

Problem Based Learning Verses Tutorials in the Knowledge of Contraception and Family Planning Methods by Undergraduate Medical Students – Comparative Study

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How to citation this article: Nair Lakshmi, Thomas Sheela, Mammen Kitty, Sheelamoni, “Problem Based Learning Verses Tutorials in the Knowledge of Contraception and Family Planning Methods by Undergraduate Medical Students – Comparative Study”, IJMACR- January - 2023, Volume – 6, Issue - 1, P. No. 23 – 30.

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Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Introduction: Contraception is an effective prevention strategy for reducing illegal abortions related deaths in our country. It is an integral part of Obstetrics and Gynaecology syllabus. Traditionally it has been taught as lectures or small group tutorials which the students find boring. PBL is innovative approaches where the students are given problems in small groups which they try to solve with critical thinking and discussions.

Methods: The students attending OBG postings were divided into 2 groups, one group with PBL and the other tutorial group. Four relevant contraceptive topics were taken as both PBL and tutorials for all students with crossing over after 2 classes each so that all students were exposed to both teaching-learning methods. PBL was in the form of paper cases followed by facilitated

discussion under the guidance of the faculty, while the faculty took the tutorial classes. MCQs were given at the end of each session. At the end of all four classes a perception questionnaire was given for both methods to all students. The results were then analyzed.

Results: 52 students were included in the study. It was seen that the mean marks obtained by the students in the MCQs of all four topics after PBL was significantly higher than those obtained by the same students after a tutorial. Also the students' satisfaction, ability to generate interest in the topic and overall efficacy of the teaching – learning method was higher in PBL method than the tutorial.

Conclusion: This study concludes that PBL is an effective method of learning and can be used to impart

knowledge about contraception and family planning methods to undergraduate medical students.

Keywords: Contraception, PBL, Tutorials.

Introduction

Contraception is an effective primary prevention strategy for reducing abortion and pregnancy related maternal mortality in our country. It is an integral part of Obstetrics and gynaecology syllabus in India and is being taught to students in the form of lectures or tutorials. The amount of information available is vast and most of the students find the classes to be dry and boring. The knowledge of medical students regarding various contraceptive practices in our country has been found to be suboptimal.¹ To achieve our national goal of population control the knowledge of the students have to be improved.

Tutorial is a teaching session given to a small group of students by a tutor / lecturer .The students can ask questions and clarify the content that they have learned . In a traditional tutorial format, the teacher plays the central role in transferring knowledge to small group of students and will provide the ultimate answers to most questions.² Whereas problem based learning is a teaching learning method in which the facts and concepts are presented as complex real life problems to promote student learning. The problems can be paper based clinical scenarios, lab data, photographs, video, newspaper clips or articles, real or simulated patients etc. This method help students acquire critical thinking skills and create a responsibility towards self-study.³ It can also be used as tool for finding and evaluating research materials and promoting lifelong learning.⁴ It has been seen that, in contraception and family planning, the methods to be used have to be tailored according to a particular family's need and cultural preferences. Hence

textbook knowledge is not enough, the physician should be able to use their knowledge in clinical context, should be able to analyze the need of the patient so that they can guide them better to choose an appropriate contraception and family planning method. PBL can be useful in this regard as it trains the students to learn through solving real world problems and act as a medium for development of clinical problem solving skills. In view of this background the following study was conducted in my institution.

Material and Methods

Study design – Comparative study

Study setting – Travancore Medical College, Kollam.

Study population – MBBS students of 6th semester

Study period – 26th June 2019 – 19th August 2019

Sample size – 52 students

Sampling method - Convenient Sampling (all the students of 6th semester attending OBG postings in the designated time period)

Intervention – Problem based learning, Tutorials

Inclusion criteria – all 6th semester medical students attending the OBG postings in the designated time period of the study.

Exclusion criteria – students who were absent during the study

Study tool – Post intervention assessment by MCQs , feedback questionnaire based on 5 point Likert scale which was peer reviewed and validated.

Data collection – three batches of 6th semester's students consisting of a total of 58 students attended the OBG posting during this time period. A total of 52 students were recruited for the study (6 students were absent during the study period) .Each batch consisted of 18 – 20 students .

This batch was further divided into 2 small groups of 9-10 students each according to even and odd roll numbers and were named batch A and B respectively. Four clinically significant contraception and family planning topics (oral contraceptives, Intrauterine devices, medical termination of pregnancy and emergency contraception) were taken as both PBL and tutorials to these batches.

