Europasian Journal of Medical Sciences
EJMS

Original Research Article

Perception and Experience of Student-Facilitated Problem-Based Learning in Medical Education: A Qualitative Analysis in a Resource-Limited Setting of Nepal

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ABSTRACT

Background: Shortage of trained faculty to facilitate problem-based learning (PBL) is a major challenge in resource-limited settings. Our study aimed to assess the effectiveness and shortcomings of student-facilitated PBL in such a setting in Nepal.

Methods: First year and second year medical students (80 students) conducted student-facilitated PBL modules in Karnali Academy of Health Science, Jumla during March and April of 2024. This report presents the retrospective reflexive thematic analysis of the perceptions or experiences of the students and faculty involved in the PBL modules. The data comprised of presentation slides of six teams of student during wrap-up seminars and notes taken during four focus group discussions (25 participants in total) of the students and faculty members after the PBL modules.

Results: The major themes included prior concerns and overall experience, facilitator and facilitation-related experience, group dynamics, learning experience, resource management and suggestions for training. Most of the students and faculty valued the student-facilitated PBL modules positively. More self-directed nature, in-depth study, hesitation-free discussions and development of problem-solving and leadership skills were among the perceived advantages of the PBL modules. Major challenges were related to inadequacy of the PBL process skills, team management and time management issues. Further training of students in those areas was suggested.

Conclusions: The overall experience of the students and faculty members remained positive. Thus, student-facilitated PBL modules with the provision of faculty supervision and adequate training of students may serve as an alternative model of PBL in resource-limited scenarios.

Keywords: Effectiveness; focus group; peer tutor; perception; problem-based learning; qualitative study

INTRODUCTION

Problem-based learning (PBL) is akin to learning in a natural way and it fosters critical thinking, problem solving and social skills.[1,2] With this recognition, PBL has been adopted as a pedagogical tool in the medical curricula in Nepal for about 30 years.[3,4] At the same time, owing to the need for arranging various resources including trained tutors, its effective implementation is challenging and more so in resource-limited settings.[2] Nepal, a developing nation, lacks adequate basic medical faculty and their distribution is further less favorable to remote areas;[5] which makes it difficult to manage faculty members to facilitate PBL.

Strengthening the role of students to make PBL less dependent on faculty may offer a viable alternative to faculty-tutored PBL. In support of this view, studies have been done in various parts of the globe on PBL facilitated by peers of the same level or senior peers. Many of the studies have demonstrated the effectiveness of peer-tutored PBLs and non-expert facilitated tutors in imparting content knowledge and psychosocial skills while some studies have favored expert-led PBL.[6-9]

In the context of Nepal, some students' reflections have reported positive experience of peer tutoring.[10] However, to our knowledge, no prior study has systematically analyzed the experience of student-facilitated PBL. We aimed to analyze the perceptions and experience of students and faculty members regarding the effectiveness and shortcomings of student-facilitated PBL modules in a health science academy situated in a remote area of Nepal. Since this model of PBL seeks to strike a balance between student-facilitator's role as a discussion leader and a learner, our findings are expected to have global relevance.

DATA AND METHODS

Our observational study adopted both quantitative and qualitative approaches to retrospectively analyze the test scores and subjective experiences pertaining to the student-facilitated PBL respectively. This report presents the qualitative component of the study and the quantitative analysis has been reported elsewhere in a separate article .[11] Perceptions or experiences of the MBBS first year and the second year students as well as the faculty members involved in the implementation of the student-facilitated PBL were analyzed utilizing qualitative phenomenological approach and pragmatic research paradigm.

The study proposal was approved by the Institutional Review Committee of the Karnali Academy of Health Sciences (Ref: 081/082/01) on 30 Aug 2024. Approval from the Office of the Dean was also obtained for retrieval of data for the study; and analysis was carried out during September of 2024. Being a retrospective analysis of academic records, consent from the study participants was not applicable. Confidentiality of the data was strictly maintained and de-identification of the participants was ensured in publishable reports.

