ORIGINAL ARTICLE

PROBLEM BASED LEARNING AND ITS IMPLEMENTATION: FACULTY AND STUDENT'S PERCEPTION

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Background: Problem based learning (PBL) is perhaps the most innovative instructional method implemented in medical education after its introduction. The objective of the study was to evaluate faculty and students' perception about problem based learning and its implementation. **Methods:** The Mixed method sequential design was used to conduct this cross sectional study at Lahore Medical and Dental College (LMDC) from April to June 2012. In the first phase a survey was conducted on 25 faculty members and 235 students on the basis of non-probability convenience sampling and then 3 teachers and 5 students were interviewed in depth. The analyses of qualitative and quantitative data were integrated in the final interpretation phase to draw a conclusion. **Result:** Faculty (96%) and students (73.2%) consider PBL more interesting as compared to conventional teaching. Faculty (56%) and students (43.8%) thinks PBL time-consuming as compared to conventional method. 80 % faculty and 73.2% students support introducing PBL at LMDC but 88% faculty and 72% student thought that faculty training is required for its implementation. 56% Faculty were of the view that workload cannot be managed by present faculty but 51.9% student did not agree with the faculty. Almost 50% of participants thought that clinical faculty is sufficiently available for preparing clinical scenario. Both faculty (76%) and students (71.9%) agreed that PBL help in producing better result in examination. Annual intake of student at LMDC is considered adequate by 48% faculty and 41.9% students. **Conclusion:** PBL is popular among students and faculty of medical college. They feel it a better system and can be implemented after proper planning.

Keywords: Problem based learning, PBL, Medical education, perception, Implementation, Faculty, Students, Awareness, Barriers, Advantages, and Disadvantages.

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INTRODUCTION

Problem based learning (PBL) is perhaps the most innovative instructional method implemented in medical education after its introduction. PBL was pioneered in the medical school program at McMaster University in Hamilton, Ontario, Canada in the late 1960s by Howard Barrows and his colleagues.[1,2]

Now it is time tested effective teaching method worldwide, but it is yet too recent that it has been introduced and evaluated in Pakistani medical colleges.[3,4]

Our medical universities are on the way towards curriculum reviews and medical educators are optimistic about implementing problem based learning. Medical education department of Lahore Medical and Dental College is also working hard to improve the teaching methodology in the institute. To achieve this goal, medical education department has arranged many workshops to train the faculty regarding problem based learning. Although problem based learning has not been completely implemented at our institute, but the faculty and students have exposure to it, by the workshops and different problem based learning practical sessions. This study was designed to get the feedback of students and faculty of our institute regarding implementation issues of problem base learning as the outcomes expected of the learner in a PBL setting may differ among students from different cultural up bringings.[5] Studies conducted[6–8] so far in the Pakistani context involved closed-ended survey leaving many questions unanswered. Hence a mixed method study with both survey and in-depth personalized interviews were organized to not only find out about faculty and students' perceptions but to also gain detailed knowledge of reasons behind prevailing perceptions in a hope to identify barriers and solutions from the stake holders to overcome those barriers for better ownership, which may facilitate the challenging process of implementation.

MATERIAL AND METHODS

This cross sectional study implying mixed method sequential design[9] was conducted at Lahore Medical and Dental College in year 2012 (April to June). Lahore Medical and Dental College is using problem based learning method from last five years in different classes of undergraduate training. In the first phase a cross sectional survey was done using a 14 item close ended questionnaire. In the questionnaire, the first four items were about knowledge about PBL and rest of

10 items are about views regarding implementation of problem based learning at Lahore Medical and Dental College.

Three hundred questionnaire was distributed among faculty members and students on the basis of non-probability convenience sampling. 25 (7 BDS & 18 MBBS) faculty and 235 (93 BDS & 142 MBBS) students' participants responded to the questionnaire. Quantitative data obtained in first phase was analysed through SPSS-16 and percentages were calculated. In the second phase, 3 faculty and 5 students were selected on the basis of non-probability purposive sampling, and they were subjected to face to face in-depth interview (Table-1) after seeking formal informed consent.

