



## Medical Students' Perspectives on Problem-Based Learning (PBL) Method as a Part of CBME Curriculum

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### ABSTRACT

**Context:** The goal of Problem Based Learning (PBL) is to prepare medical students for life-long learning by engaging them in self-directing learning, self-regulation and effective teamwork in which the students are responsible for discovering facts and uncovering key concepts.

**Aim:** The aim of this study is to explore the perspectives of 2nd year under graduate students in a medical college about problem-based learning.

**Materials & Methods:** A cross-sectional study was conducted among 130 second year medical undergraduate students from December 2020 to April 2021. A self-administered questionnaire was used that focused on benefits, execution and role of facilitator in PBL teaching method to collect data using Google forms. Collected data were exported in excel sheet & analyzed using EpiInfo Version 7.2.2.6 Software.

**Results:** Out of 130 participants, almost one third (48; 36.9%) preferred problem-based learning as a method of theory teaching. Students mentioned that PBL method helped them to improve various skills like communication skills (90%), problem solving skills (90%), presentation skills (88%), and decision-making skills (87%) & brainstorming skills (83.8%). Most of the students enjoyed the self-directed learning occurred in PBL session.

**Conclusions:** This study highlighted the role of PBL method in teaching curriculum in the medical education and perception of the students toward it. The students perceived that PBL method is an interesting, innovative, interactive & effective Teaching-Learning (TL) method which helped to develop the decision-making skill, problem solving skill & communication skills.

**Key Words:** Medical student, perspectives, problem-based learning, CBME



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### INTRODUCTION

Problem based learning is a learning process based on the principle of using problems as a starting point for the acquisition and integration of new knowledge [1]. In problem-based learning (PBL) students use “triggers” from the problem case or scenario to define their own learning objectives. Subsequently they do independent, self-directed study before returning to the group to discuss and refine their acquired knowledge [2].

PBL is a student-centered, inquiry-based instructional model in which learners engage with an authentic, ill-structured problem that requires further research [3]. Students identify gaps in their knowledge, conduct research, and apply their learning to develop solutions and present their findings [4]. According to Dochy et al [5], problem-based learning was developed in order to help students in the development of professional skills such as problem-solving, analysis, synthesis, and evaluation, as well as the ability to solve problems in the real world. Group learning facilitates not only the acquisition of knowledge but also several other desirable attributes, such as communication skills, teamwork, problem solving, independent responsibility for learning, sharing information, and respect for others [2].

There is growing evidence that real-world type of questions and learning activities that are student-centered may be more valuable than traditional teacher-centered lectures in which most of the pertinent information is presented by the teacher, followed by a case study or assignment [6,7].

With the introduction of CBME curriculum for medical students in India, it becomes imperative to implement PBL as one of the Teaching-Learning (TL) methods & to know the perspectives of the students in relation to it. Understanding the students' perspectives, their experiences and feedback about problem-based learning may help the teachers/faculty to design the PBL exercises/scenarios more correctly & implement it effectively during teaching session. The aim of this study is to explore perceptions about problem-based learning among the 2<sup>nd</sup> year undergraduate students of a medical college.

## MATERIALS AND METHODS

A cross sectional study was conducted among semester III MBBS students of the medical college from December 2020 to October 2021. The study protocol was reviewed and approved by the Institutional Ethics Committee vide No. DMHS/IEC/2016/214/6114 dated 03/07/2021. A total 130 students were studying in semester III during the study period. All these III Semester students had given informed consent & were enrolled for the study.

The whole batch of III semester students (130) was divided into four batches, two batches of 32 students & two batches of 33 students for the clinical posting of one-month duration each, in the department of Community Medicine. The batch of 32-33 students was divided alphabetically into three batches of 10-11 students each for the clinical posting. Students remained in these groups throughout one-month duration of clinical posting.

Each batch of 10-11 students was allotted one faculty as facilitator to guide them during this whole PBL process. All facilitators were given training about conduction of PBL session. Facilitators were trained about their role & responsibilities during PBL sessions, group dynamics, timeframes, and learning contents of each PBL scenario.

The process of PBL recommended by Maastricht University [8] is followed which includes steps as understand the problem, explore the curriculum, & resolve the problem.

At the beginning of the posting, the students were briefed verbally about the principles, methodology, and practice of a PBL session. Brainstorming sessions were conducted to bring out relevant topics like public health problems of importance. Topics selected for PBL were leprosy, tuberculosis, alcoholism, HIV, teenage pregnancy, menstrual hygiene, tobacco use and de-addiction, poor sex ratio, sickle cell anemia. Two combined sessions were conducted for each monthly batch consisting of three subgroups.