Context

Karnali Academy of Health Sciences has introduced PBL in

its integrated and student-centered curriculum;[12] and PBL is usually facilitated by faculty members. During March and April of 2024, when faculty tutors could not be arranged, student leaders facilitated PBL using the PBL triggers and facilitator guide prepared by experienced faculty members. One PBL module on one case scenario was conducted for the MBBS first and the second year each. This article resulted from retrospective analysis of the PBL records by the faculty members involved in the implementation of the student-facilitated PBL. The student-facilitated PBL modules were conducted under the supervision of the PBL coordinator (LRJ) and the MBBS Phase-I coordinator. Faculty members from various basic medical sciences and community health science prepared the PBL triggers, facilitator guide and test questionnaires.

PBL of each team composed of 10 students. The first year students did not have prior experience with PBL although the second year students were familiar to faculty tutor-facilitated PBL. The students were oriented (two hours for the first year and one hour for the second year) before the PBL sessions about the PBL process and their responsibilities.

Maastricht seven-step-model of PBL was adopted.[13] The student leaders took the facilitator role to implement the PBL process and participated as learners at the same time. The facilitator guide and printed triggers (problem segments) were distributed to the team leaders in installments and the team leaders were expected to consult the facilitator guide for a trigger only after the half-time of the respective trigger. The facilitator guide intended to outline the PBL process, leader responsibility, timeline and expected interactions or discussion points and possible learning objectives without offering hints to solution. In a PBL week (two hours per day), group discussions were scheduled on days one, three and five whereas self-study on days two, four and six. A wrap-up seminar was organized on the seventh or eighth day for each batch to share learning with the whole batch and faculty members. Post-test was taken after the PBL sessions.

Focus group discussions with the following four groups were conducted to receive feedback and to share experience of the student facilitators/leaders, team members and faculty.

- Three team leaders and two team members from the second year
- Five team members from the second year
- Five team leaders and four team members from the first year and
- Six faculty members (coordinators, PBL case designers, test question setters including the authors)

Participants with these different roles were chosen purposively to gather their different perspectives. Available team members were requested to participate as per convenience. The discussions, each about 30-45 minutes long, were facilitated by the PBL coordinator (LRJ). The participants were invited to participate in the face-to-face discussions held in the PBL rooms or college premises (according to their preference) in order to share their experiences on predetermined topics including their overall experience of student-facilitated PBL, the advantages of the PBL module, its shortcomings and suggestions for future improvements. The participants were invited to express their perceptions freely in a welcoming environment and confidentiality of their expressions was reassured. Probes and clarifying questions were used as necessary. Brief handwritten notes were taken by the facilitator (LRJ) during the discussion for future reference. The responses recorded in the notes were anonymized and labels indicating the role, year of study etc. of the respondent were noted after each saying. While facilitating the focus group discussion, the facilitator was aware of his own role in the PBL module as the coordinator, relationship with the participants (teacher-student), his own attitude or beliefs (in favor of self-directed learning) and attempted to minimize any possible bias by encouraging participation and welcoming differing opinions.

Data and its initial processing

Presentation slides of wrap-up seminars regarding PBL experience from various PBL teams were retrieved from PBL records and copied to separate Word files. Pseudonyms were used for the teams and student names were removed. The handwritten brief discussion notes from focus group discussions were also retrieved from PBL records and, with the aid of memory, fair notes were prepared in English language in Word documents by the first author (LRJ) ensuring that names or other identifying information of the participants were not included.

Data Analysis

In order to identify major themes related to the research question and to allow fully qualitative (Big Q) analysis to supplement our separate quantitative analysis, reflexive thematic analysis of the data was adopted following the process suggested by Braun and Clarke.[14] The analysis was first performed by the first author (LRJ) with the assistance of the research software Taguette and the analysis was cross-validated by a co-author (PN). Differences in opinions were discussed to reach consensus. The researchers were aware of their individual roles, experiences and attitudes while analyzing the data to minimize personal bias.

