

PROBLEMBASED LEARNING IN COMPARISON WITH SMALL GROUP DISCUSSION AS A TEACHING LEARNING METHOD FOR NATIONAL HEALTH PROGRAMMES

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ABSTRACT

Background: National Health Programmes are core components of medical curricula in India, requiring innovative teaching-learning methods aligned with Competency-Based Medical Education (CBME). **Objective:** To determine the effectiveness of problem-based learning in comparison with that of small group discussion and to assess the perception of students on problem-based learning in comparison with small group discussion. **Materials and Methods:** A quasi-experimental study was conducted among 3rd phase undergraduate medical students of Government medical college, Thrissur. Participants were randomly divided into two groups. One group had small group discussion and the other problem-based learning for one national programme. The interventions were switched over for the next programme. 5 national health programmes were taught among the group. On an average 120 students participated for each programmes in four different sessions. Post intervention an immediate test and a retention test were conducted after 2 weeks. Perception on these two methods were also studied using Likert scale. Data was entered in Excel and analysed using SPSS 16. Mean scores were analysed using independent t tests. Perception analysed using proportion. Level of significance kept at 5%. Difference between pass percentage, agreement and disagreement were analysed using chi square test. **Results:** The mean score in the PBL group was 11.88 ± 3.8 and in the SGD group was 13.12 ± 3.9 . The mean difference found was less even though the difference found was statistically significant. There was no significant difference in the pass percentage among the two methods. The perception on the different teaching learning methods were comparable among students. **Conclusion:** PBL is an equally effective in improving immediate knowledge scores for National Health Programmes when compared with small group discussion. Students' perception on new method was similar to the routine small group discussion. A blended approach combining both methods is recommended to align with CBME outcomes.

INTRODUCTION

One of the most important responsibilities of an Indian medical graduate is to provide community health care. Knowledge in community health care is essential for providing essential primary health care. Students should be able to recognise the public health issues and problems in the community. They should have critical thinking and problem-solving ability to tackle the problems arising in public health. The teaching of National Health Programmes (NHPs) forms an integral part of undergraduate and postgraduate medical education in India, aiming to

produce health professionals who are competent to address the country's priority health problems. The shift towards Competency-Based Medical Education (CBME) under the National Medical Commission (NMC) of India, there is an increasing emphasis on student-centered and active learning strategies.^[1] Problem-Based Learning (PBL) is one such method that engages students actively in learning through real-life scenarios, fostering self-directed learning, problem-solving skills, and integration of knowledge across disciplines.^[2,3]

It is very difficult to learn various National health programmes due to its large volume of contents and

difficult public health concepts. Lectures and small group discussions (SGDs) have been the predominant methods employed to teach these programmes usually. Small group discussion is an interactive method that promotes peer learning, sharing of ideas, and critical thinking within a guided environment.^[4] Problem-Based Learning (PBL) is a teaching method in which complex real-world problems are used as the vehicle to promote student learning of concepts and principles as opposed to direct presentation of facts and concepts. Students develop power of reasoning and learn concepts by applying problem solving learning. This learning facilitates the development of specific knowledge, requisite skills and professional attitudes in students.

While both SGDs and PBL are interactive methods, their effectiveness in delivering content-heavy and policy-oriented topics like National Health Programmes remains under-explored. Understanding which method better facilitates comprehension, retention, and application of knowledge about National health programmes can guide educators in selecting appropriate teaching-learning strategies. The reported studies on educational interventions in this area is limited. This has to be learned for evidence to incorporate this newer method to teach this vast area in community medicine

Objectives- To determine the effectiveness of problem-based learning in comparison with that of small group discussion as a teaching learning method for National health programmes.

To assess the perception of students on problem-based learning in comparison with small group discussion for National health programmes.

MATERIALS AND METHODS

It was a quasi-experimental study conducted at Department of Community Medicine, Government medical college, Thrissur among Phase 3 Part 1 MBBS students who came for small group discussions in community medicine. There were two groups with two educational methods in the study one with small group discussion and other with problem-based learning. Next week the educational methods were interchanged between the groups. The study duration was 3 months

Sample size was calculated using $n = \frac{(Z\alpha + Z\beta) \times SD_1 + (Z\alpha + Z\beta) \times SD_2}{d}$. SD is the average standard deviation SD1 and SD2. Both values, SD1 and SD2 were taken from mean marks for two methods in a study conducted by Laveesh M.R et al in 2016 (8)

With 80% power ($Z\beta 0.842$) and alpha error 5% ($Z\alpha 1.96$), the calculated minimum sample size was 21.4 in each group.