In the first three hours session, Students chose one public health problem for their group. They reviewed the literature in relation to the epidemiology & applied aspects of the chosen public health problem under the guidance of facilitator. The particular topic was studied in detail by the students over the period of four weeks. They were free to meet amongst themselves and with the facilitator later for further discussions. Each subgroup had formed WhatsApp group along with the facilitator & Chief Investigator for continued interaction.

In the second three hours session which was held four weeks later, Knowledge and understanding of the selected public health problem and its feasible solutions were presented by using power point presentation, chalk & board & flipcharts by all the groups in presence of Chief Investigator & facilitators. After each presentation, the members of other groups were free to ask questions or to add relevant comments. The knowledge of the students regarding the topic was assessed by the facilitators and other faculties who attended the session by asking questions about the topics orally.

At the end of last session, Feedback was taken from the students about PBL – teaching learning method as a part of CBME through self-administered questionnaire by using Google forms. The questionnaire was developed after doing extensive literature search using the web-based search engines PubMed, Medline, and Google scholar by using key words 'problem-based learning', 'CBME curriculum', 'medical students and PBL' etc. The questionnaire was reviewed by the experts from the department and pilot tested among 20 students to test accuracy of responses. Feedback questionnaire included constructed response with open ended questions and selected response with five-point Likert scale as strongly disagree, disagree, neutral, agree, and strongly agree. The five-point Likert scale responses were combined into three different categorical variables: "agree" (strongly agree plus agree), "neutral", and "disagree" (strongly disagree plus disagree). A score of 3, 2 and 1 was given to agree, neutral and disagree categories respectively. Information on the items in the questionnaire was clearly explained to the participants before the assessment.

Collected data were exported in excel sheet & analyzed using Epi Info Version 7.2. 2.6. Descriptive analysis was done by calculating the frequency in percentage for categorical variables. The chi-square test was used to measure the associations between the different categorical outcome variables and  $P < 0.05$  was considered as statistically significant.

## RESULTS

### Socio-demographic profile

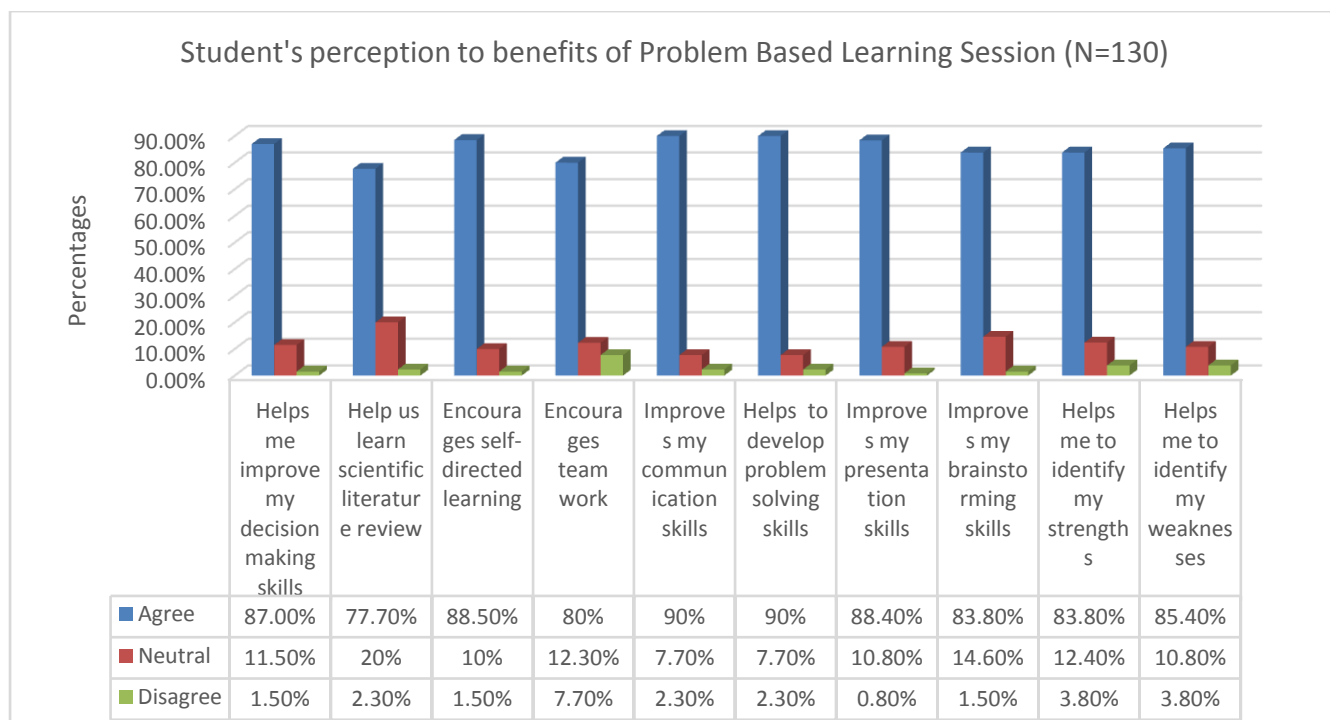
A total of 130 students participated in the study. Out of the total participants, 58 (44.6%) were male and 72 (55.4%) were female. The mean age of participants was  $19.9 \pm 0.963$  years, with a range of 17-23 years. One third of the participants were from Dadra & Nagar Haveli (48; 36.9%). Majority (101; 77.7%) of them were staying in hostel and their mode of schooling was English medium (116; 89.2%). Almost one third (48; 36.9%) of them preferred problem-