Effectiveness of the PBL was determined based on the perception of the areas and extent of student learning by the students and faculty members. Shortcomings were expressed in terms of the difficulties/barriers/disadvantages/needs they experienced or perceived.

RESULTS

Wrap-up presentations of six teams out of eight teams were available. The four focus group discussions included 25 participants in total. There was representation of both faculty members and students in the discussions. Representation of students by level, gender and role was also evident. (Table 1) The major themes and subthemes that were developed by the reflexive thematic analysis are shown in Fig. 1 and are described below.

1. Prior concern and overall experience

Prior concerns: At the time of the unavailability of faculty members to facilitate PBL sessions, both faculty and students had prior concerns about whether the sessions would go well when conducted by the students themselves.

"We students were alone without a dedicated faculty tutor. We

Table 1. Characteristics of the participants of focus group discussions (Four focus groups, n=25)

Variables	Frequency
Status (n=25)	
Student	19
Faculty member	6
Gender (n=25)	
Male	17
Female	8
Level of students (n=19)	
MBBS first year	9
MBBS second year	10
Role of students (n=19)	
Team leader (facilitator)	8
Team member	11

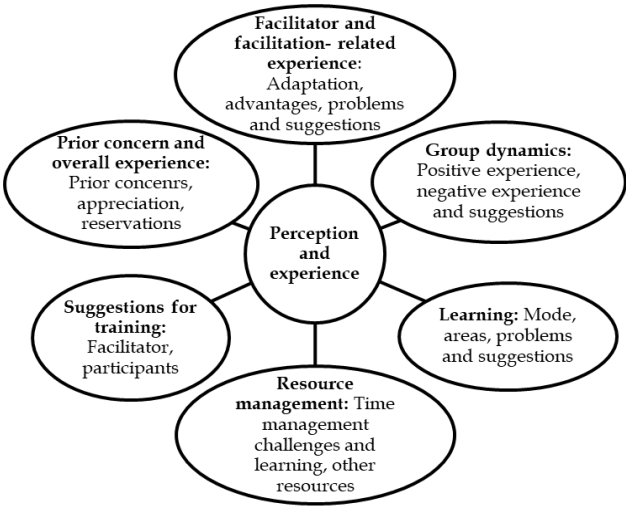

Figure 1. Major themes and subthemes from the reflexive thematic analysis

had concerns if we would be able to conduct it successfully…." (a team leader, second year)

"Although we had prior concerns as to the ability of the students to conduct the sessions independently,….." (a faculty member)

Appreciation of the PBL module: Overall experience of most of the students of the self-facilitated PBL sessions was found to be positive.

"To compare with the [faculty] tutor-facilitated PBL, self-facilitated sessions were more interesting." (a team member, second year)

"It was good." (a team member, first year)

"We did not face such a problem. We consulted the facilitator guide. It was not so difficult." (a team leader, second year)

"It went reasonably well." (a faculty member)

Reservations about the PBL module: Some students and faculty members had some reservations about the self-facilitated PBL, however.

"Tutor-facilitated sessions were better for me." (a team member, second year)

"(I would prefer) a hybrid model with faculty guidance but with student autonomy." (a team member, first year)

"I think a faculty tutor is required for it [PBL]." (a faculty member)

The students rated their overall experiences of the PBL starting from 5 up to 10 on the scale of 0-10, with the best possible score being 10.

2. Facilitator and facilitation-related experience

Adaptation to the new model: The faculty members involved in designing of the problems reported that extra efforts had to be given on their part.

"It required greater efforts to prepare the facilitator guide to ensure that the students will be able to make the most of the PBL sessions." (a faculty member)

The student leaders had a feeling of new and higher responsibility. They used the facilitator guide for their help, some at the end of the discussion of each trigger and some in the mid-way as needed. Some shared the contents with their peers as well. There were some suggestions for some modifications to the facilitator guide.

