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Perceptions of Pre-clinical Science Faculty Members Regarding Problem Based Learning at  
Manipal College of Medical Sciences

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**ABSTRACT**

**Introduction:** Problem-Based Learning (PBL) is a student-centered instructional method that enhances critical thinking, teamwork, and knowledge retention. At Manipal College of Medical Sciences (MCOMS), PBL has been integrated into the pre-clinical sciences curriculum. Understanding faculty perceptions of this pedagogical method is essential for optimizing its implementation. This study aimed to assess the perceptions of pre-clinical science faculty members at MCOMS regarding the effectiveness and challenges of PBL in medical education.

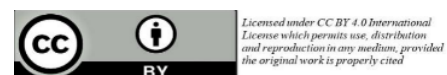
**Methods:** A descriptive cross-sectional study was conducted among 30 faculty members from seven pre-clinical departments at MCOMS from 1<sup>st</sup> to 28th February, 2023 after approval from institutional review board (Reference ID: MCOMS/IRC/547/GA). Data were collected using a structured questionnaire containing 30 perception items rated on a five-point Likert scale. Responses were analyzed using SPSS version 20, and Kruskal-Wallis tests were employed to explore associations with faculty characteristics.

**Results:** Faculty perceptions toward PBL were generally favorable. More than 85% agreed that PBL improves knowledge retention, student engagement, communication skills, teamwork, and critical thinking. However, significant concerns were reported about inadequate faculty training, lack of assessment clarity, and unsuitable classroom infrastructure. A statistically significant difference in perception was observed among the oldest age group ( $p=0.020$ ), but not with other demographic variables.

**Conclusions:** Faculty members value PBL for its educational benefits but identified gaps in training and institutional support. To maximize the impact of PBL, structured faculty development programs and logistical improvements are recommended.

**Keywords:**

*Education; Faculty, medical; Problem based learning; Teaching methods.*



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## INTRODUCTION

Problem-Based Learning (PBL) is an educational approach that uses real-life clinical problems to promote critical thinking, problem-solving, and self-directed learning.[1] Introduced at McMaster University in the late 1960s, it has since been widely adopted in medical education.[2] PBL involves students working in small groups with guidance from a facilitator to analyze clinical scenarios, identify learning issues, and acquire relevant knowledge through self-directed study and collaborative discussion.[3-5] This active, student-centered approach contrasts with the traditional lecture-based method and has been credited with promoting deeper learning, improved retention, and better preparation for clinical practice.[6,7]

Manipal College of Medical Sciences (MCOMS), Pokhara, follows a hybrid curriculum in which PBL is integrated across all pre-clinical subjects. As faculty members play a key role in designing, facilitating, and guiding PBL sessions, their understanding and perceptions of this approach are essential for its success. However, limited studies have explored faculty perspectives on PBL in our context.

This study aimed to assess the perceptions of pre-clinical science faculty members at MCOMS towards the implementation and effectiveness of PBL in undergraduate medical education.

## METHODS

This descriptive, cross-sectional study was conducted at MCOMS to assess faculty perceptions of PBL. The study was conducted from 1<sup>st</sup> to 28<sup>th</sup> February, 2023. The participants included 30 pre-clinical science faculty members currently using PBL as part of their teaching practice. Faculty from the departments of anatomy, physiology, biochemistry, pathology, microbiology, community medicine, and forensic medicine were included.

Inclusion criteria were all faculty members of basic sciences at MCOMS who were actively involved in conducting problem-based learning sessions. Faculty members who declined to provide consent for participation were excluded from the study. Participation was voluntary, and a structured, pre-designed questionnaire was administered. Participants were assured of confidentiality, and no identifying information was collected. Furthermore, their identities were protected by not asking them to sign any consent form and were informed that the completion of the survey would serve as their consent. Questionnaires were distributed in person by the researcher.