Batch A initially was given 2 topics (OCP and IUD) as PBL while batch B was exposed to the same topics as tutorials. Then there was crossover of the batches. Now Batch A was taught 2 new topics

(MTP and emergency contraception) as tutorials while batch B was exposed to the same topics as PBL. At the end of each exposure the students were given a test using same MCQs which were 10 in number consisting of 10 marks each. At the end of all 4 exposures the entire batch (A and B) was required to answer a feedback questionnaire (Appendix 1) regarding both teaching methods. This exact same methodology was continued for next 2 batches which came for gynaecology postings.

The data collected from MCQs and questionnaire was entered in Microsoft excel spreadsheet. The

PBL was in the form of paper cases with relevant questions which were given to the students so that they can discuss and analyze the problem and come up with solutions. These students were given access to reference materials (textbook in this case). The faculty acted as a facilitator only. Whereas in the tutorial method the faculty imparted the knowledge to the students with relevant aids (powerpoint slides etc) , the students at the end could ask questions and clarify their doubts if any .

The 6th semester students were taken as they were familiar with the topics as they had completed their family planning postings in the 5th semester.

Statistical analysis – data collected from MCQs was entered in a Microsoft excel sheet and was analyzed using independent sample t test Using SPSS 20 software, whereas the data collected from the questionnaire was analyzed using Mann Whitney test.

Ethical consideration – clearance was taken from the IRB and ethical committee before commencing the study on 20/6/19. IEC.No:-057/19

Informed consent – informed written consent was taken from all students before conducting the study.

Results

Out of 58 students who attended the OBG posting during the period of study, 52 students attended all four classes and hence were included in the study . Table 1 shows the distribution of male and female students in the study 17 males and 35 female students respectively.

Tables 2-5 shows the mean marks obtained by the students in both tutorials and PBL groups for all the four topics. It was seen that in OCP, IUCD , MTP and emergency contraception the mean marks obtained by students in tutorials were 6.69, 5.65, 6.81 and 6.92 respectively whereas the mean marks obtained by the PBL group was 7.42,7.65,8.31 and 8.58 respectively. The samples were analyzed by independent sample t test and the results in all 4 topics were found to be statistically significant in favor of PBL.

Table 6-7 shows the results of perception questionnaire for both PBL and tutorial respectively. About 94.2% (49/52) students agreed that PBL was able to generate interest in the subject as compared to 53.9% (28/52) in Tutorials. Similarly 94.3% (49/52) students said that they were able to understand contraception better with PBL as compared to 51.9% (27/52) students in tutorials. 82.7% (43/52) said that they will remember contraception better with PBL as compared to 34.6%

(18/52) in tutorials. 92.3% said that they will recommend PBL as a good teaching -learning method. 86.5% (45/52) said that PBL was beneficial to them compared to 51.9% (27/52) students who said that tutorials were beneficial. The satisfaction rate among students with PBL was 96.2% (50/52) as compared to 46.1 % (24/52) in tutorials.

Table 8 shows the mean range of marks using a Mann Whitney test with numbers 1 to 5, to assess the statistical significance. 1 point was given for strongly agree and 5 was given for strongly disagree.

The total perception score was for 60 points in both PBL and Tutorials. So lower the score better is the acceptance of teaching -learning method. Table 8 shows that the students scored better in all question on PBL as compared to the tutorials which was statistically significant.

Table 1: Table showing gender distribution of the study.

Gender	Frequency	Percentage
Male	17	32.7
Female	35	67.3
Total	52	100.0

Table 2: Scores for OCP

Variable	Group	N	Mean	SD	t value	p value
OCP	Tutorials	26	6.69	1.258	2.034	0.047*
	Problem Based Learning	26	7.42	1.332		

p<0.05, statistically significant. P value was calculated by using Independent sample t test. The above table show that the mean (7.42) exam scores regarding OCP was high in problem based learning group compared to tutorial group.

Table 3: Scores for IUCD

Variable	Group	N	Mean	SD	t value	p value
IUCD	Tutorials	26	5.65	1.810	4.511	0.001*
	Problem Based Learning	26	7.65	1.355		

p<0.05, statistically significant. P value was calculated by using Independent sample t test.

The above table shows that the mean (7.65) exam scores regarding IUCD were high in problem based learning group compared to tutorial group.

Table 4: Scores for MTP

Variable	Group	N	Mean	SD	t value	p value
MTP	Tutorials	26	6.81	1.721	3.722	0.001*
	Problem Based Learning	26	8.31	1.123		

p<0.05, statistically significant. P value was calculated by using Independent sample t test. The above table shows that the mean (8.31) exam scores regarding MTP was high in problem based learning group compared to tutorial group.

