International Journal of Community Medicine and Public Health
Joshi HS et al. Int J Community Med Public Health. 2017 Oct;4(10):3727-3730
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20174240

Original Research Article

Is problem based learning a better teaching tool as compared to didactic lectures for the undergraduate students?

Hari Shankar Joshi[1], Rashmi Katyal[1]*, Arun Singh[1], Gaurav Joshi[2], Shalini Chandra[3], Kashmir Singh[4]

[1]Department of Community Medicine, [3]Department of Pharmacology, [4]Department of Surgery, Rohilkhand Medical College, Bareilly, Uttar Pradesh, India
[2]Motilal Nehru Medical College and Hospital, Allahabad, Uttar Pradesh, India

Received: 29 July 2017
Revised: 29 August 2017
Accepted: 30 August 2017

***Correspondence:**
Dr. Rashmi Katyal,
E-mail: rashmikatyal@gmail.com

ABSTRACT

Background: PBL is an educational approach in which complex problems serve as the context and the stimulus for learning. In PBL classes, students work in teams to solve one or more complex and compelling "real world" problems. They develop skills in collecting, evaluating, and synthesizing resources as they first define and then propose a solution to a multi-faceted problem. The objectives of the study were to acknowledge the students about problem based learning; to assess the effectiveness and outcome of the teaching methodologies i.e. didactic lectures versus PBL; recommendation of incorporation of PBL or traditional teaching method as a teaching tool.
Methods: Medical undergraduate (UG) students admitted in RMCH, Bareilly, India. A total of 112 students divided into three batches (36, 33 and 33 students) participated in a systematically conducted PBL session in community Medicine department during the middle of their academic year after having experienced at least 4 months of traditional teaching in community medicine. Perception of the faculty was also taken on Likert's scale. Responses to the items in the questionnaire was scored as follows: traditional much better (1), traditional better (2), both the same (3) PBL better (4), or PBL much better (5). Appropriate Statistical analysis using appropriate tests will be done.
Results: Information gathering and student-teacher relationship is more through traditional method of teaching as compared to PBL which is more in favour of development of interest, motivation, learning efficiency, curiosity, questioning attitude, interpersonal relationship, independent thinking and reasoning..
Conclusions: It can be very well included that introduction of PBL as the teaching modality among the students can improve the quality of medical education as per the evaluation done through the introduction of Likert'scale.

Keywords: PBL, Interactive teaching, Medical education

INTRODUCTION

The PBL method of teaching has been shown to be an effective instructional tool to foster critical thinking and problem solving skills among medical students.[1] PBL has been used in a variety of disciplines and educational levels.[2] Auto didacticism or self directed learning (SDL), which is commonplace in higher learning, is the idea that the teacher does not need to schedule learners' private time. Students are expected to be able to organize their lives, studies and learning in a manner which prepares them for their chosen profession.[3]

PBL is an instructional strategy that uses small groups that attend a series of sessions. PBL is defined as "…an instructional method characterized by the use of patient problems as a context for students to learn problem-solving skills and acquire knowledge about the basic and

clinical sciences".[4] Authors who have studied constructivist theory suggest that the interactive nature of PBL fosters a greater incorporation of new information into existing knowledge in order to create new ideas and concepts.[5]

Traditional classroom curricula emphasize the presentation of content information through a lecture format whereas the PBL method relies on the introduction of real-life problems as a means to facilitate self-directed learning.[5] PBL shifts the learning environment from a faculty-centered approach to a student-centered process.[6] In a PBL classroom, the student becomes a partner in the learning process by utilizing real-life scenarios to recognize what they know and what they need to know to understand the situation, thus creating their own knowledge. This approach gives the student the responsibility for analyzing information and communicating it to other students in class.[7]

This study specifically compares the teaching methods and ads to the limited number of studies that have focused on the comparison of the traditional teaching methods with PBL.

Aims and objectives

1. To acknowledge the students about problem based learning.
2. To assess the effectiveness and outcome of the teaching methodologies i.e. didactic lectures versus PBL in order to implement PBL sessions for Final MBBS/undergraduate students and faculty.
3. Recommendation of incorporation of PBL or traditional teaching method as a teaching tool in the medical curriculum, whichever is effective in the medical education.