Demographic data collected included participants' age, gender, designation, teaching experience, and years of involvement with PBL. The survey comprised 30 items evaluating perceptions of PBL, using a 5-point Likert scale (1–Totally agree, 2–Agree, 3–Neutral, 4–Disagree, 5–Totally disagree).

For analysis, the scale was converted to a score ranging from +1 to -1. Scores of 'totally agree' and 'agree' were grouped as +1, 'neutral' as 0, and 'disagree' and 'totally disagree' as -1. Thus, the total score for each respondent ranged from +30 to -30. A mean score was then calculated across all items to represent each participant's overall perception.

Data were entered and analyzed using SPSS version 20. Descriptive statistics, including frequencies, means, and standard deviations, were used. The Kruskal-Wallis test was applied to examine associations, with a p-value of <0.05 considered statistically significant. Ethical approval was obtained from the Internal Review Committee of MCOMS(MCOMS/IRC/547/GA) prior to commencing the study.

## RESULTS

Out of the total 32 pre-clinical faculty members

at MCOMS, Pokhara, Nepal, 30 participated in this study. Two faculty members could not be included as they were on long leave during the data collection period. Among the respondents, 63.3% (n = 19) were male and 36.6% (n = 11) were female. The majority (56.7%) were between 30–40 years of age, followed by 30% in the 41–50 age group, and 13.3% above 50 years.

In terms of academic designation, both lecturers and assistant professors each accounted for 11(36.7%) of participants, while professors comprised 6(20%) and associate professors 2(6.7%). Half of the faculty (50%) had more than 10 years of overall teaching experience, while 33.3% had between 1–5 years and 16.7% between 6–10 years. With regard to their experience conducting PBL sessions, 40% had 1–5 years of experience, 30.0% had 6–10 years, and another 30.0% had more than 10 years of experience.

The majority of responses to the 30-item questionnaire reflected a positive perception of problem-based learning, with most faculty selecting “agree” or “strongly agree.” In particular, over 85% of respondents agreed that PBL enhances content knowledge, improves retention, makes learning more enjoyable, and fosters student engagement, critical thinking, communication, teamwork, and confidence. More than 90% believed it supports group discussion skills and helps bridge theoretical and clinical knowledge in the basic sciences.

However, notable concerns were also expressed. A large proportion of faculty disagreed that they had received adequate training prior to facilitating PBL sessions (83.3% disagreed), and many found the classroom environment unsuitable for small-group discussions (76.7% disagreed). Uncertainty about the assessment methods used in PBL was also evident, with 56.7% disagreeing that they were clearly

defined. Some faculty (66.7%) also opposed the idea of returning to purely conventional lecture-based methods, indicating a preference for retaining PBL despite its challenges. A detailed distribution of responses to five key items is presented in Table 1.

**Table 1: Faculty Perceptions on Key Aspects of Problem-Based Learning (n=30)**

PBL Perception Item	Disagree N (%)	Neutral N (%)	Agree N (%)
PBL improves communication skills between students	1(3.3)	1 (3.3)	28 (93.3)
PBL makes learning more interesting and fun	2(6.7)	2(6.7)	26(86.7)
Classrooms are designed to suit small group PBL discussions	23(76.7)	2(6.67)	5(16.7)
Proper training was given to faculty before conducting PBL classes	25(83.3)	3(10)	2 (6.7)

The mean rank perception scores were higher among male faculty (17.13), professors (21.42), faculty with 6–10 years of teaching experience (18.40), and those with 1–5 years of PBL experience (16.92); however, these differences were not statistically significant. A statistically significant difference in perception was observed among different age groups ( $p = 0.020$ ), with faculty aged above 60 years showing the highest mean rank (22.88). Table 2 summarizes the mean rank scores across selected demographic and professional characteristics.

