

Comparison of the Effectiveness between Problem Based Learning and Lecture Class in Pharmacology for Medical Undergraduates

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ABSTRACT

INTRODUCTION

Problem Based Learning (PBL) originated at case Western Reserve University in the late 1950's and it uses clinical cases or structured problems to kindle questioning, critical thinking, problem solving skills, self-learning skills and develops team work and application of knowledge by a curriculum reformation by medical faculty.

METHODOLOGY

This was a cross over educational interventional study done for a period 6 months after getting IEC clearance (IRB No. B 6 / 79 / 2015/ TDMCA). Second year medical undergraduates of the odd batch (n = 25) of Government T.D. Medical College, Alappuzha undergoing pharmacology training were included in the study after obtaining informed consent.

RESULTS

Twenty five second year medical undergraduates participated in this study and all the students got an opportunity to participate in one PBL session and one Lecture session either for Pharmacotherapy of depression or Tuberculosis.

DISCUSSION

This was an educational intervention which comprised of Problem - Based Learning; a student centered Teaching - Learning Method (T - L M) where students had a freedom to devise methods to identify their learning needs and build on their existing knowledge working as team and conventional lecture which was a teacher - centered process.

CONCLUSION

Problem based learning is appreciated by students as a better teaching - learning method for generating enthusiasm to learn the topic, developing communication skills and team work as well as creating better teacher - student interaction.

KEYWORDS

Antitubercular therapy, Pulmonology OPD, Gynecology OPD, Tuberculosis

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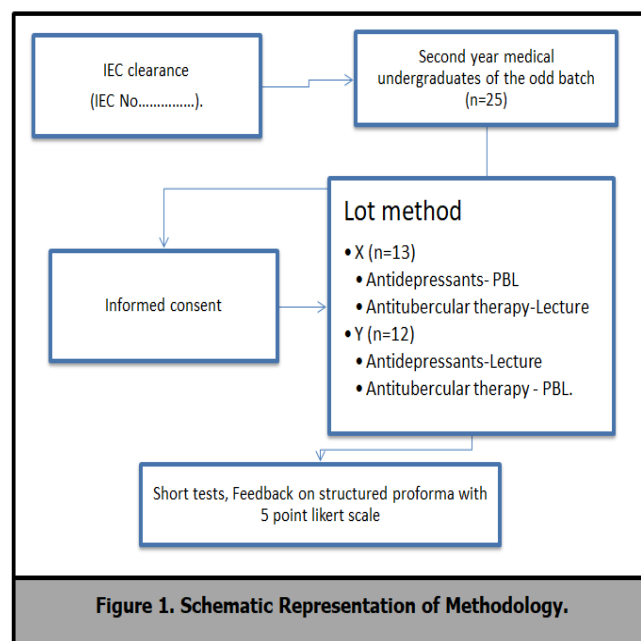
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INTRODUCTION

Problem Based Learning (PBL) originated at case Western Reserve University in the late 1950's and it uses clinical cases or structured problems to kindle questioning, critical thinking, problem solving skills, self - learning skills and develop team work and application of knowledge by a curriculum reformation by medical faculty.¹ In PBL, groups of 6 - 9 students are exposed to a totally unfamiliar problem or situation by the teacher in a phased manner and the students hypothesize and learn with a problem solving approach as the scenarios get topped up with additional pieces of information. This approach builds upon the existing knowledge of students individually or collectively, gradually filling up the knowledge gaps and lacunae referring on to text books, journals and the internet.² PBL is thus a pedagogical, active, learner centered approach which requires a facilitator who acts as a scaffold of discussions in the right path.^{3,4} Medical undergraduates have opined that linking clinical scenarios to pharmacotherapeutics ensures imbibing the concept in a clinical context which helps better assimilation and competence.⁵ The objective of this study was to compare the mean marks scored after PBL and Lectures; and to describe the perceptions of second year medical undergraduates about Problem based learning compared to lecture classes in Pharmacology.