METHODS

The participants were third year medical undergraduate (UG) students admitted in Rohilkhand Medical College, Bareilly, India.

The study was conducted between October 2014 to March 2015 among students posted in the department of community medicine.

A total of 112 students divided into three batches (36, 33 and 33 students) participated in a systematically conducted PBL session in community Medicine department during the middle of their academic year after having experienced at least 4 months of traditional teaching in community medicine.

Inclusion criteria

All the students present in the department of community medicine at the time of study were included.

Exclusion criteria

The students who were absent and not willing to participate were excluded from the study.

The students were initially briefed about the principles, methodology, and practice of a proper PBL session. The faculty was assigned to conduct PBL session. The first session was for one hour, wherein the students introduce themselves and elect a leader. Then they were given the problem based on case –control study. They were free to meet amongst themselves later for further discussion. Similar 4 to 5 sessions were held based on descriptive study, cohort, experimental study and other basic epidemiological tools etc. The last session was held one week later, lasting for 2 hours. In the first hour, the students shared their knowledge and understanding, asked for further information related to the problem and discusses the problem again in the presence of facilitator until they reached a consensus.

Questionnaire

At the end of the session, the objective of this research study was explained to the students and they will be invited to participate. Informed verbal consent was obtained from all those who volunteered. They were asked to fill in a 15-item questionnaire evaluating their preferences for PBL or traditional pedagogy as they had experienced it in the class.

Also, the perception of the faculty was taken on the Likert's scale.

Analysis

Responses to the items in the questionnaire were scored as follows: traditional much better (1), traditional better (2), both the same (3) PBL better (4), or PBL much better (5). Appropriate Statistical analysis using SPSS 22.0 was done and appropriate tests were applied.

RESULTS

As it is quite evident from the indexed research that acquisition of knowledge is more (41%) through problem based learning than traditional learning (27.7%) and the difference is statistically significant (p=0.000). Similarly, information gathering is more through traditional way of teaching (51.8%) and the difference is statistically significant (p=0.000). Understanding of the general principles (41.9%) and learning efficiency (51.8%) is more through PBL (problem based learning) and there is a statistically significant difference. As it seems that there is more personal enjoyment and satisfaction through PBL (68.7%) and there is a statistically significant difference. Motivation (57.2%) and development of interest (65.2%) is much higher in PBL than traditional way of teaching and the difference is found to be highly statistically significant. Though development of interpersonal

relationship (58.9%) and teamwork (79.5%) is more in PBL, the student –teacher relationship (45.6%) is found more in the traditional way of teaching and there is statistically significant difference.

The most important inference about the development of reasoning (73.2%), curiosity and questioning attitude (58.9%), independent thinking (73.2%) and preparation of clinical subjects (50.8%) is more through PBL as compared to traditional teaching method with a statistically significant difference.

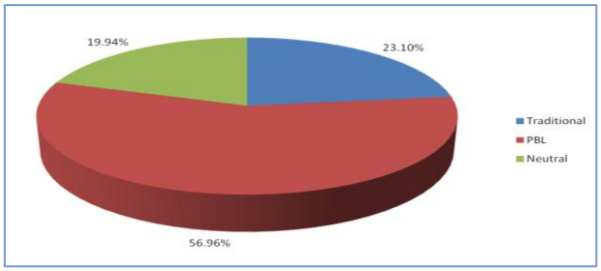

Figure 1: Comparative preference for the teaching methodology: traditional versus PBL.

Table 1: Descriptive statistics of the teaching methodologies: traditional versus PBL using the Likert's scale.