The objective of these interviews was to validate the responses received in the quantitative phase, in other words triangulation and to find out rationale for a certain response in a survey.[10] The recorded interviews were interpreted with the help of field notes through framework analysis. Emergent coding was used to generate themes and trends from the thick description. Miles and Huberman's process was used for content analysis.[11]

The analyses of qualitative and quantitative phases were integrated in the final interpretation phase to draw a conclusion.

RESULTS

Out of 260 participants, 25 were faculty members (7 BDS & 18 MBBS) and 235 were students (93 BDS & 142 MBBS).

The results of survey are shown in table-2.

Content analysis of transcribed interviews resulted in emergence of following main themes and sub-themes with supportive evidence of results obtained through survey questionnaire for triangulation:

Advantages of problem base learning: PBL develops critical thinking among the students and develop teamwork and communication skill among them. (100% faculty and 80% student). Participants were of the view that PBL is self directed learning which increases thirst of knowledge (100%). One participant commented "There is no student teacher barrier so things can be remembered more easily"

It actively involves students and keep student's interested in the process (40% faculty & 90% student) as one of our student commented that "Impossible to sleep during PBL, unlike regular lecture".

It has steeper learning curve (10% student) and student become independent in the future (20% student). Problem can be looked in actual scenario and socioeconomic background of patient can be dealt with (10%). PBL provide factual concepts (10%).

Disadvantages of problem base learning: 66.7% faculty & 80% student were of the view that some important text and facts can be missed. Basic points and minor level of the structure may be missed due to main focus on big level (20% students). If point of views are not fact based, it can create ambiguity (20% student) .Time consuming, more difficult, sometimes less interesting if topic is not liked by a participant (30% participant).There is no disadvantage until unless it is not practiced (20% student). More clinical knowledge than theoretical knowledge (40% student & 20% faculty). Narrow spectrum of knowledge and information about the disease (20% students). More resources and manpower required (80% student and faculty). Without base line knowledge when all subjects are taught at once, there might be some problem regarding its thorough understanding (40% student and 20% faculty). Students have to face problems regarding clarification of concepts (20% students). For beginners it is difficult to process large amount of information in short time (20% faculty). But one of the participants actually summarized by saying "The advantages outweighs all"

Implementation of problem base learning at Lahore medical and Dental College PBL should be implemented or Faculty training needed before its implementation at LMDC: Both faculty (80%) and students (74%) agreed that problem base learning should be implemented at LMDC. Only 57.1% BDS faculty agreed with this question and rest of all are not sure if it can be implemented or not. Only 8% faculty and 11% students are sure that it cannot be implemented at LMDC.

One of participants said "Doctor if I tell you truth, fear of change is also one factor that I am not optimistic about that system success here."

All the students who have been interviewed were of opinion that they like practical things and also it will make things easy for them.

"We are here to become doctor, not to do PhD in anatomy, biochemistry etc

Table-1: Questions asked in the in-depth interviews

1. Can you please describe advantages and disadvantages of problem based learning?
2. What are your views about implementation of problem base learning method at LMDC? Is faculty training required for its implementation?
3. Problem base learning should be introduced at Lahore Medical and Dental College? What immediate measures required to introduce PBL at Lahore Medical & Dental College?
4. Keeping in mind the present UHS curriculum, would PBL help in producing better result in professional examinations?
5. Why you think that Annual intake of student (150 MBBS & 75 BDS) at LMDC is ideal for implementing PBL at LMDC?