**Table 2: Mean Rank Perception Scores of Faculty Members by Selected Characteristics (n=30)**

Characteristics	Number	Mean Rank	P value
<b>Age</b>			
30-40	17	17.03	0.020
41-50	9	9.33	
>50	4	22.88	
<b>Gender</b>			
Male	19	17.13	0.181
Female	11	12.68	
<b>Designation</b>			
Lecturer	11	14.09	0.316
Assistant Prof	11	13.59	
Associate Prof	2	16.00	
Professor	6	21.42	
<b>Years of PBL experience</b>			
1-5	12	16.92	0.445
6-10	9	16.72	
>10	9	12.39	

## DISCUSSION

In this study the perceptions of pre-clinical faculty members of the department of anatomy, physiology, biochemistry, microbiology, pathology, community medicine and forensic medicine, MCOMS, Pokhara, Nepal were evaluated.

It is seen that the undergraduate medical education is in constant need to keep up with the demands of the changing new medical innovations which emerge regularly. In a similar way, medical institutes also need to change their pedagogy to keep pace with the developing trends in medical education. Many medical schools worldwide have transitioned from traditional teaching methods to adopting PBL

curricula, either fully or in a hybrid manner within integrated curricula. As with most practices, it is crucial to get the insights and feedback from stakeholders, particularly educators, to ensure the effectiveness and usefulness of any practice that occurs in any institute to ensure its efficiency.

Several studies have highlighted the positive impact of PBL on learning in basic medical sciences.[4,8,9] Meo SA demonstrated that students engaged in PBL exhibited significantly higher knowledge and skills compared to those taught through traditional methods, with notable improvements observed in both multiple-choice examinations and practical assessments in respiratory physiology.[8] Another study reiterates this finding, by stating that students who practiced PBL model of teaching achieved better academic performance than those who were limited to following only the traditional lecture-based teaching-learning methods.[10] Similarly, our study found that 86.7% of faculty members agreed that PBL imparts better content knowledge, and 83.3% felt it enhances knowledge retention.

Despite the global implementation of PBL, awareness levels vary. A study in Hunan province, China, revealed that 41.2% of nursing students were unfamiliar with PBL, and among those who had heard of it, 54.4% recognized it as a teaching method but lacked deeper understanding.[11] This highlights the crucial role educators play in introducing the concept of PBL to students and helping them understand how it works.

In the context of Nepal, while many medical institutions have adopted PBL, there's a scarcity of literature focusing on the perceptions of pre-clinical faculty members actively involved in its implementation. Most existing studies emphasize students' perspectives. For instance, a

study at King Faisal University in Saudi Arabia assessed student attitudes towards PBL, revealing positive perceptions, especially concerning communication skills and motivation to study.[12] In our study, 93.3% of educators concurred that PBL enhances communication skills, aligning with these findings.

Aboonq found that 89.4% of participants believed PBL aids students in teamwork, and 86% felt it fosters peer interaction.[13] This finding was similar to the observation made in the current study with 90% agreeing on PBL's role in promoting teamwork and 86.7% acknowledging its benefits in improving group discussion skills.

Regarding the preference for teaching methods, Aboonq reported that 61.2% of respondents favored PBL over traditional methods, while 29.4% remained neutral [13]. In the present study, when presented with the statement "It is better to go back to the conventional lecture method than adopting the PBL model," 66.7% disagreed, indicating a preference for PBL, though 26.7% were neutral, and 6.7% agreed. In the study done by Al-sheri et al the same item was agreed upon by 15.4% but disagreed by 76.2% of the participants [7]. This indicates that majority prefer the PBL model but also shows that there are still some educators who have reservations regarding to the PBL pedagogy method. A possible explanation to the reservation could be that these educators have graduated from institutions where the focus was on traditional curriculum and were comfortable with what they had been accustomed to.

Concerning the belief that PBL produces better graduates, Aboonq found 61.9% agreement and 27.4% neutrality among participants [13]. Our findings were comparable, with 66.7% agreeing and 20% disagreeing, reinforcing the perception of PBL's positive impact on graduate quality.[13]

A study from Mymensingh Medical College in Bangladesh indicated that 69% of faculty believed PBL enhances self-directed learning, and 64% supported its inclusion in clinical teaching.[14] In our research, 90% of participants agreed that PBL stimulates critical thinking, highlighting its role in fostering independent learning.