	Traditional much better=1 (%)	Traditional generally better=2 (%)	Both the same=3 (%)	PBL generally better=4 (%)	PBL much better=5 (%)
Acquisition of knowledge	17 (15.2)	14 (12.5)	35 (31.3)	23 (20.5)	23 (20.5)
Information gathering	37 (33.0)	21 (18.8)	23 (20.5)	20 (17.9)	11 (9.8)
Understanding general principles	23 (20.5)	19 (17.0)	23 (20.5)	22 (19.6)	25 (22.3)
Learning efficiency	17 (15.2)	10 (8.9)	27 (24.1)	23 (20.5)	35 (31.3)
Personal enjoyment and satisfaction	8 (7.1)	6 (5.4)	21 (18.8)	37 (33.0)	40 (35.7)
Motivational level	14 (12.5)	8 (7.1)	26 (23.2)	31 (27.7)	33 (29.5)
Stimulating interest in the subject	5 (4.5)	11 (9.8)	23 (20.5)	35 (31.3)	38 (33.9)
Interpersonal relationships	14 (12.5)	10 (8.9)	22 (19.6)	25 (22.3)	41 (36.6)
Teamwork	8 (7.1)	7 (6.3)	8 (7.1)	32 (28.6)	57 (50.9)
Student teacher relationships	30 (26.8)	21 (18.8)	19 (17.0)	19 (17.0)	23 (20.5)
Development of reasoning	10 (8.9)	6 (5.4)	14 (12.5)	39 (34.8)	43 (38.4)
Curiosity and a questioning attitude	16 (14.3)	7 (6.3)	23 (20.5)	27 (24.1)	39 (34.8)
Developing independent thinking	9 (8.0)	7 (6.3)	14 (12.5)	43 (38.4)	39 (34.8)
Preparation for clinical subjects	10 (8.9)	12 (10.7)	22 (19.6)	20 (17.9)	48 (42.9)
Overall value	3 (2.7)	8 (7.1)	35 (31.3)	24 (21.4)	42 (37.5)

Table: 2 Comparative statistical analysis of the teaching modalities: traditional versus PBL.

	Traditional (%)	Neutral (%)	Problem based learning (%)	t-value (%)	P value
Acquisition of knowledge	31 (27.7)	35 (31.3)	46 (41.0)	28.396	0.000
Information gathering	58 (51.8)	23 (20.5)	31 (27.7)	26.548	0.000
Understanding general principles	42 (37.5)	23 (20.5)	47 (41.9)	28.715	0.000
Learning efficiency	27 (24.1)	27 (24.1)	58 (51.8)	33.119	0.000
Personal enjoyment and satisfaction	14 (12.5)	21 (18.8)	77 (68.7)	48.542	0.000
Motivational level	22 (19.6)	26 (23.2)	64 (57.2)	36.855	0.000
Stimulating interest in the subject	16 (14.3)	23 (20.5)	73 (65.2)	44.467	0.000
Interpersonal relationships	24 (21.4)	22 (19.6)	66 (58.9)	36.978	0.000
Teamwork	15 (13.4)	8 (7.1)	89 (79.5)	53.609	0.000
Student teacher relationships	51 (45.6)	19 (17.0)	42 (37.5)	27.978	0.000
Development of reasoning	16 (14.3)	14 (12.5)	82 (73.2)	48.943	0.000
Curiosity and a questioning attitude	23 (20.6)	23 (20.5)	66 (58.9)	37.320	0.000
Developing independent thinking	16 (14.3)	14 (12.5)	82 (73.2)	48.943	0.000
Preparation for clinical subjects	22 (19.6)	22 (19.6)	68 (50.8)	38.538	0.000
Overall value	11 (9.8)	35 (31.3)	66 (58.9)	46.267	0.000

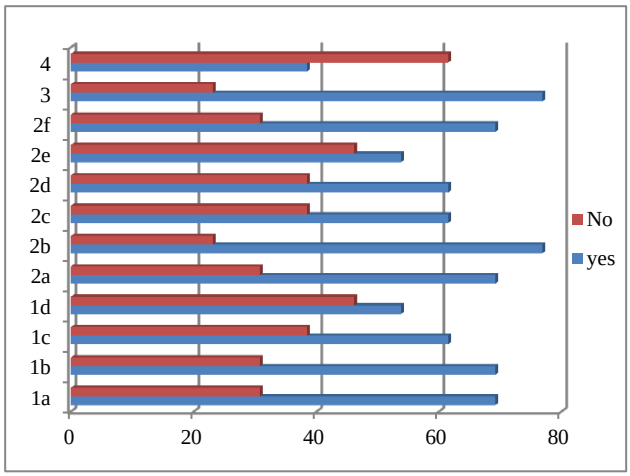

Figure 2: Perception of the faculty about introduction of PBL in medical education.