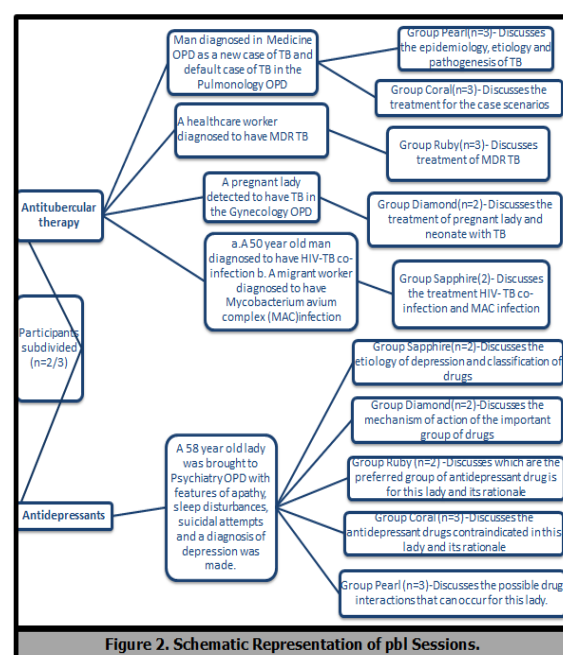
MATERIAL AND METHODS

This was a cross over educational interventional study done for a period 6 months after getting IEC clearance (IRB No. B 6 / 79 / 2015 / TDMCA). Second year medical undergraduates of the odd batch (n = 25) of Government T.D Medical College, Alappuzha undergoing pharmacology training were included in the study after obtaining informed consent. The students were allocated into 2 groups X and Y with 13 students in one group and 12 in the other group by Lot method as shown in Figure 1. The two topics selected were Pharmacotherapy of depression and Tuberculosis. For conducting PBL 5 subgroups were formed (n = 2 / 3) as shown in Figure 2. In the initial introductory interactive sessions a brief overview of the topics were given and the participants were instructed to build upon their existing knowledge and a second session was conducted after five days. Both lecture and problem based learning was dealt by the same teacher. At the end of the second session, a peer validated structured preform with 5 point likert scale (1 - Strongly disagree to 5 Strongly Agree) was distributed to obtain the feedback from the participants regarding the effectiveness of either teaching methods. Short tests were conducted for both the groups 7 days after the sessions to assess early recall. The data were entered in Microsoft excel and statistical analysis was done by SPSS 16 for windows (SPSS Inc, Chicago, USA). The qualitative variables are expressed as frequencies and percentages and the marks of the two groups was analyzed using Mann Whitney U test since the sample size was less than 30.



RESULTS

Twenty five second year medical undergraduates participated in this study and all the students got an opportunity to participate in one PBL session and one Lecture session either for Pharmacotherapy of depression or Tuberculosis. The mean age was 21.36 ± 0.64 years. There were 11 (44 %) female and 14 (56 %) male participants. As shown in Table 1, there was no statistically difference in the marks scored by the students who received lecture and problem based learning session for antidepressants and ant tubercular therapy. However as shown in Figure 2, majority of the participants had a positive perception towards problem based learning as compared to lectures.



	Antidepressants	Ant tubercular therapy
Mean Rank of Lecture Group	15.61	12.88
Mean Rank of PBL Group	10.63	12.05
Mann Whitney U	39.5	66.5
P value	0.09	0.77

Table 1. Comparison of Marks Scored in Short Test.

Twenty three (92 %) opined that PBL had better teacher - student interaction, 21 (84 %) thought that PBL was a good innovation in teaching - learning process, 22 (88 %) opined that it was better in developing team work, 18 (72 %) felt that it helped in better organization of the topic and inspired to learn it, 16 (64 %) thought it was better way of learning the topic by co - ordination, 20 (80 %) thought that it created enthusiasm to learn the topic, 22 (88 %) thought that it was better in developing communication skills, 15 (60 %) felt that PBL helped in better understanding of topic and can improve academic performance and 19 (76 %) thought it created interest in topic more than lectures. However 1 or 2 participants disagreed to majority of the statements as shown in Figure 3.