Table 5: Score for emergency contraception

Variable	Group	N	Mean	SD	t value	p value
Emergency Contraception	Tutorials	26	6.92	2.226	3.159	0.003*
	Problem Based Learning	26	8.58	1.474		

P<0.05, statistically significant. P value was calculated by using Independent sample t test. The above table shows that the mean (8.58) exam scores regarding Emergency contraception were high in problem based learning group compared to tutorial group.

Table 6 : Feedback PBL

Questions	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Was able to generate interest in the subject	31(59.6%)	18(34.6%)	3(5.8%)	0(0.0%)	0(0.0%)
Attention span of learner was good during the session.	32(61.5%)	17(32.7%)	3(5.8%)	0(0.0%)	0(0.0%)
Was able to understand the principles of topic.	23(44.2%)	25(48.1%)	4(7.7%)	0(0.0%)	0(0.0%)
Were able to clear your doubts about the topic if any.	20(38.5%)	26(50.0%)	6(11.5%)	0(0.0%)	0(0.0%)
Was able to generate interactive discussion.	36(69.2%)	13(25.0%)	3(5.8%)	0(0.0%)	0(0.0%)
Was suitable to make contraceptive method easily understandable.	29(55.8%)	20(38.5%)	3(5.8%)	0(0.0%)	0(0.0%)
Will remember the topic better with this teaching method for long time.	32(61.5%)	11(21.2%)	8(15.4%)	0(0.0%)	1(1.9%)
Generates motivation for self study.	21(40.4%)	20(38.5%)	10(19.2%)	1(1.9%)	0(0.0%)
Will recommend this as a good teaching learning method.	33(63.5%)	15(28.8%)	4(7.7%)	0(0.0%)	0(0.0%)
Can be adopted for teaching other subjects.	19(36.5%)	21(40.4%)	11(21.2%)	1(1.9%)	0(0.0%)
Overall this teaching method was effective and beneficial to me.	30(57.7%)	15(28.8%)	7(13.5%)	0(0.0%)	0(0.0%)
Satisfied with this teaching method.	29(55.8%)	21(40.4%)	2(3.8%)	0(0.0%)	0(0.0%)

Table 7: Feedback Tutorial

Questions	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Was able to generate interest in the subject	7(13.5%)	21(40.4%)	19(36.5%)	5(9.6%)	0(0.0%)
Attention span of learner was good during the session.	5(9.6%)	15(28.8%)	22(42.3%)	9(17.3%)	1(1.9%)
Was able to understand the principles of topic.	8(15.4%)	30(57.7%)	11(21.2%)	3(5.8%)	0(0.0%)
Were able to clear your doubts about the topic if any.	11(21.2%)	14(26.9%)	17(32.7%)	10(19.2%)	0(0.0%)
Was able to generate interactive discussion.	4(7.7%)	11(21.2%)	16(30.8%)	19(36.5%)	2(3.8%)
Was suitable to make contraceptive method easily understandable.	6(11.5%)	21(40.4%)	17(32.7%)	8(15.4%)	0(0.0%)
Will remember the topic better with this teaching method for long time.	4(7.7%)	14(26.9%)	20(38.5%)	13(25.0%)	1(1.9%)
Generates motivation for self study.	0(0.0%)	12(23.1%)	28(53.8%)	11(21.2%)	1(1.9%)
Will recommend this as a good teaching learning method.	3(5.8%)	15(28.8%)	22(42.3%)	12(23.1%)	0(0.0%)
Can be adopted for teaching other subjects.	3(5.8%)	20(38.5%)	21(40.4%)	8(15.4%)	0(0.0%)
Overall this teaching method was effective and beneficial to me.	6(11.5%)	21(40.4%)	20(38.5%)	5(9.6%)	0(0.0%)
Satisfied with this teaching method.	6(11.5%)	18(34.6%)	18(34.6%)	10(19.2%)	0(0.0%)

Table 8: The feedback questionnaire was assessed using Mann Whitney test

SN	Feedback	Teaching – learning methods	Mean rank	P value
1.	Was able to generate interest in the subject	PBL	36.81	<0.001
		Tutorial	68.19	
2.	Attention span of learner was good during the session.	PBL	33.91	<0.001
		Tutorial	71.09	
3.	Was able to understand the principles of topic.	PBL	42.67	<0.001
		Tutorial	62.33	
4.	Were able to clear your doubts about the topic if any.	PBL	41.48	<0.001
		Tutorial	63.52	