As this study was an educational intervention it was decided to give the new method for all students of Phase 3 MBBS students who are in Community Medicine. All those students who were present on the days of allotted hours for small group discussions were included in the study. There were 4 sessions in a week. On an average 120 students participated in the study per week. On an average 60 students in each group for each exposure (intervention)

Sampling method: All students who came for the session were included in the study. On the first day students were divided into two groups (A and B) based on computer generated random number. These groups were fixed for the entire study period.

Intervention- Two learning methods

- Group A Small group discussion
- Group B Problem based learning

Data variables / Tool

1. For interventions- obtained Marks in the immediate and retention tests
2. Perception of teaching methods - 5-point Likert scale - The areas assessed were engagement, clarity, relevance, effectiveness, enjoyment, accessibility and feedback

Data collection procedure

There were two groups in this study, group A and B. In the first session, students were divided into two groups using computer driven random number after getting informed consent. Two interventions in this study included Problem based learning and small group discussion. In one session, group A had given problem-based learning and group B had given small group discussion which was structured facilitated by a faculty, for one national health programme.

The next week the interventions were interchanged between the groups. Likewise, there were a total of 5 programmes taught in this study. Last two programmes were combined as one intervention. Hence four interventions (types of methods) were there in the present study. Each student will get multiple interventions in this study. A total of 5 programmes included in this study the list is given in the following table.

A total of 234 interventions (Number of students X number of exposures) with small group discussion and 242 interventions with problem-based learning. The interventions given were shown in the following table.

List of National health programmes included in this study

Programme	Problem based learning	Small Group discussion
National TB elimination programme	A	B
Reproductive and child health programme – mother component	B	A
Reproductive and child health programme -child component	A	B
National vector borne disease control programme– Malaria		

Small group discussion group was again divided into 6 numbered small groups in a session and given one national programme to read in the hall and discuss among themselves as routinely done currently. A structured format for discussion will be provided. Faculty is a facilitator of group discussion and facilitated during the discussion. This is the routine format for the teaching of National health programme.

Problem based learning group was provided with a problem based on the same National health programme after giving a brief introduction by the faculty in a separate hall. They were given suggestions regarding the resources and to whom they have to contact if needed, for the solutions. They have given the freedom to solve the problem. They have selected one team leader from the group. They divided the big problem into small problems by listing out it and gave to different persons to solve them. After two hours they presented the problem with the solutions. Faculty was present only at time of presentation and discussion to clear their doubts at the end of the allotted time. Faculty was present only at the end of the session to clarify any doubts regarding their solution.

Methodology of the intervention adopted in this study is given in the figure number.^[1]

Assessment: Immediate assessment was done on the same day in the last 30 minutes and retention after 2 weeks with an exam with one-word short answer question. Total marks for the exam were 20. Retention tests were done in a smaller number of interventions due to difficulty in availability of students after two weeks.

Perception on the teaching methods was assessed using 5-point Likert scale. The areas assessed were engagement, clarity, relevance, effectiveness, enjoyment, accessibility and feedback. After all the intervention, students were given questionnaire. After getting informed consent data was collected.

Data analysis- Marks and perceptions were entered in Ms Excel and analysed using SPSS 16. Mean marks and standard deviation were calculated. Independent t test was used for comparing marks obtained for two intervention group. Pass percentage was calculated using proportions and its association with type of intervention was calculated using chi square test. The level of significance kept at 5%. The perception was analysed using proportions.

Ethical considerations – Data collection started only after getting approval from Institutional research committee and Institutional ethics committee (IRC **PROTOCOL NO: IEC/GMCTSR/2025/19, dated 30.04.2025**). Informed consent was obtained from students. All students were given exposure to both types of intervention routine as well as new method.

Confidentiality of data maintained throughout the study.

RESULTS

Results of this study described as basic details, marks obtained in the short exams both immediate and after two weeks. For comparison of marks number of interventions had been taken in two groups.

Demographic details of the study population - Mean age of the population was 21.94 ± 1.02 ranging from 20 to 24 years. Among the population majority were females (73.2%) which is comparable to the proportion of females in medical education in the college.

