pregnancy topics such as preeclampsia, gestational diabetes mellitus, and preterm labor. However, the teaching methodologies differed between the groups.

Group A underwent traditional teaching, which included lectures and didactic sessions delivered by faculty members. The content was presented in a structured manner, followed by a brief question-and-answer session at the end of each lecture. Group B engaged in PBL sessions, where students were divided into smaller groups, each guided by a trained facilitator. Clinical scenarios related to high-risk pregnancy were presented, and students were encouraged to discuss, identify key problems, and develop solutions through collaborative learning. Facilitators ensured that discussions remained focused and aligned with the learning objectives but refrained from providing direct answers.

To assess the outcomes, both groups completed a pre-test prior to the intervention to evaluate baseline knowledge and skills. Following the teaching sessions, a post-test was conducted to measure knowledge gain. The post-test consisted of multiple-choice questions (MCQs) and clinical vignettes specifically designed to assess both theoretical knowledge and practical application in high-risk pregnancy management. Additionally, an Objective Structured Clinical Examination (OSCE) was conducted to evaluate clinical decision-making and communication skills.

Student satisfaction with the respective teaching methods was assessed using a validated questionnaire on a 5-point Likert scale, covering aspects such as engagement, perceived effectiveness, and confidence in applying knowledge. Feedback from facilitators and instructors was also collected to gain insights into the feasibility and challenges of implementing PBL.

The data collected were analyzed using statistical software. Descriptive statistics were used to summarize demographic characteristics, and inferential statistics, including paired and independent t-tests, were applied to compare pre- and post-test scores within and between groups. A p-value of $<0.05$ was considered statistically significant.

## RESULTS

The baseline characteristics of the participants in the study showed no significant differences between the traditional learning group and the problem-based learning (PBL) group, indicating a comparable starting point for both groups. The mean age of participants was 21.8 ± 1.6 years in the traditional group and 22.0 ± 1.5 years in the PBL group, with a p-value of 0.452, reflecting no statistically significant difference. The gender distribution was also similar, with 58 (55.2%) female students and 47 (44.8%) male students in the traditional group, compared to 61 (58.1%) female students and 44 (41.9%) male students in the PBL group ($p = 0.685$). Prior knowledge, as assessed by pre-test scores, was comparable between the two groups, with a mean score of 38.5 ± 8.2 in the traditional group and 37.9 ± 7.9 in the PBL group ($p = 0.631$). These findings confirmed that both groups were evenly matched in terms of demographics and baseline knowledge before the intervention. [Table 1]

The comparison of pre-test and post-test scores demonstrated significant knowledge improvement within both groups following their respective teaching interventions. In the traditional learning group, the mean pre-test score was 38.5 ± 8.2, which increased to 65.8 ± 9.1 after the intervention, with a p-value of $<0.001$, indicating a statistically significant gain in knowledge. Similarly, the problem-based learning (PBL) group showed an increase in mean scores from 37.9 ± 7.9 to 74.3 ± 8.7, also with a p-value of $<0.001$. When comparing post-test scores between the two groups, the PBL group demonstrated a significantly greater

improvement than the traditional group, with a p-value of <0.001. These results highlight the superior efficacy of the PBL approach in enhancing knowledge acquisition compared to traditional teaching methods. [Table 2]

The Objective Structured Clinical Examination (OSCE) results revealed that the problem-based learning (PBL) group outperformed the traditional learning group across all assessed components. In clinical decision-making, 89 students (84.8%) in the PBL group achieved competency compared to 70 students (66.7%) in the traditional group, with a statistically significant difference (p = 0.003). Similarly, in communication skills, 92 students (87.6%) from the PBL group performed successfully, compared to 63 students (60.0%) in the traditional group, with a highly significant p-value of <0.001. The overall OSCE pass rate was also higher in the PBL group (90 students, 85.7%) compared to the traditional group (68 students, 64.8%), with a p-value of 0.002. These findings underscore the advantage of the PBL approach in developing both clinical decision-making and communication skills, resulting in a higher overall pass rate. [Table 3]