Table-2: Result of survey

		Faculty BDS	Faculty MBBS	Total Faculty	Student BDS	Students MBBS	Total Students	Total Participants
Total		**7**	**18**	**25**	**93**	**142**	**235**	**260**
I KNOW (can define) problem base learning method of teaching	**N. A**	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (1.1%)	3 (2.1%)	4 (1.7%)	4 (1.5%)
	A	7 (100.0%)	17 (94.4%)	24 (96.0%)	64 (68.8%)	110 (77.5%)	174 (74.0%)	198 (76.2%)
	DA	0 (0.0%)	0 (0.0%)	0 (0.0%)	13 (14.0%)	11 (7.7%)	24 (10.2%)	24 (9.2%)
	DK	0 (0.0%)	1 (5.6%)	1 (4.0%)	15 (16.1%)	18 (12.7%)	33 (14.0%)	34 (13.1%)
I have EXPOSURE to PBL teaching method, as student or teacher, during stay at LMDC	**N. A**	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.7%)	1 (0.4%)	1 (0.4%)
	A	5 (71.4%)	11 (61.1%)	16 (64.0%)	52 (55.9%)	111 (78.2%)	163 (69.4%)	179 (68.8%)
	DA	2 (28.6%)	7 (38.9%)	9 (36.0%)	34 (36.6%)	16 (11.3%)	50 (21.3%)	59 (22.7%)
	DK	0 (0.0%)	0 (0.0%)	0 (0.0%)	7 (7.5%)	14 (9.9%)	21 (8.9%)	21 (8.1%)
Problem base learning strategy is interesting as compared to conventional teaching (Lectures)	**N. A**	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (1.1%)	2 (1.4%)	3 (1.3%)	3 (1.2%)
	A	6 (85.7%)	18 (100.0%)	24 (96.0%)	69 (74.2%)	103 (72.5%)	172 (73.2%)	196 (75.4%)
	DA	1 (14.3%)	0 (0.0%)	1 (4.0%)	9 (9.7%)	23 (16.2%)	32 (13.6%)	33 (12.7%)
	DK	0 (0.0%)	0 (0.0%)	0 (0.0%)	14 (15.1%)	14 (9.9%)	28 (11.9%)	28 (10.8%)
Problem base learning is more time consuming as compared to conventional teaching (Lecture)	**N. A**	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
	A	5 (71.4%)	9 (50.0%)	14 (56.0%)	30 (32.3%)	73 (51.4%)	103 (43.8%)	117 (45.0%)
	DA	2 (28.6%)	9 (50.0%)	11 (44.0%)	43 (46.2%)	46 (32.4%)	89 (37.9%)	100 (38.5%)
	DK	0 (0.0%)	0 (0.0%)	0 (0.0%)	20 (21.5%)	23 (16.2%)	43 (18.3%)	43 (16.5%)
Problem base learning should be introduced at Lahore Medical and Dental College	**N. A**	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (3.2%)	4 (2.8%)	7 (3.0%)	7 (2.7%)
	A	5 (71.4%)	15 (83.3%)	20 (80.0%)	72 (77.4%)	100 (70.4%)	172 (3.2%)	192 (73.8%)
	DA	1 (14.3%)	1 (5.6%)	2 (8.0%)	3 (3.2%)	22 (15.5%)	25 (10.6%)	27 (10.4%)
	DK	1 (14.3%)	2 (11.1%)	3 (12.0%)	15 (16.1%)	16 (11.3%)	31 (13.2%)	34 (13.1%)
Problem base learning is good only for basis science subjects	**N. A**	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (1.1%)	4 (2.8%)	5 (2.1%)	5 (1.9%)
	A	0 (0.0%)	1 (5.6%)	1 (4.0%)	28 (30.1%)	38 (26.8%)	66 (28.1%)	67 (25.8%)
	DA	3 (42.9%)	15 (83.3%)	18 (72.0%)	45 (48.4%)	71 (50.0%)	116 (49.4%)	134 (51.5%)
	DK	4 (57.1%)	2 (11.1%)	6 (24.0%)	19 (20.4%)	29 (20.4%)	48 (20.4%)	54 (20.8%)
Problem base learning is good only for clinical science subjects	**N. A**	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (1.1%)	1 (0.7%)	2 (0.9%)	2 (0.8%)
	A	1 (14.3%)	3 (16.7%)	4 (16.0%)	32 (34.4%)	60 (42.3%)	92 (39.1%)	96 (36.9%)
	DA	4 (57.1%)	14 (77.8%)	18 (72.0%)	38 (40.9%)	58 (40.8%)	96 (40.9%)	114 (43.8%)