Comparison of marks in problem-based learning and small group discussion - For analysis purpose number of interventions were considered by taking total number of exposures. There were 234 exposures of problem-based learning (PBL) and 242 exposures of small group discussion (SGD).

Initial exam was conducted on the day of the teaching itself total mark of the short exam was 20. Minimum mark obtained were 2 and one consecutively for PBL and SGD. Highest mark were 20 for both interventions. The mean difference in the marks found between two interventions were only 1.2 and 1.5 respectively in immediate and retention exams. But the difference found was statistically significant which is shown in the table number 1. As the same student received both interventions at different times an analysis was done to find out difference between the two interventions individually and no significant difference was found the two methods ($p=0.760$).

Marks of two groups compared for different national health programmes in this study. A significant difference was found for National vector control programme and reproductive and child health programme for child. (table number 2). Problem based learning alone will be difficult for complex programmes with different components.

Pass percentage for the exam in the study population - The pass percentage for the exams were calculated in this study by taking the proportion of 50% marks in the examination. There was no significant difference found in the pass percentage of students with two interventions (small group discussion and problem-based learning) in this study. This is shown in the table number 3.

Perception of students on two learning methods - The perception of the students on the new method for National health programmes compared to old methods was studied. The areas of perception included enjoyment, clarity, relevance, effectiveness, enjoyment, accessibility and feedback. 5-point Likert scale was used for collection of data. To analyse, it was divided into

agree, neutral and disagree. Agreement with problem-based learning with small group discussion in this study was comparable. The results are shown in the figure no 1 and 2.

Highest agreement was seen in relevance (80.5%) followed by effectiveness (75%), clarity (75%) and engagement (75%) and highest disagreement was observed in enjoyment (9.8%) in problem-based

learning. Among the students, 40.2% preferred problem-based learning as a method of choice when compared with 59.8% preferred small group discussion. 45.5% of males and 38.8% of females preferred problem-based learning as a method of learning. The proportion of students who agreed problem-based learning as understandable is higher than that of small group discussion.

Table1: Comparison of marks between problem-based learning and small group discussion

Teaching method	Number of interventions (Immediate)	Mean marks (Immediate test)	Number of interventions (Retention)	Mean marks (retention test)
Problem based learning	234	11.88±3.8	56	13.31±3.5
Small group discussion	242	13.12±3.9	53	14.38±3.6
Mean difference pvalue		1.2 p-0.001		1.5 0.028

Table 2: Marks obtained in different National health programmes

National health programme	PBL	SGD	pvalue
National TB elimination programme	9.99 ± 4.05	10.4±3.27	0.498
National vector borne disease control programme 1. Malaria 2. Dengue, JE, chikungunya, Filariasis, Leishmaniasis	13.12 ± 3.2	14.64±3.57	0.006
Reproductive and child health programme- Child	12.98 ± 3.39	14.71±3.18	0.007
Reproductive and child health programme- mother	11.14 ± 3.15	13.24±4.33	0.65

Table 3: Comparison of Pass percentage in two methods

Method	Passed - Number (%)	Not passed- Number (%)	Chi square and pvalue
Problem based learning	177 (75.6)	57 (24.4)	Chi square 3.5 p-0.06
Small group discussion	200(82.6)	42 (14.4)	

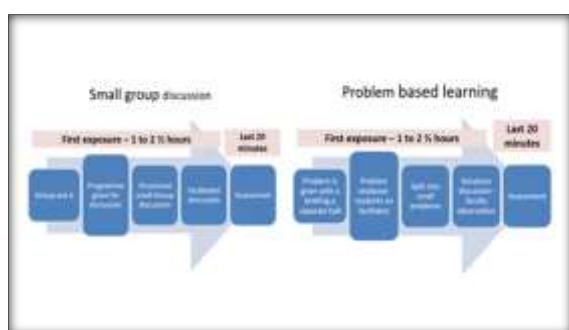


Figure 1: Methodology of the intervention in this study

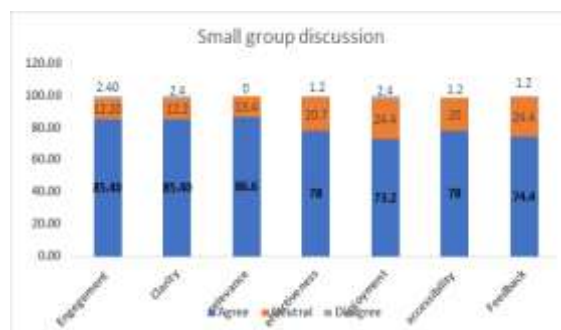


Figure 3: Perception of students on small group discussion as a teaching learning method