"Responsibility was high. It was new too." (a team leader, second year)

"It will be more helpful if the facilitator guide is more elaborative with more subheading or subtopics." (a team leader, second year)

"We used the facilitator guide at the end of each trigger." (a team leader, first year)

"Students can be instructed to consult the guide only after independent initial discussion on each trigger so that the leader can also participate as a student learner." (a faculty member)

Advantages of the model: An advantage of being facilitated by a peer was that the students were able to conduct the PBL relatively independently and to direct their discussion in a natural way. Many of the students also felt more freedom to express their opinion with peers in the absence of a teacher.

"I feel that we had better discussions. Students alone made more free discussion. A tutor would give more fixed direction to the discussion." (a team member, second year)

"I felt more freedom of expression without hesitation. There was no fear of making mistakes in front of a teacher." (a team member, second year)

"There was freedom of expression. No fear of judgment by a teacher…." (a team member, first year)

"On observation, they [students] were having interesting discussions related to various basic medical sciences, community health sciences, clinical sciences and psychosocial sciences. They appeared to follow the general process/steps of PBL." (a faculty member)

From the perspective of the team leaders, they were benefited from some unique learning opportunities.

"That [model] helps to develop leadership skills, communication skills and other life skills." (a faculty member)

"It provided a chance for developing leadership skills… Time management skills were learned." (a team leader, second year)

"It [PBL] helped in learning how to manage a team." (a team leader, first year)

Problems and suggestions: The students also experienced some problems in the absence of a faculty tutor.

"We were not so knowledgeable about the overall process. A tutor would give a better direction. We were not able to figure

out how much discussion is necessary and on which contents. Participation was not so good. A tutor would encourage more participation. Some students dominated the discussion. (a team member, second year)

"Since I [the leader] was a peer, there was some tendency of ego problems." (a team leader, first year)

"First year students were relatively less proficient [in the PBL process]." [a faculty member]

"The students tended to focus more on clinical aspects than on the basic medical sciences." (a faculty member)

"The faculty members also felt the need for some supervision.

"I feel that there should be monitoring of student activities to make sure that they are on the right track. They may be instructed to report to the faculty after each session. (a faculty member)

3. Experience of group dynamics

The PBL teams reported mixed experience of group dynamics.

Positive experience: The students were able to work in the teams fairly well.

"Preparation and sharing of ideas was a very good experience. (a team member, first year)

"There was better involvement of students. (a team member, second year)

"Collaborative learning [was a positive aspect.](a team presentation, first year)

"It enhanced teamwork and unity. (a team member, second year)

"I found them [students] interested and engaged during the PBL sessions. (a faculty member)

Negative experience and suggestions: The students also faced some challenges while working in the team.

"Diverging views were difficult to manage. (a team leader, second year)

"Some students were less interested." (a team leader, first year)

"Some students dominated the discussion. (a team member, second year)

"Work division was difficult to manage." (a team leader, second year)

"Diversion out of topic [was a problem]. (a team presentation, first year)

"There was a lack of preparation by some students. Some peers were not so sincere and absenteeism was a problem. [a team leader, first year]

The suggestions for improving group dynamics included formation of teams of close peers, developing openness to diverging views, use of turns while speaking, constructive resolution of conflicts and good planning beforehand.

4. Learning experience

Mode of learning: Student-facilitated PBL was described as *"student-based" (a team presentation, second year)* which required more self-directed learning and the learners engaged more in self-study, shared their learning with the peers and learned from self-assessment and peer-assessment. They also reported to have experienced active learning.

Learning areas: The students found it helpful for acquiring in-depth content knowledge and team skills.