based learning as a method of theory teaching followed by small group discussion (42;32.2%). The various finding of the study is summarized in figures and tables mentioned below.

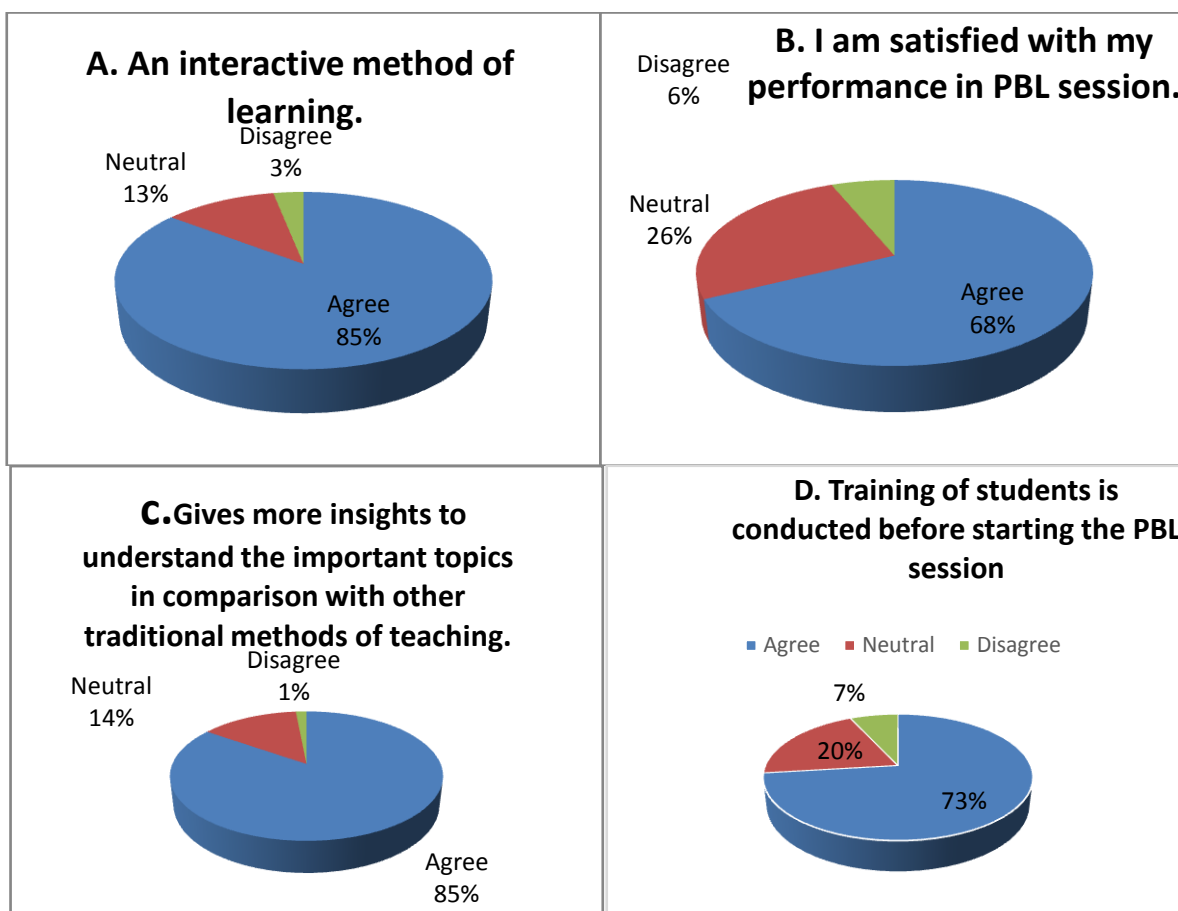
**Table/Figure 1: Frequency distribution of various socio demographic variables (N=130)**