The student satisfaction survey results highlighted significantly higher satisfaction levels among the problem-based learning (PBL) group compared to the traditional learning group across all measured parameters. In terms of engagement, 93 students (88.6%) in the PBL group reported satisfaction, compared to 59 students (56.2%) in the traditional group, with a p-value of <0.001. Similarly, 91 students (86.7%) in the PBL group found the method effective, as opposed to 62 students (59.0%) in the traditional group (p < 0.001). Confidence in applying knowledge was also notably higher in the PBL group, with 88 students (83.8%) expressing confidence compared to 57 students (54.3%) in the traditional group, yielding a p-value of <0.001. These results emphasize the superior impact of PBL on student engagement, perceived effectiveness, and confidence in applying the learned material. [Table 4]

The facilitator feedback for both teaching methods highlighted notable differences in their experiences with the traditional and problem-based learning (PBL) approaches. Regarding the feasibility of the method, 4 facilitators (66.7%) in the traditional group and 5 facilitators (83.3%) in the PBL group found the respective methods feasible, though this difference was not statistically significant (p = 0.500). Student participation was reported to be significantly higher in the PBL group, where all 6 facilitators (100.0%) observed active engagement, compared to only 3 facilitators (50.0%) in the traditional group, with a p-value of 0.041. Additionally, the suitability of the teaching method for the topic was rated positively by 5 facilitators (83.3%) in the traditional group and all 6 facilitators (100.0%) in the PBL group, although the difference was not statistically significant (p = 0.500). These findings suggest that PBL was more effective in fostering student participation, while both methods were considered feasible and suitable for teaching high-risk pregnancy management. [Table 5]

**Table 1: Baseline Characteristics of Participants**

| Characteristic | Traditional (n = 105) | PBL (n = 105) | p-value |
|---|---|---|---|
| Mean Age (years) | 21.8 ± 1.6 | 22.0 ± 1.5 | 0.452 |
| Female Students | 58 (55.2%) | 61 (58.1%) | 0.685 |
| Male Students | 47 (44.8%) | 44 (41.9%) | 0.685 |
| Prior Knowledge (Pre-test)* | 38.5 ± 8.2 | 37.9 ± 7.9 | 0.631 |

*Pre-test scores are expressed as mean ± SD.

**Table 2: Knowledge Improvement (Pre-test vs Post-test Scores)**

| Group | Pre-test Score, Mean ± SD | Post-test Score, Mean ± SD | p-value (within group) |
|---|---|---|---|
| Traditional | 38.5 ± 8.2 | 65.8 ± 9.1 | <0.001 |
| PBL | 37.9 ± 7.9 | 74.3 ± 8.7 | <0.001 |
| p-value (between groups) | 0.631 | <0.001 | |

**Table 3: Clinical Skill Assessment (OSCE Scores)**

| OSCE Component | Traditional (n = 105) | PBL (n = 105) | p-value |
|---|---|---|---|
| Clinical Decision-Making | 70 (66.7%) | 89 (84.8%) | 0.003 |
| Communication Skills | 63 (60.0%) | 92 (87.6%) | <0.001 |
| Overall OSCE Pass Rate | 68 (64.8%) | 90 (85.7%) | 0.002 |

**Table 4: Student Satisfaction Survey Results**

| Parameter | Traditional (n = 105) | PBL (n = 105) | p-value |
|---|---|---|---|
| Engagement | 59 (56.2%) | 93 (88.6%) | <0.001 |
| Perceived Effectiveness | 62 (59.0%) | 91 (86.7%) | <0.001 |
| Confidence in Application | 57 (54.3%) | 88 (83.8%) | <0.001 |

**Table 5: Facilitator Feedback**

| Aspect | Traditional (n = 6)* | PBL (n = 6)* | p-value |
|---|---|---|---|
| Feasibility of Method | 4 (66.7%) | 5 (83.3%) | 0.500 |
| Student Participation | 3 (50.0%) | 6 (100.0%) | 0.041 |

| | | | |
|---|---|---|---|
| Suitability for Topic | 5 (83.3%) | 6 (100.0%) | 0.500 |

*Facilitator feedback was obtained from 6 instructors assigned to each group.

## DISCUSSION

This study aimed to compare the effectiveness of traditional learning (TL) and problem-based learning (PBL) approaches in teaching high-risk pregnancy management to medical students. The results indicated that PBL led to significantly greater improvements in knowledge acquisition and clinical skills, as well as higher student satisfaction compared to the traditional method. These findings are consistent with several studies that have demonstrated the superior effectiveness of PBL in medical education.