"It was interesting, especially its clinical orientation. (a team member, first year)

"They were making reasonable progress in clinical reasoning following hypothetico-deductive reasoning in a natural way to solve the problems. They looked enthusiastic about the process. (a faculty member)

"[PBL] encouraged critical thinking. (a team presentation, first year)

"[It helped] learning communication, problem solving and leadership skills. (a team presentation, first year)

"[It helped in] confidence boost and development. (a team presentation, first year)

"[It facilitated] collaborative work and teamwork skill development. (a team presentation, second year)

"[It promoted] learning and teaching as well as teaching and learning. (a team presentation, second year)

"[It helped develop] presentation and communication skills. (a team presentation, second year)

"Their [students'] performance in the wrap-up seminars was also appreciable. (a faculty member)

Problems and suggestions: Some students faced challenges due to *"lack of foundational knowledge" (a team presentation, second year)* and some perceived the method to have *"low productivity" (a team presentation, first year)*. Opinions in favor of *"diverse assessment strategies (a team presentation, second year)"* in addition to targeting content knowledge alone were also expressed. Faculty members also felt the need of mechanisms to *"ensure that various learning needs are fulfilled"*.

5. Resource management:

Time management challenges and learning: Difficulty in time management was a common problem faced by the students.

"Time management was not so good. It was difficult to complete topic discussions on time and we could not prepare and discuss adequately. (a team member, second year)

"[We faced] difficulty in time management. (a team presentation, first year)

At the same time, time management skill enhancement was one of the achievements of the PBL.

"It was 5:30 PM on the first day when we finished the discussion. Next day we completed at 5:00 PM i.e. on time. We learned time management from experience. (a team leader, second year)

The students came up with some suggestions for more effective time management.

"Allocated discussion time must be strictly followed. Presenters, the time keeper and the leader must be aware of time. (a team member, second year)

"It will be more helpful if we have more time for discussion (three hours) and preparation. (A team member, second year)

Management of other resources: Availability of internet facility and whiteboards was appreciated by the students. However, inadequate supply of reliable reading materials (books) in the library was felt by the students. They also wished for a supply of books during group discussion.

Supervising faculty members also felt the need for proper arrangement of PBL rooms.

"The PBL rooms should be in close proximity so that student progress can be easily monitored and any assistance provided on time." (a faculty member)

6. Suggestions for further training

In order to make the student-facilitated PBL more effective, the need for further training of the student facilitator and other team members on various skills was highlighted.

"It will be more effective if the team leaders (for time management, enhancing participation, organization of the PBL process) and members (for the process of PBL, participation and sense of responsibility) are further trained. (a team leader, second year)

"Training leaders for facilitating the session will be helpful. Team members should be instructed not to interrupt others while speaking, to respect everyone, to participate actively and not to dominate the discussion. (a team leader, first year)

"A few students seemed to have limited self-study skills which need to be addressed for the PBL to be more fruitful." (a faculty member)

DISCUSSION

The experience or perceptions of students and faculty members regarding student-facilitated PBL was analyzed by qualitative methods. Most of the students and faculty members valued the student-facilitated PBL in a positive light. There were some concerns and suggestions for better learning experience as well. Comparatively, the first year students appeared to have faced more challenges since this was their first experience of PBL. Besides this, individual student factors such as their self-study skills also seem to have played some role.

There were prior concerns as to the feasibility of student-facilitated PBL. On completion, however, there was a general consensus that it was a good decision to go for the student-facilitated PBL. The students liked the greater opportunity for self-directed learning and independent learning. Interestingly, a major voice resonated that the students experienced more freedom of expression in the absence of judgment by a faculty. Steele et al also reported that the peer-facilitated groups felt less stress during group discussions.[15] Zheng et al. and KC et al. also found that students were more free to interact due to social congruence.[10,16] Moreover, the team leaders found the sessions interesting and sensed higher responsibility with the potential for positive career development (e.g. leadership skills) although they faced challenges to ensure proper monitoring of group process. Similar reports can be found in the self-reflections of the peer tutors of Solomon et al. study.[17] The facilitator guide was found helpful in our study and was expected to be more elaborative in order to promote more relevant discussion. Moreover, there was a general consensus that some level of supervision from faculty is desirable.