Variables	Categories	Number(%)
Gender	Male	58(44.6%)
	Female	72(55.4%)
Permanentplaceofresidence	DNH	48(36.9%)
	Daman	34(26.2%)
	Diu	14(10.8%)
	Maharashtra	7(5.4%)
	Gujrat	11(8.5%)
	Rajasthan	13(10%)
	Others	3(2.3%)
Currentresidence	Stayinginhostel	101(77.7%)
	Day-scholar	29(22.3%)
Modeofschooling	English	116(89.2%)
	Gujarati	11(8.5%)
	Hindi	2(1.5%)
	Marathi	1(0.8%)
	Combinationofmethods	5(3.8%)
Preferredmethodoftheoryteaching	Problembasedlearning	48(36.9%)
	Tutorials	9(6.9%)
	Powerpointpresentation	17(13.1%)
	Didacticlectures	9(6.9%)
	Smallgroupdiscussion	42(32.2%)
	Combinationofmethods	5(3.8%)

DNH- Dadra and Nagar Haveli, Others: Andhra Pradesh, Punjab



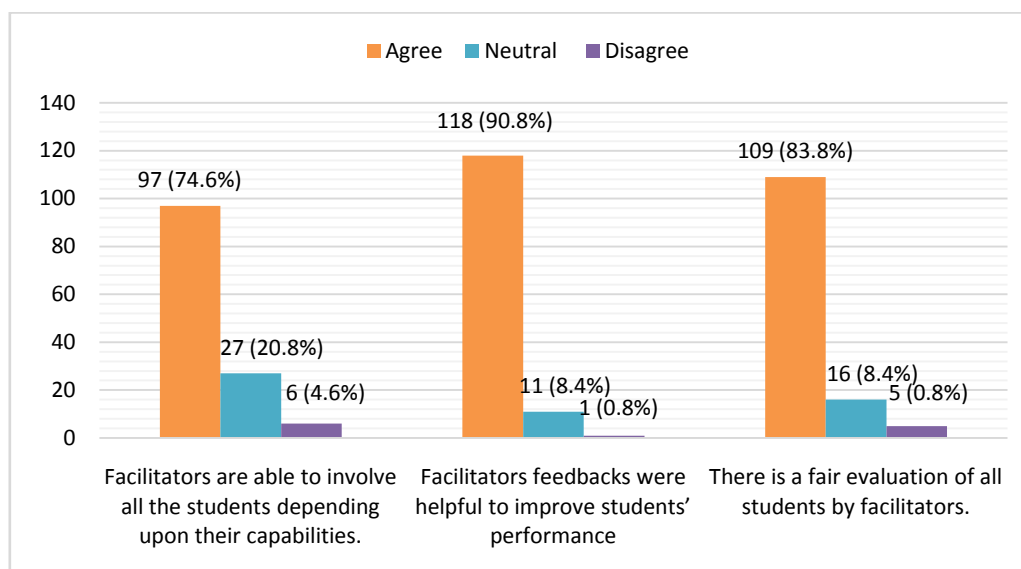
**Table /Fig.2: Student's perception to benefits of problem-based learning (PBL) session (N=130)**



Table/Fig.3: (A, B, C, D) Student's perception to execution of problem-based learning (PBL) session (N=130)

Table/Fig.4: Student's perception to execution of problem-based learning (PBL) session (N=130).