1a.Non availability of properly trained faculty; 1b.Non availability of logistics (rooms, furniture, access to internet and computers) ; 1c.No Remunerations for extra laborious job; 1d.No liability as PBL not yet included in the university curriculum; 2a.PBL facilitates self -learning; 2b.PBL is better way of understanding of learning objectives; 2c.PBL creates interest in topic; 2d.PBL is a more scientific way of teaching; 2e.PBL strengthens student's intrinsic motivation; 2f.PBL gives systematic approach or attempts to apply in educational process. 3.Whether advocate implementing PBL than traditional teaching; 4.Whether want to become PBL facilitator than a traditional teacher.

DISCUSSION

The finding that PBL has positive influences in improving students' achievement are quite evident from this research is quite comparable with the research conducted revealing that PBL resulted in higher student achievements.[8] The development of inherent interest and motivation in the subject as highlighted in this study is similar to the results of the study conducted by.[9] The research conducted on questioning resulting in higher student's achievements is comparable with the study conducted by.[10,11] Acquisition of knowledge, understanding of general principles and learning efficiency along with development of reasoning, independent thinking, curiosity and questioning attitude is more developed with PBL as compared to traditional method of teaching as is shown in the present study which is in concordance with other studies which state that discussing problems in a PBL group (before beginning to research learning issues) activates relevant prior knowledge and facilitates the processing of new information and Students are better able to construct new knowledge when they can relate it to what they already know.[12]

CONCLUSION

It can be very well concluded from the indexed research that problem based learning (PBL) being an innovative educational approach, that is gaining prominence in higher education has been found to have more positive effects as it seems through its evaluation on Likert's scale.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Onyon C. Problem based learning: a review of the educational and psychological theory. Clin Teach. 2012;9:22-6.
2. Savery, John R. Overview of problem-based learning: Definitions and distinctions. Interdisciplinary J Problem-based Learning. 2006;1(1):9-20.
3. Armstrong JS. Natural Learning in Higher Education. Springer, Encyclopedia of the Sciences of Learning Philadelphia, PA: University of Pennsylvania; 2012: 1-10.
4. Albanese MA, Mitchell, S. Problem-based learning: A review of literature on its outcomes and implantation issues. Acad Med. 1993; 68(1): 52–81.
5. Beachey WD. A comparison of problem-based learning and traditional curricula in baccalaureate respiratory therapy education. Respiratory Care. 2007;52(11):1497–506.
6. Mishoe, S. Problem-based learning: Any influence in respiratory care? Respiratory Care. 2007;52(11):1457–9.
7. Beers GW. The effect of teaching method on objective test scores: Problem-based learning versus lecture. J Nursing Educ. 2005;44(7) :305–9.
8. Chin C, Chia LG. Problem-based learning: using students' questions to drive knowledge construction. Sci Educ. 2004;88(5):707-27.
9. Dolmans DH, Wolfhagen IH, van der Vleuten CP, Wijnen WH.. Solving problems with group work in problem based learning: Hold on to the philosophy. Med Educ. 2001;35:884-9.
10. Cuccio-Schirripa S, Steiner HE. Enhancement and analysis of science question level for middle school students. J Res Sci Teaching. 2000;37(2):210–24.
11. Selcuk SG, Sahin M, Acıkgoz K. The Effects of Learning Strategy Instruction on Achievement, Attitude, and Achievement Motivation in a Physics Course. Res Sci Education. 201141(1);39-62.
12. Schmidt HG, De Volder ML, De Grave WS, Moust JHC, Patel VL. Explanatory models in the processing of science text: The role of prior knowledge activation through small-group discussion. J Educ Psychol. 1989;81:610–9.

Cite this article as: Joshi HS, Katyal R, Singh A, Joshi G, Chandra S, Singh K. Is problem based learning a better teaching tool as compared to didactic lectures for the undergraduate students? Int J Community Med Public Health 2017;4:3727-30.