	DK	2 (28.6%)	1 (5.6%)	3 (12.0%)	22 (23.7%)	23 (16.2%)	45 (19.1%)	48 (18.5%)
Problem base learning is good for both basic and clinical subjects	**N. A**	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (2.1%)	3 (1.3%)	3 (1.2%)
	A	6 (85.7%)	17 (94.4%)	23 (92.0%)	72 (77.4%)	97 (68.3%)	169 (71.9%)	192 (73.8%)
	DA	0 (0.0%)	1 (5.6%)	1 (4.0%)	4 (4.3%)	21 (14.8%)	25 (10.6%)	26 (10.0%)
	DK	1 (14.3%)	0 (0.0%)	1 (4.0%)	17 (18.3%)	21 (14.8%)	38 (16.2%)	39 (15.0%)
Problem base learning can be implemented at Lahore Medical and Dental College	**N. A**	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (1.1%)	1 (0.7%)	2 (0.9%)	2 (0.8%)
	A	4 (57.1%)	16 (88.9%)	20 (80.0%)	71 (76.3%)	103 (72.5%)	174 (74.0%)	194 (74.6%)
	DA	0 (0.0%)	2 (11.1%)	2 (8.0%)	5 (5.4%)	22 (15.5%)	27 (11.5%)	29 (11.2%)
	DK	3 (42.9%)	0 (0.0%)	3 (12.0%)	16 (17.2%)	16 (11.3%)	32 (13.6%)	35 (13.5%)
Problem base learning can be implemented at Lahore Medical and Dental College only after proper training of faculty	**N. A**	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.7%)	1 (0.4%)	1 (0.4%)
	A	5 (71.4%)	17 (94.4%)	22 (88.0%)	72 (77.4%)	99 (69.7%)	171 (72.8%)	193 (74.2%)
	DA	0 (0.0%)	1 (5.6%)	1 (4.0%)	10 (10.8%)	19 (13.4%)	29 (12.3%)	30 (11.5%)
	DK	2 (28.6%)	0 (0.0%)	2 (8.0%)	11 (11.8%)	23 (16.2%)	34 (14.5%)	36 (13.8%)
Work load of problem base learning can be easily managed with present faculty	**N. A**	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (2.1%)	3 (1.3%)	3 (1.2%)
	A	2 (28.6%)	5 (27.8%)	7 (28.0%)	49 (52.7%)	73 (51.4%)	122 (51.9%)	129 (49.6%)
	DA	3 (42.9%)	11 (61.1%)	14 (56.0%)	19 (20.4%)	33 (23.2%)	52 (22.1%)	66 (25.4%)
	DK	2 (28.6%)	2 (11.1%)	4 (16.0%)	25 (26.9%)	33 (23.2%)	58 (24.7%)	62 (23.8%)
Clinical faculty will be easily available for preparing clinical scenario	**N. A**	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.7%)	1 (0.4%)	1 (0.4%)
	A	2 (28.6%)	10 (55.6%)	12 (48.0%)	45 (48.4%)	80 (56.3%)	125 (53.2%)	137 (52.7%)
	DA	3 (42.9%)	6 (33.3%)	9 (36.0%)	14 (15.1%)	23 (16.2%)	37 (15.7%)	46 (17.7%)
	DK	2 (28.6%)	2 (11.1%)	4 (16.0%)	4 (4.3%)	38 (26.8%)	72 (30.6%)	76 (29.2%)
Keeping in mind the present UHS curriculum, would PBL help in producing better result in professional examinations	**N. A**	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
	A	5 (71.4%)	14 (77.8%)	19 (76.0%)	65 (69.9%)	104 (73.2%)	169 (71.9%)	188 (72.3%)
	DA	1 (14.3%)	2 (11.1%)	3 (12.0%)	4 (4.3%)	20 (14.1%)	24 (10.2%)	27 (10.4%)
	DK	1 (14.3%)	2 (11.1%)	3 (12.0%)	24 (25.8%)	18 (12.7%)	42 (17.9%)	45 (17.3%)
Annual intake of student (150 MBBS & 75 BDS) at LMDC is ideal for implementing PBL at LMDC	**N. A**	1 (14.3%)	1 (5.6%)	2 (8.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.8%)
	A	4 (57.1%)	8 (44.4%)	12 (48.0%)	29 (31.2%)	67 (47.2%)	96 (40.9%)	108 (41.5%)
	DA	1 (14.3%)	5 (27.8%)	6 (24.0%)	36 (38.7%)	34 (23.9%)	70 (29.8%)	76 (29.2%)
	DK	1 (14.3%)	4 (22.2%)	5 (20.0%)	28 (30.1%)	41 (28.9%)	69 (29.4%)	74 (28.5%)