Sr NO.	Perception of student		Male	Female	
1	There is a scope for contribution by all students in PBL sessions in some or other way.	Agree	46	57	$X^2 = 0.0004$ . $p = 0.983984$ . Not significant at $p < 0.05$ .
		Disagree	12	15	
2	There is full scope of utilization my qualities in PBL method.	Agree	44	62	$X^2 = 2.2416$ . $p = 0.134344$ . Not significant at $p < 0.05$ .
		Disagree	14	10	
3	PBL method is better in comparison to other methods like small group discussions and tutorial	Agree	22	43	$X^2 = 6.1015$ . $p = 0.013506$ . Significant at $p < 0.05$ .
		Disagree	36	29	



**Table/Fig.5: Student's perception to facilitators' contribution during problem-based learning (PBL) session (N=130)**

## DISCUSSION

Most of the students mentioned that PBL method helped them to improve various skills like communication skills (90%), problem solving skills (90%), presentation skills (88%), and decision-making skills (87%) & brainstorming skills (83.8%). Majority of the students reported that PBL methods encourages self-directed learning (88%) & team work (80%). A large number of students cited PBL method helped them in identifying their strengths (83.8%) and weaknesses (85.4%). Our results are consistent with studies conducted by Pawlina W et al[9] and Dope SA et al[10], Sahar Younes Othman[11].

### Execution of problem-based learning (PBL) session

Almost two third of the students (73.1%) were satisfied with the training conducted before starting the PBL session. High percentage (84.6%) of them agreed to the statement that PBL method gives more insights to understand the important topics in comparison with other traditional methods of teaching. Although majority of students (88; 67.7%) rated that they are satisfied with their performance in PBL session, this percentage was comparably less than that for other statements (Table/Fig 4).

Our study reported that almost half of the students agree that PBL method gives more insights to understand the important topics in comparison with other traditional methods of teaching. Another study by Shah et al[12] also recommends traditional lectures along with other methods of teaching like PBLs, videos, bedside teaching and mannequins should be used in combination for a better teaching and learning experience. In our study, majority of the students (85%) reported the PBL method as an interactive method of learning. Similar findings were observed in the study done by Nahar et al[13]. One of the advantages of the PBL method as reported by majority of the students in our study is full scope of utilizing their qualities and expressing their views in an effective way. Shamshan et al. also reported the similar findings in his study[14].

Perception of Boys & girls differed in certain aspects of execution of PBL. About one third of boys (37%) & 59.7% girls reported that PBL method is better in comparison to other Teaching Learning methods like small group discussions and tutorial & this difference in perception between boys & girls is statistically significant (Table/Fig 5).

More than ninety percent of students (118; 90.8%) reported that facilitator's feedbacks were helpful to improve their performance. Similar findings were observed in the study done by Shankar et al[15] and Al-Nagar et al[16]. In our study according to students, facilitators stimulated them to get involved depending upon their capabilities (97; 74.6%) and also did a fair evaluation of all the students (Table/Fig 6). Similar findings were observed in the study done by Sahar Younes Othman [11].

### Feedback about PBL method by the students

Majority of the students are satisfied with the PBL session. They felt that PBL method is an interesting, innovative & interactive method of learning. It helps in improving the presentation skills & communication skills. Most of the students enjoyed the self-directed learning occurred in PBL session while some students pointed out what went right or wrong & how they might have improved the presentation in PBL session. Some quotes by students are as follows:

*"It was the perfect method to improve the learning skills and communication with the facilitators and batchmates..."*  
*"This method was effective in boosting my confidence and to understand my weaknesses."*



“Team work was difficult as every student is not interested in group participation”.

“There should be more interaction between the facilitators & students participating.”

“It is time consuming method”.

Feedback given by the participants about PBL method in our study is consistent with the findings of the study conducted by Larin, H. M. et al [17] which mentioned that majority students cited that PBL method is an interesting, innovative & interactive method of learning which helps to improve various skills & boost confidence while some students opined that PBL is time consuming method and requires more team work.

**Limitation:** Perceptions by the students are subjective in nature. Further research is needed to find out more objective results about benefits of PBL to the students.

## CONCLUSION

This study highlighted the role of PBL method in teaching curriculum in the medical education and perception of the students toward it. The students perceived that PBL method is an interesting, innovative, interactive & effective Teaching-Learning (TL) method which helped to improve their communication skills, presentation skills and problem-solving skills & encouraged them for self-directed learning. Students also mentioned some challenges while conducting PBL like difficulty in team work, inadequate communication between facilitator and students & more time-consuming activity. Henceby using appropriate measures to reduce the challenges for conducting PBL, this method should be used more frequently for Undergraduate student teaching which will help student to get more insight in understanding the complex concepts & to promote self-directed learning.

**Conflict of Interest:** NIL

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