In regard to the opinion for the perception item, "Proper training was given to the faculties before conducting PBL classes", 25(83.3%) of the studied participants disagreed, 3(10%) had a neutral stance and 2(6.7%) agreed. In MCOMS, recruited faculty members are not required to have such training certificates and therefore most have never received a formal training in PBL model. At present, the new faculties who must abide with PBL teaching-learning activities, get guidance for PBL model from the experienced seniors or self-learn.

This is probably the reason why 80% of the faculty members were in agreement with the item, "Some extra training should be given to faculty for conducting PBL". In a similar study done by Al-sheri et al, they found that only about 40% of the respondents agreed to "All faculty and students had sufficient training on PBL".[7] In the same study, 37.1% also believed that their institute was not sufficiently prepared for the implementation of the PBL model due to factors such as lack of resources (library, laboratories, faculty members), language barrier, disagreement on the PBL format and lack of clear instructions, lack of satisfaction in the system, untrained tutors and time management issues. It was also hypothesized that students' issues such as absence of preparation before the sessions, lack of motivation for self-learning and a heavy dependence on lecturer were other obstacles for the successful execution of the PBL module.[7]



Assessment methods also emerged as a concern. In our study, 56.7% of faculty members disagreed with the clarity of assessment methods for each PBL session. In contrary to this finding, Al-sheri et al reported 26.5% disagreement with this item in their study, while 13.2% remained neutral.[7] The large number of educators who are in disagreement with this statement in the present study indicates that further training/workshops are needed in MCOMS to facilitate their understanding of the assessment method.

Physical infrastructure poses another challenge. When asked if classrooms were designed to facilitate small group discussions inherent to PBL, 76.7% of respondents in this study disagreed. Traditional lecture halls with fixed seating arrangements hinder the interactive and collaborative environment PBL requires. Adapting classroom layouts to support roundtable discussions or flexible seating can enhance the effectiveness of PBL sessions.

More than 90% of the participants in Orfan et al's study believed that PBL makes the topic more interesting and fun.[15] This opinion holds true in this study as well as 86.7% had similar views. In problem-based learning in medical schools, students apply what they know to solve authentic problems with the intention of producing results that matter as it re-creates real life situations. From an educator's point of view, the unveiling of this whole process through the minds of learners can be very fascinating- PBL's real-life problem-solving approach not only enriches student learning but also offers educators the satisfaction of witnessing student growth through self-directed exploration.

In this study, only a little more than half (53.3%) were interested in using more PBL in their classes. Problem based learning does have its own disadvantages, particularly in set up like

ours where it is stressful for the faculty members as it takes up a lot of time and responsibility, a heavy reliance on books, literatures and internet and also experiential learning from the teachers is limited. This could be some potential possible reasons why instructors do not want to apply more PBL in their courses.

This study's primary limitation is its small sample size and focus on a single institution, which may limit the generalizability of the findings. Future research encompassing multiple centers with larger participant pools is recommended to validate and expand upon these insights. Nonetheless, this study offers valuable perspectives, being among the first to assess educators' perceptions of PBL at MCOMS and correlating these views with demographic and professional characteristics.

## CONCLUSIONS

PBL is an innovative teaching learning experience that has shown significant impact in medical education. According to the studied participants, it helps students work in teams, improves communication and discussion skills, improves the individual students' confidence level, and stimulates critical thinking in them. However, it is also clear from this study that the instructors would appreciate trainings for proper conduction of PBL classes. Therefore, it is suggested that the institute provide the instructors with training/hands-on workshops in order to enable them to effectively integrate problem-based learning in to their classes in order to enhance students' learning and motivation.

## CONFLICT OF INTEREST

None

## SOURCES OF FUNDING

None

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