



Students approach towards problem based learning over traditional learning method

Author

Ayesha Juhi

Associate Professor, Department of Physiology, Apollo Institute of Medical Science and Research,
Hyderabad, India

Email: juhiayasha@gmail.com

Abstract

Background: *In the present 21st century, the conventional biomedical beliefs and established medical doctrines have been replaced by advanced concepts and new disciples which have challenged the medical school authorities to determine the curriculum which encourages high level knowledge, skills, critical thinking and self directed learning that prepares the physicians for professional practices in fast changing healthcare environment. The approach towards learning that students adopt appears to be an important factor in determining both the quantity and quality of learning. Lecture is a traditional and didactic, most common method of teaching. It helps to provide information to a large number of students at a time however student involvement is minimal. In PBL, a clinical problem is given to students without prior reading or lecture. The student analyses the problem through self-directed efforts, solves the given problem by applying his knowledge and skills followed later by group discussions acquires knowledge and develops skills. Hypothesis: Problem based learning is a better learning approach over lecture based learning.*

Material and Methods: *Important clinical topics were discussed during lecture based learning (LBL) and problem based learning (PBL) to First year MBBS students. Students approach towards two different learning methodologies was assessed by providing them questionnaire and rate it on a likert scale. The results obtained were compared using non parametric wilcoxon sign rank test.*

Results: *The results of the study proved that in comparison to LBL, the PBL method produces better outcomes of recall, analytical and critical thinking in addition to problem solving skills. PBL had been found to be a more effective form of learning method with a greater degree of learning satisfaction and motivation as compared to the conventional LBL method.*

Conclusion: *Problem based learning methodology had a superior efficacy for analyzing, reasoning, applying the knowledge for gaining clinical skills, retention of knowledge, self directed learning and enhancing communication skills over lecture based learning method by students.*

Keywords: *Problem-based learning, Lecture-based learning, Iron deficiency Anaemia, Hypertension, Diabetes, Myocardial infarction.*

Introduction

In the present 21st century, the conventional biomedical beliefs and established medical doctrines have been replaced by advanced

concepts and new disciples which have challenged the medical school authorities to determine the curriculum which encourages high level knowledge, skills, critical thinking and self

directed learning that prepares the physicians for professional practices in fast changing healthcare environment. The approach towards learning that students adopt appears to be an important factor in determining both the quantity and quality of learning.

Traditionally, medical students have been taught basic science and introductory clinical material in the conventional lecture format. It has long been assumed that such lectures impart the greatest amount of information in the shortest period of time, forming the framework for future clinical learning.⁽¹⁾ It is estimated that students' attention diminishes after 10 minutes of passive listening, limiting what is learned.⁽²⁾ Additionally, lectures do little to challenge and stimulate the students to problem solve, a skill that is necessary for their clinical years as well as their medical careers.⁽³⁾

In PBL, a clinical problem is given to students without prior reading or lecture. The student analyses the problem through self-directed efforts, solves the given problem by applying his knowledge and skills followed later by group discussions acquires knowledge and develops skills. An adequate infrastructure, trained faculty, well-equipped library and internet facility is required for PBL. A tutor is present throughout the session to facilitate the learning process.⁽⁴⁾

Material and Methods

It is a cross-sectional comparative study conducted on first MBBS students studying in Apollo medical college, Hyderabad. 54 students gave the consent to take part in the study. Ethical clearance was taken from the institute.

Students were exposed to clinical important topics like Iron deficiency Anaemia, Hypertension, Diabetes and Myocardial infarction. At the end of the completion of the topics students approach in understanding the clinical topic was assessed using a 13 items questionnaire on a likert scale. 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree.

Out of total 4 clinical topics, Iron deficiency Anaemia and Hypertension was discussed in form lecture based learning methodology.