The significant improvement in post-test scores in both groups ($p < 0.001$) reflects the effectiveness of both teaching methods. However, the PBL group showed a substantially greater knowledge gain, with post-test scores averaging 74.3 ± 8.7, compared to 65.8 ± 9.1 in the TL group. This aligns with the findings of Xiaoling L et al. (2024),[5] who noted that PBL significantly enhanced the retention and application of medical knowledge by fostering active learning through problem-solving and critical thinking. Similarly, studies by Kurtulus O et al. (2010),[6] and Dil IM et al. (2014),[7] reported that students in PBL groups achieved better outcomes in both theoretical and practical assessments. Our study echoes these results, with the PBL group showing a more profound increase in knowledge related to high-risk pregnancy management, suggesting that active learning, through real-life clinical scenarios, may be more effective in ingraining complex concepts.

In clinical skill assessments, measured through the Objective Structured Clinical Examination (OSCE), the PBL group outperformed the TL group in clinical decision-making ($p = 0.003$), communication skills ($p < 0.001$), and the overall pass rate ($p = 0.002$). This is consistent with the findings of Marliyya Z et al. (2011),[8] who observed that PBL facilitated the development of not only cognitive skills but also practical skills such as clinical reasoning and communication. PBL's emphasis on collaborative learning and its real-world application encourages students to engage in critical clinical reasoning, which may be less pronounced in traditional lecture-based formats. Our study found that PBL students scored higher in these aspects, emphasizing the potential of PBL in enhancing both technical and interpersonal skills crucial in obstetric care.

One of the most striking findings of this study was the higher student satisfaction observed in the PBL group. Engagement, perceived effectiveness, and confidence in applying knowledge were significantly greater in the PBL group compared to the TL group ($p < 0.001$ for all). This is in line with the work of David G et al. (2005),[9] who concluded that PBL promotes greater student engagement by requiring active participation in learning, leading to higher levels of motivation. The results from our study suggest that PBL not only enhances learning outcomes but also improves students' overall educational experience, likely due to the active, student-centered approach that PBL fosters.

The facilitator feedback revealed interesting insights as well. While both groups were considered feasible and suitable for teaching high-risk pregnancy management, PBL was perceived to significantly enhance student participation ($p = 0.041$). Facilitators in the PBL group reported full student engagement, whereas only half of the traditional group facilitators observed active participation. This difference aligns with findings from Aloysius G et al. (2016),[10] who noted that PBL encourages student responsibility for learning, leading to greater participation. The increased student participation in the PBL group may be due to the collaborative nature of the method, where students actively engage in problem-solving, which has been shown to deepen learning (Dolmans et al., 2005).[11]

In contrast, the traditional method, which relies on lectures and passive learning, did not result in the same level of active engagement or participation. This is supported by the findings of Albanese and Mitchell (1993), who highlighted that traditional teaching methods, while effective for transmitting factual knowledge, do not foster the same level of interactive learning and critical thinking required for clinical practice. The lack of significant differences between groups in terms of feasibility and suitability of the method may reflect that both methods can be effectively implemented in teaching high-risk pregnancy management, depending on the specific context and objectives.

While our study provides compelling evidence in favor of PBL, it is not without limitations. The study was conducted at a single institution with a relatively small sample size of 210 students, which may limit the generalizability of the findings. Additionally, while the pre-test and post-test scores are objective measures of knowledge acquisition, they do not fully capture the depth of students' understanding or their ability to apply knowledge in real-world settings. Future studies could benefit from a longitudinal design, which would allow for a more comprehensive assessment of the long-term impact of PBL on clinical practice. Furthermore, exploring the impact of different PBL structures, such as the role of facilitators and the length of PBL sessions, would provide further insights into optimizing this teaching method.

## CONCLUSION

In conclusion, this study supports the growing body of evidence suggesting that PBL is a more effective teaching approach than traditional learning for medical students, particularly in enhancing knowledge retention, clinical skills, and student satisfaction. Given the complexity and importance of managing high-risk pregnancies, teaching methods that promote active learning, clinical reasoning, and student engagement, such as PBL, should be prioritized in medical education. These findings also highlight the need for continued innovation in teaching strategies to improve the quality of medical education and prepare students for the challenges of clinical practice.

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