NA: not answered. A: agreed. DA: do not agree. DK: do not know

All the faculty who have been interviewed, 88% of faculty and 74% of students in survey thought that faculty is in need of more facilities and training before implementation of this system at their institute.

What immediate measures would be required at LMDC To introduce PBL: Arrange introductory lecture (33.3% faculty & 40% student). Motivate teacher and students. Modification in curriculum (40% student). Better coordination between faculty and students as well as between clinical and basic science faculty (66.6% faculty & 40% student). Attendance and evaluation should be included in internal assessment (66.6% faculty & 20% student). Make batches according to student's interest in specific subject (20% student). Faculty should be properly trained (33.3% faculty & 60% student). Clinical experience should be started earlier (33.3% faculty & 40% student). Proper committee should be formed to implement PBL and students should also be enrolled in it. LMDC should try to get university status otherwise there is no point.(20% student). Arranging moral programs to teach respected teachers to be fair and just. (20% student) One comment was "Force from higher up" Another comment was "You have already taken first step by conducting this survey."

Few interesting suggestions were "arrange continuous supply of electricity" or "improve multimedia" and "every single person in the college is a problem so problem based learning would not be that difficult"

Effect of PBL on UHS examination result: Most of the participants said that only one word "Of course". One of faculty member was of the view that it will take time to improve results as "Unfair internal assessment can make the things worse"

Student Faculty ratio is ideal for implementing PBL at LMDC: Faculty (48%) and students (41%) were of opinion that this ratio is acceptable if managed properly. One of our student participant shared his experience of University college London Medical school that they take 400 students and divide them into 120 batches, making it feasible for small group discussion

DISCUSSION

The effectiveness of the PBL curriculum has been investigated by several systematic reviews.[12–14] In our study majority (75.4%) thought that it is an interesting method for producing better result in professional examination.

An article[8] published from Bharia University Medical and Dental college showed that 46.22% MBBS faculty agreed, 26.67 disagreed and 27.09 remained neutral when asked regarding implementation of PBL, in contrast to survey part of our study that showed 88.9% of our MBBS faculty and 57.1% of BDS faculty was in favour of PBL implementation. In the same study 79.15% students were in favour PBL implementation which is near to our study where 72.5% of MBBS students and 74% of BDS students were in favour of PBL implementation.

Our 74.2% participants emphasized on faculty training for PBL implementation which has also reported in literature.[5,8,15] Suggestion given by our participants has also been supported by Literature[3,5] that running an introductory course on study skills was important to guide students from a traditional system of education to the student-centred, PBL curriculum in the medical school. Further a suggestion given by one of our participants need consideration that a committee including students should be formed for looking after implementation of PBL at college.

In our study 71.9% students and 76% faculty thought that problem base learning will produce better result in professional examination. This is not consistent with current literature which shows that students scored equally well, if not better, with the PBL variant as with traditional teaching method.[6] But any study that treats PBL as a single `intervention' and examines the usual cognitive and clinical outcomes will arrive at a conclusion of minimal difference.[16,17] A strong association between liking for PBL and group study was found and the analytical performance and thought process of students were significantly improved after PBL sessions.[18,19] In another very comprehensive review by Neville it was seen that different studies on PBL curriculum outcomes between 1993 and 2008 showed a clear trend towards higher rating of clinical performance from PBL graduates as assessed by their clinical supervisors[20,21]

The limitations of our study is that problem base learning has not been yet implemented completely in LMDC. Further research can focus on more than one medical college or institutes where problem base learning has completely adapted. It will provide another view point for comparison.

CONCLUSION

Problem based learning is popular among students and faculty of medical college. They feel it a better system, should be implemented but have reservations about its implementation. Participants suggested training, coordination and motivation of both students and faculty. The challenges and barriers discussed in this study must construe as significant issues that need resolution, close attention and further research.

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