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Education Section

Problem Based Learning (PBL) - An Effective Approach to Improve Learning Outcomes in Medical Teaching

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ABSTRACT

Introduction: As the "Science of Medicine" is getting advanced day-by-day, need for better pedagogies & learning techniques are imperative. Problem Based Learning (PBL) is an effective way of delivering medical education in a coherent, integrated & focused manner. It has several advantages over conventional and age-old teaching methods of routine. It is based on principles of adult learning theory, including student's motivation, encouragement to set goals, think critically about decision making in day-to-day operations. Above all these, it stimulates challenge acceptance and learning curiosity among students and creates pragmatic educational program.

Aim and objectives: To measure the effectiveness of the "Problem Based Learning" as compared to conventional theory/ didactic lectures based learning.

Material and Methods: The study was conducted on 72 medical students from Dayanand Medical College & Hospital, Ludhiana. Two modules of problem based sessions designed and delivered. Pre & Post-test score's scientific statistical analysis was done. Student feed-back received based on questionnaire in the five-point Likert scale format.

Results: Significant improvement in overall performance observed. Feedback revealed majority agreement that "Problem-based learning" helped them create interest (88.8 %), better understanding (86%) & promotes self-directed subject learning (91.6 %). Substantial improvement in the post-test scores clearly reveals acceptance of PBL over conventional learning.

Conclusion: PBL ensures better practical learning, ability to create interest, subject understanding. It is a modern-day educational strategy, an effective tool to objectively improve the knowledge acquisition in Medical Teaching.

Keywords: Medical Education, Modern Vs. Conventional Teaching

INTRODUCTION

The scientific instructional method, where 'triggers' from clinical scenarios, is utilized to define customized learning objectives, perform independent research, refine & analyse findings in group discussions is a modern day pedagogy in medical education and described as "Problem Based Learning" [1]. Instead of rigmarole conventional methods of teaching, students are allotted with an exciting and challenging problem at the beginning of the session. This is followed with brainstorming of relevant issues, filtering out the irrelevant thoughts & ideas, discussing possible solutions which are of practical utility and involves real-world implications. Students were charged with sense of responsibility to learn on their own, utilizing the given situation or problem as a navigator to realize what needs to be learnt and what is most relevant and needs to be taught [2]. The method was initiated at the MC Master University's school of Medicine, Canada, in 1960s and is now widely accepted & adopted in medical curricula of multiple countries [3]. Students actively acquire knowledge, emphasize more on understanding than memorising just to pass university examination. This method encourages use of various information sources and reading materials.

Problem based learning (PBL) encompasses "active learning with particular relevance to the learning objectives (as opposed to the traditional passive spoon-feeding rote learning based on teacher-designed didactic lectures and instructions) [4]. It is now a well-established approach used for undergraduate, postgraduate and continuing medical education programs of medical education [5].

The method utilizes practical clinical cases & their real-time context to understand basic and clinical subjects [6]. It actually creates an environment that encourages practical involvement of students, pushes them to participate in an on-going activity in which cross-functional feedback from peers & facilitators is encouraged [7].

The pedagogy is scientifically well-framed on the core belief that "Most effective learning needs, active learner's involvement, context based knowledge use, underlying well-defined specific purpose [8].

AIMS AND OBJECTIVES

To measure the effectiveness of "Problem Based Learning" compared to Conventional learning in medical Education.

MATERIAL AND METHODS

The study was conducted at Dayanand Medical College & Hospital, Ludhiana and involved 72 undergraduate medical students, who voluntarily agreed to participate in the study. All ethical clearances and written consents were taken from concerned authorities before conducting the study. A well-designed, scientifically tested questionnaire was given to all the subjects in the beginning. This questionnaire was based on Pathology, including short-answer and multiple-choice questions. These were already taught to the subjects in their routine lectures. Problem Based Learning sessions were conducted in two modules. The topics covered in these modules were same as those covered in the traditional lecture. The facilitators were trained for these sessions. Subjects divided into 9 groups. Each group allotted with one facilitator. Clinical problem was given. Each group was given, one-week time, to prepare for the presentation. During these sessions, subjects were encouraged to discuss the clinical scenario given. After session, post-test questionnaire was administered. Student's feedback to assess the effectiveness of PBL sessions was taken based on questionnaire on the five-point Likert scale comprising: Strongly agree (1); Agree (2); Undecided (3); Disagree (4); and Strongly disagree (5). Completed questionnaires were collected and data analysed using SPSS (version 16). Pre and Post-test scores were analysed using paired t-test. Appropriate tables were used for data presentation. Subject's feedback was expressed in terms of percentage. p-value <0.05 was considered statistically significant.

RESULTS

The pre and post-test scores comparison revealed significant improvement in the post-test scores (shown in [Table/Fig-1]). The improved performance was evaluated by applying paired t-test. (p-value = 0.01). Questionnaire analysis revealed that majority of the students strongly agreed that Problem-based learning helped in creating interest (88.8%), better understanding(86%) and promotes self-directed learning(91.6%). About (90%) opined that method, motivated them to learn and 83 % strongly opined that it facilitated team learning. The PBL sessions were highly appreciated by almost all subjects. Overall, 97 % subjects strongly recommended that more PBL sessions should be incorporated in the curriculum (shown in [Table/Fig-2]).

[Table/Fig-2]: Student Feedback Questionnaire

Kindly tick (√) the appropriate option

1. Strongly agree 2. Agree 3. Undecided 4. Disagree 5. Strongly disagree.

	Observation (n)	Mean (SD)	S.E of mean	p-value
Pre-test score	72	10.04 (3.1)	0.37	0.01*
Post-test score	72	14.89 (1.9)	0.22	

[Table/Fig-1]: Table depicting comparison of marks obtained pre-test and post-test

S. No.		1	2	3	4	5
1.	PBL promotes self-directed learning	66(91.6)	03(4.2)	03(4.2)	-	-
2.	PBL sessions motivate me to learn	65(90)	04(5.6)	01(1.4)	02(3)	-
3.	PBL sessions helped me to create interest in the subject	64(88.8)	05(6.8)	02(3)	01(1.4)	-
4.	PBL sessions helped me have better understanding about the subject	62(86)	08(11.2)	01(1.4)	01(1.4)	-
5.	PBL facilitates team learning	60(83)	12(17)	-	-	-
6.	More PBL sessions should be incorporated in the curriculum	70(97)	02(3)	-	-	-

[Table/Fig-2]: SD-Standard deviation, S.E-Standard error of mean
*- statistically significant

DISCUSSION

Statistically significant results were obtained on comparing the pre and post-test scores by the students. There was a positive feedback by majority of the students. This study on PBL clearly unearthed, the students appreciation for facilitated team-learning (83.9%) and boosted self-confidence (83.9%). Subject's responses clearly indicated appreciation of the strategy [9]. In addition to biomedical training, students practice skills, that encourage them to self-directed learning for future [10].

A study by Prince et al clearly revealed that more PBL graduates compared to non-PBL graduates indicated that they had learned profession-specific methods, communication skills and teamwork in medical school [11]. Another study revealed that majority of faculty ,both with and without prior experience of PBL, agreed that PBL helped students acquire critical-thinking skills and created sense of responsibility towards self-study [12]. A similar study by Abraham et al reported that student's success rate in the university examinations improved subsequent to concerned methodology adoption [13].

Similar previous studies have unanimously proved that students in the PBL class are with more positive attitude toward their learning environment [14]. Similarly, in present study also, the critical need for more PBL sessions was felt by majority.

CONCLUSION

PBL, an educational strategy is an effective tool to objectively improve the knowledge acquisition in Medical Teaching.

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