Two topics Diabetes and Myocardial infarction were discussed in the form of problem based study. Students were divided into small groups of 10-12 each with three faculties as facilitator. A problem depicting a scenario of diabetes patient was priorly made by the concerned faculty. Problem was discussed under two sessions. The first session called as brain storming, where the students after reading the given problem, they discuss among themselves, search unfamiliar terms, analyse the problem, form hypothesis of the given problem and come out with objectives on their own in presence of faculty. The second session which is a presentation session, where each student among the group gives presentation of the objectives formed in the previous meeting and in the end come to a conclusion of the given problem. A week gap is given between the two sessions for preparing the objectives so students can do self directed learning for understanding the problem in depth.

Sl no	Items
1	Learning quality (at the end of the session all the objectives are covered and well understood)
2	Knowledge retention (retrieve and utilize)
3	Practical usefulness (able to link the basic science with clinical importance)
4	Class attractiveness (early ability to realize the basic science knowledge is of utmost importance clinical science)
5	Stimulates thinking, analysis and reasoning skills
6	Able to connect the prior level of knowledge to the present topic
7	Answering to questions in exams at least 50% of the learnt topic
8	Self directed learning (motivates me to learn the subject further by referring books, journals, internet etc)
9	When I have understood the topic, it gives me a chance to discuss with my group mates and present it. Hence, enhances my communication skills.
10	Helps to interact with peers(faculty)
11	I feel I have learned the subject in depth
12	Motivation (self -directed learning, problem solving skills, group dynamics, communication skills)
13	Is an effective method of learning (at the end of the session I feel very satisfied as it has augmented my confidence in learning)

The questionnaire consisting of 13 items was taken at the end of sessions and after lecture class was over.

Statistics analysis: The total score was calculated separately for PBL and LBL by the students approach. The score was tabulated using IBM SPSS VERSION 24. Non parametric test wilcoxon ranked test for two dependent sample was used to analyse and compare the PBL and LBL score.

Result

The total score for the PBL and LBL on likert scale was 44.69 and 31.22 respectively. According to Wilcoxon Signed Ranks Test with p value of 0.0001 was considered highly significant which proves PBL is preferred method over LBL.

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	25th	Percentiles 50th (Median)	75th
PBL	54	44.69	2.648	39	49	43.00	45.00	47.00
LBL	54	31.22	2.006	28	35	30.00	31.00	32.00

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
LBL - PBL	Negative Ranks	54 ^a	27.50	1485.00
	Positive Ranks	0 ^b	.00	.00
	Ties	0 ^c		
	Total	54		

a. LBL < PBL

b. LBL > PBL.

c. LBL = PBL

Test Statistics^a

	LBL - PBL
Z	-6.404 ^b
Asymp. Sig. (2-tailed)	.000

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

Discussion

According to the results obtained, students preferred pbl as an effective method over lecture based learning as it is short time focus on the topic where the teacher plays an active role and students are passive learners. When it comes to thinking, analysis and reasoning skills PBL was a better learning method. Self directed learning can extensively happen only through PBL rather than LBL as the topic taught is not again discussed in near future where as in presentation session where student come prepared for the objectives of the given topic.

Communication skills were even enhanced among students with their colleagues and their peers. Their knowledge retention and utilization of the knowledge gained through PBL was way more than their learning happened through LBL

Few studies which had the same results pertaining to students satisfaction with PBL over LBL.⁽⁵⁻⁸⁾

In a study conducted by Lin in Taiwan on nursing students, the group who received PBL as the training method showed more satisfaction, critical thinking and self-motivated learning. And it was shown that PBL training was more effective than conventional teaching⁽⁹⁾

Meo assessed knowledge and skills of undergraduate medical students in a respiratory physiology course and concluded that students in PBL group obtained significantly higher scores compared to LBL approach⁽¹⁰⁾

On the other hand, McParland et al. compared PBL with LBL in the field of psychiatry in England. He concluded that performance of the students holding PBL was better in both multiple choice questions and the viva.⁽¹¹⁾

In the present study, students preferred PBL because of motivation boost, quality learning, knowledge retention, class attractiveness, and practical usefulness of contents.

Conclusion

Problem based learning methodology had a superior efficacy for analyzing, reasoning, applying the knowledge for gaining clinical skills, retention of knowledge, self directed learning and enhancing communication skills over lecture based learning method by students.

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