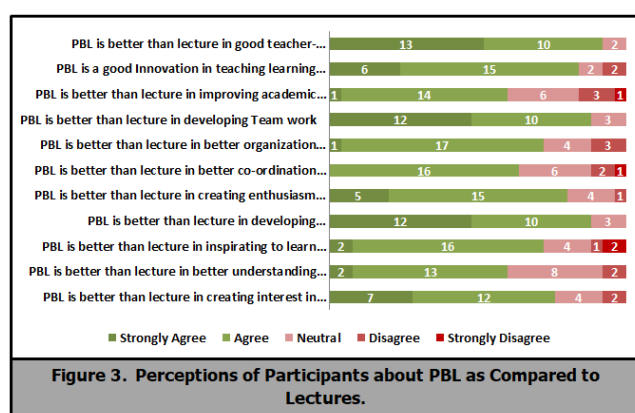


Figure 3. Perceptions of Participants about PBL as Compared to Lectures.

DISCUSSION

This was an educational intervention which comprised of Problem - Based Learning; a student centered Teaching - Learning Method (T - L M) where students had a freedom to devise methods to identify their learning needs and build on their existing knowledge working as team and conventional lecture which was a teacher - centered process. Recently there has been an emphasis on competence which can be attained by T - L M which helps in cooperative learning, problem - solving and contextual learning.⁶ Some countries have adopted problem based medical curricula, however in India we have recently embraced the competency based medical education for Pharmacology where there is umpteen emphasis on small group discussions.⁷ In this study majority (92 %) of the participants opined that the teacher - student interaction is better than that of lecture. In PBL the role of teachers are facilitatory rather than disseminatory. Positive teacher - student relationship enriched with good interaction has a key role in the development of a good learning community.

It not only gives students an ownership of the knowledge acquired but also helps in the development of challenging problem situations which enhance students' motivation.⁸ In this study while 80 % thought that PBL created enthusiasm in learning a topic only 60 % felt that it could enhance the comprehension of the learnt topic. opined that mere steering the direction of group learning by the facilitator without an attempt to deliver detailed knowledge or vocabulary of problem solved can create a sense of disengagement, disconnection and make the mentor disenfranchised.⁹ In this study 72 % felt that it helped in better organization of the topic and inspired to learn it and 64 % thought it was better way of learning the topic by co - ordination, states that the central concept in PBL is collaborative working on real world problems which enhances multidisciplinary integration and helps in discovery of self - learning modes.⁹ A review, found that PBL does not have a positive outcome with regards to knowledge acquisition nor does it provide unequivocal support for enhanced learning.¹⁰ In this study only 60 % participants felt that PBL could enhance academic performance. We could not find any statistically significant difference in the short test conducted after 7 days to assess immediate recall. A study evaluating the acquisition of knowledge and soft skills during basic and preclinical sciences found that PBL was preferred in Phase 2 compared to Phase 1, however there was no statistically difference for the same amongst second and third years.¹¹ A meta - analysis done on selected topics in pharmacology education involving PBL found that PBL had a positive effect on gaining higher theoretical scores assessed through examination.¹² Bokey et al found that active engagement processes like enquiry based learning and case based learning are put forward alternatives to PBL.

Limitation

This was a small sample size study with 2 PBL sessions compared to Lecture. There was no test to assess long term retention. More studies need to be conducted after engaging the participants in longer PBL sessions

CONCLUSION

Problem based learning is appreciated by students as a better teaching - learning method for generating enthusiasm to learn the topic, developing communication skills and team work as well as creating better teacher - student interaction.

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