5.	Was able to generate interactive discussion.	PBL	31.59	<0.001
		Tutorial	73.41	
6.	Was suitable to make contraceptive method easily understandable.	PBL	36.57	<0.001
		Tutorial	68.43	
7.	Will remember the topic better with this teaching method for long time	PBL	35.36	<0.001
		Tutorial	69.64	
8.	Generates motivation for self study	PBL	34.68	<0.001
		Tutorial	70.32	
9.	Will recommend this as a good teaching learning method	PBL	32.71	<0.001
		Tutorial	72.29	
10.	Can be adopted for teaching other subjects	PBL	40.31	<0.001
		Tutorial	64.69	
11.	Overall this teaching method was effective and beneficial to me.	PBL	37.97	<0.001
		Tutorial	67.03	
12.	Satisfied with this particular teaching method	PBL	35.50	<0.001
		Tutorial	69.50	

For all the questions the p value is <0.001 It means there is significant difference between the perceptions of the students about PBL and tutorial method of teaching – learning (They favor PBL than Tutorial method) and it is statistically significant.

Discussion

Out of 58 students only 52 students were present for all the four classes. Considering the design of the study (cross over) the factors effecting students’ score like IQ, memory, motivation were largely eliminated. Also the tutor in both groups was same so the confounding factors related to the lecturer like knowledge, manner of expression etc. were also omitted. The present study showed that in terms of marks obtained by the students , they performed better in PBL that traditional tutorial method of teaching in all the four topics taken in contraception and family planning .This was comparable to a study where patient oriented problem based learning was used to teach haematology and the post test scores were significantly higher than those students taught by traditional methods.¹⁵ In another study it was found that students in PBL had a higher chance of outperforming those students who were exposed to traditional methods like lectures in immediate test scores after the lesson as well as in a delayed posttest after 1 week.¹⁶ A similar study on contraception and PBL showed that students were aware of and used contraceptive resources more when compared to traditional methods.¹⁴ Although the

number of female students were more in the batches as compared to male students the performance was same for both genders. In a study by Sarah H found that female students were better informed about OCP and other methods of contraception than male students.¹ in this study no such gender preference was seen. In my personal experience the students who were good in studies performed well in both type of teaching – learning methods but those students who were poor performers actually performed better in PBL , which shows that PBL creates interest in the students for the subject and also helps in self-motivation and self-directed learning.

In PBL an important factor to be considered is the student dynamics, some students were quite active in the discussions while a few of them were rather shy about responding probably due to the fear of voicing an incorrect answer. A study on PBL in Korea showed that students were reluctant to speak in class unless they were sure of something for the fear of negative feedback.¹⁷ Here it is the role of the faculty to encourage both correct as well as incorrect answers for a healthy discussion and also for ensuring active participation by all the students. The feedback questionnaire was given at the end of all 4 classes to the students, here also the results were statistically significant, and most students preferred PBL to conventional tutorials. PBL in the form of paper cases with structured questions made the topic easier for them to understand and with collective discussions they could come up with relevant answers to the questions asked. They were mostly satisfied with this method and were interested in utilizing it for other topics as well. This is similar to a meta-analysis done on studies related to effectiveness of PBL in nursing education which showed that PBL has positive effect on

student satisfaction with training , skills development and clinical education.¹⁸ But a study which compared PBL based curricula to Traditional curricula in basic sciences and clinical examinations found that although the results of examinations were comparable in both groups the students were happier with educational experience in the PBL curricula.¹⁹

The limitations of the study was that due to the time constraints only 52 students were studied so the sample size was small , also the MCQs were given at the end of each session so only the recent memory could be tested . In a study where the students were tested after 6 months after being randomized into PBL and traditional method respectively, students from the PBL group recalled 5 times more concepts than their counterparts.²⁰ Hence the researchers have suggested that after PBL the students could retain and retrieve knowledge for longer periods of time, which unfortunately could not be tested in this study. Further research is required to test for the long term retention of knowledge in students undergoing PBL.

Despite the limitations of this study I feel that PBL is an excellent and interesting method to impart knowledge about contraception and family planning to the medical students without boring them or making them feel the need to memorize the topics, and regurgitate that knowledge during exams, and promptly forgetting it afterwards.

Conclusions

As learning is a continuous process we need to continuously update our teaching methods to meet the needs of our students. Medical education in India is changing rapidly, unfortunately there is disproportionate increase in medical college with acute shortage of good teaching staff. Hence learner centric methods like PBL

can be used with the advantage of students having the opportunity to participate and contribute to their learning. But any new method to be implemented should be consistently evaluated and assessed. This study shows that problem based learning is an effective mode for undergraduate medical education as it promotes autonomous learning, teamwork, critical thinking and problem solving skills of the students. PBL can be modified (in this case contraception and family planning) to suit the needs of individual departments and if incorporated more in the teaching learning process, can be interesting for both the teachers as well as the students.

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