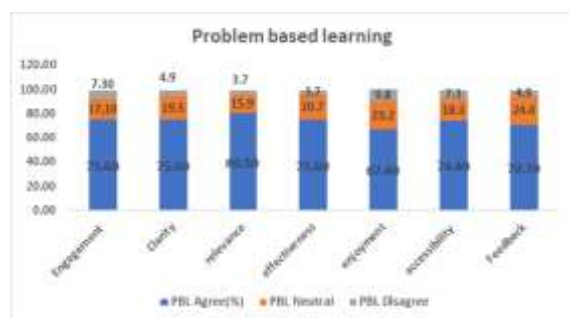


Figure 2: Perception of students on Problem based learning as a teaching learning method

DISCUSSION

Problem based learning (PBL) is widely recognized for promoting critical thinking, self-directed learning, and application of knowledge in complex clinical scenarios.^[3] Its application in the day to day teaching learning sessions are minimum. National health programmes are with vast knowledge which are contextual are difficult to understand and retain. Even though a significant difference found in the post test scores between problem-based learning and small group discussion the mean difference in the marks was very less. The low scores in PBL in this study might be due to its content-heavy, policy-oriented topics such as National Health Programme.

The adaptability to a new learning method might be another reason for the low scores.

Comparing to PBL, small group discussion (SGD) provided a structured environment where the facilitator guided the discussions to ensure coverage of all essential points, which might have contributed to better knowledge retention and performance in this context. The pass percentage between the two methods was similar not showed any significant difference. Implementing Problem based learning can also be considered an effective method to teach the National health programmes. In a study conducted by Joseph et al, it was given that problem-based learning as an effective method for learning community medicine.^[5]

The students were familiar with the routine method. It will take some time to adapt a newer method in this particular topic. It was noticed that complex programmes with multiple components, implementation of problem-based learning alone might be difficult. In this situation structured small group discussion followed by giving a problem-based task for understanding the real-life implementation of the National health programme would be beneficial. Previous studies also reported similar findings.^[9] According to Mohammad Hadi,^[7] problem-based learning method leads to a significant increase in learning and recalling output compared to the traditional method.

Reported studies comparing these two methods for this specific topic was difficult to find. Heidari found problem-based learning was effective in teaching ethical principles.^[10] Another area in community medicine is statistics and according to a study conducted by Anand Bihari problem-based learning was effective in learning statistics.^[11]

Regarding the perception of the students on two teaching methods, there was no significant difference found in agreement and disagreement towards the two methods ($p < 0.89$). They perceived similarly the two methods in learning National health programmes. The newer participatory method was accepted by the students according to the present study.

Problem based learning can be incorporated in teaching National health programmes according to this study. Such incorporation of real time scenarios or problems during their undergraduate period itself will help them to be confident during their carrier to tackle public health problems and challenges. A scoping review by Joan Carles Trullas et al reported that PBL methodology obtained a high level of satisfaction, especially among students and was more effective than other more traditional for improving social and communication skills, problem-solving and self-learning skills.^[12]

Recommendations

- Problem based learning should be incorporated in teaching and learning National health programmes along with small group discussions

- Problems should be created in such a way that its implementation in the real-life situation should be possible and thus this will improve their critical thinking and problem-solving skill. The created problems to be included in the curriculum.
- More researches in the area are required to generate more evidence.

CONCLUSION

Problem based learning is also an effective teaching learning method for National health programmes. This method also made students engaged to the learning activity. There was clarity in the objectives of PBL. Students could perceive relevance of the topic through this method similar to small group discussion. Even though they felt as a less enjoyable method compared to small group method they perceived as PBL an effective method. This should be incorporated into the small group discussion to teach National health programmes for better understanding and retaining.

Limitations – Assessed using more objective questions rather than descriptive questions. In depth knowledge should be assessed. Retention test number of exposures are less compared with immediate tests.

Implications – more educational researches to be done in this area to create more evidence. This method can be implemented in the teaching process of National health programmes by various Departments.

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