Analysis of group dynamics revealed that there could be both positive and negative factors. Good interactions owing to cognitive congruence, sense of unity and teamwork were on the positive side. The study by Steele et al. also found similar results.[15] On the negative side, concerns of diversion from the primary task, dominance by some members and inadequate participation by others were raised. A study by Hyams et al. also reported these concerns in the absence of a dedicated faculty tutor to each group.[6]

The students were found to have enjoyed self-directed learning, sharing their knowledge with peers and learning from the peers. Real-life-like clinical orientation, critical thinking and problem solving process were among the major factors that the students valued positively. Development of leadership skills, communication skills, presentation skills and collaboration skills were also reported by most students. The supervising faculty members also appreciated their performance in the wrap-up seminars. These are expected and well recognized benefits of PBL modality in general.[2] Our quantitative analysis of this PBL module also supports these qualitative results and shows a significant increase in scores from the pretest to the post test (Wilcoxon signed rank, $p<0.001$, effect size=0.67).[11]

The theme of time management also appeared as a major dimension in our study. The students perceived a shortage of time for preparation and discussion. They also suggested an extension of the allocated time which seems reasonable in the light of the nature of the tasks and breadth of the knowledge contents. Despite these concerns, they reported to have developed skills for proper utilization of time to some extent. Importance of internet facility, reading materials and proper arrangement of PBL rooms has also been underlined as has been done in other studies.[2,6]

Further training of the team leaders and members was also underlined by both the students and faculty members. Although the orientation sessions were conducted during the short available time to enable students for the student-facilitated PBL modules, the need for more comprehensive training was felt. The trend and views on the importance of training the tutors can be found widely in the literature.[18,19] Barrows et al, the pioneers of PBL, have also stated that PBL can be adopted under the facilitation of a faculty tutor or students themselves provided that they are well acquainted with its philosophy and practice.[20]

In summary, it appears that students enjoyed the more self-directed approach of self-facilitated PBL resulting in significant content and psychosocial learning. They also felt that the efficient PBL process and group dynamics can be ensured through better training, prior experience with an experienced faculty tutor and continued faculty supervision.

From a broader perspective, our findings support the feasibility of student-facilitated PBL in resource limited settings. This model may be used as an alternative to faculty-tutored PBL when/where faculty tutors are not available to guide learners fully throughout the PBL sessions. As suggested by some participants, "hybrid model" i.e. student-led PBL with faculty supervision may also be adopted.

Major limitations of this study are retrospective analysis and single episode of PBL module for a small numbers of students. Owing to the retrospective nature, it was not possible to record and analyze the fine details of the focused group discussions. Future research may overcome these limitations through prospective experimental design and using larger number of students and more PBL modules. On the strength side, this study triangulates its findings from multiple stakeholders' (student leaders, members and faculty) perspectives.

CONCLUSIONS

The PBL module was perceived to be helpful in enhancing content knowledge as well as problem solving and

leadership skills. Some shortcomings such as inadequate process skills and time management skills were identified. The overall experience of the students and faculty members remained positive. Thus, student-facilitated PBL modules with provision of faculty supervision and adequate training of the students may serve as an alternative model of PBL in the resource-limited scenarios. Future studies with experimental designs, larger samples and more PBL sessions may advance this evidence.

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Author's Contributions LRJ conceptualized the study and all authors contributed to its design. LRJ collected data. LRJ and PN conducted its analysis. LRJ prepared the initial draft of the manuscript. All authors reviewed the manuscript and provided their feedback. All of the authors approved the manuscript and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate The study proposal was approved by the Institutional Review Committee of the Karnali Academy of Health Sciences (Ref: 081/082/01) on 30 Aug 2024. Approval from the Office of the Dean was also obtained for retrieval of data for the study. Being a retrospective analysis of academic records, consent from the study participants was not applicable. Confidentiality of the data was strictly maintained and de-identification of the participants was ensured in publishable reports.

Conflict of Interest None

Funding Support No external funding was used for this study.

Availability of Data and Materials Supporting data are available within the manuscript.

Acknowledgments All students of the self-facilitated PBL; Faculty; Administrative and supporting staff; Office of the Dean

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Received October 21, 2024 **Accepted** December 25, 2024
Published December 28, 2024

