ORIGINAL ARTICLE

Undergraduate medical student's perceptions on traditional and problem based curricula: Pilot study

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Abstract

Objectives: To evaluate and compare students' perceptions about teaching and learning, knowledge and skills, outcomes of course materials and their satisfaction in traditional Lecture Based learning versus Problem-Based Learning curricula in two different medical schools.

Methods: The comparative cross-sectional questionnaire-based study was conducted in the Department of Physiology, College of Medicine, King Saud University, Riyadh, Saudi Arabia, from July 2009 to January 2011. Two different undergraduate medical schools were selected; one followed the traditional curriculum, while the other followed the problem-based learning curriculum. Two equal groups of first year medical students were selected. They were taught in respiratory physiology and lung function lab according to their curriculum for a period of two weeks. At the completion of the study period, a five-point Likert scale was used to assess students' perceptions on satisfaction, academic environment, teaching and learning, knowledge and skills and outcomes of course materials about effectiveness of problem-based learning compared to traditional methods. SPSS 19 was used for statistical analysis.

Results: Students used to problem-based learning curriculum obtained marginally higher scores in their perceptions (24.10±3.63) compared to ones following the traditional curriculum (22.67±3.74). However, the difference in perceptions did not achieve a level of statistical significance.

Conclusions: Students following problem-based learning curriculum have more positive perceptions on teaching and learning, knowledge and skills, outcomes of their course materials and satisfaction compared to the students belonging to the traditional style of medical school. However, the difference between the two groups was not statistically significant.

Keywords: Students perceptions, Problem-Based Learning, Lecture-Based Learning. (JPMA 64: 775; 2014)

Introduction

In recent decades, knowledge in medical and allied health sciences has undergone a swift change. Conventional bio-medical beliefs and established scientific doctrines have been replaced by further advanced concepts, and new disciplines have appeared and parallel changes have occurred in medical schools as well. The issue that continues to challenge authorities in medical schools is to determine the curriculum which encourages high-level knowledge, skills, critical thinking, self-directed learning that best prepares the physicians for professional practice in a fast changing healthcare environment.[1] Moreover, due to the current public health and educational challenges, there is an increasing demand for problem-solving knowledge and skills to work in complex socio-medical situations. This can be accomplished through making changes in traditional educational strategy.[2] Considering these new realities, in the Kingdom of Saudi Arabia, a few medical schools have adopted new tools of teaching and learning, like problem-based learning (PBL), without the presence of any regional evidence and without knowing the student's perceptions in favour or otherwise of this approach, although literature shows the strength and limitations of both the PBL and traditional tools of teaching and learning in different regional environments.[3-6] Keeping in view the differences in the academic environment and various curricula in different medical schools, the aim of this study was to assess and compare students' perceptions in respiratory physiology course about teaching and learning, knowledge and skills, outcomes of course materials and their satisfaction in traditional Lecture Based learning (LBL) versus PBL curricula in two different medical schools of the Kingdom of Saudi Arabia.

Subjects and Methods

The comparative cross-sectional questionnaire-based study was conducted in the Department of Physiology, College of Medicine, King Saud University, Riyadh, Saudi Arabia, from July 2009 to January 2011, after approval by the institutional review board.

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Based on a computer-generated list, the students were randomised at study entry. Moreover, students were also selected based on their voluntary participation, age, gender, nationality, socio-economic, regional and cultural background, similar performance in their previous grades and uniform admission criteria for medical schools.

Students who suffered from any known debilitating disease such as diabetes mellitus were excluded from the study, as chronic diseases impair the cognitive functions, attention, understanding, observational and thinking abilities.[7]

A total of 60 individuals were selected; 30 male students from each medical school. Students were fully informed about the research methodology, objectives and formal written consent was obtained. From traditional curriculum-based medical school, 30 male, volunteer, first year medical students were selected and were taught in respiratory physiology, lung function lab for two weeks using the traditional method of education, i.e. lectures, practicals, tutorials. This group was taken as control group. From the PBL medical school, 30 male, volunteer, first year, medical students were selected to participate in this study. Various problems, case scenarios, practical sessions were conducted in respiratory physiology by the faculty members as per the respiratory physiology block according to the required learning objectives and outcomes. They were referred to the sources of information with no limitations on their use. A trained PBL tutor facilitated the discussion. The students attended PBL sessions for the same period of two weeks as LBL.

A well-established English-language questionnaire based on five-point Likert scale was distributed among the students to assess their perceptions about the effectiveness of PBL compared to the traditional methods of lecture as well as their overall perceptions. In the questionnaire, students were asked about their satisfaction, academic environment, teaching and learning, knowledge and skills and outcomes of the course material. The students were given the option of rating their response as (1) Strongly Agree (2) Agree (3) Neither Agree nor Disagree (4) Disagree (5) Strongly Disagree[8] (Appendix).

For data analysis, SPSS 19 was used. Based on the items in the questionnaire, the undergraduate medical students' responses were compared between the students belonging to PBL curriculum with the students in traditional curriculum. Each item was analysed separately to create a score for a group of items. Student t-test was used to compare the scores. Response to a single Likert item was normally treated as ordinal data, as using the five levels. We applied Pearson Chi-Square test to compare the categorical data[9] and Fisher Exact test whenever the sample size was less than five. The level of significance was set at $p<0.05$.

Appendix: Questionnaire used to assess the undergraduate medical students perception about LBL versus PBL Curricula.

Please tick [✓] the appropriate box

1. Name: ……2. Age (Year)…….
3. Gender: Male ☐ Female ☐
4. Medical School Curriculum: [i] Lecture Based….☐ [ii] Problem Based…….. ☐
5. Class: ……

6. The teaching faculty is cooperative during teaching sessions

1. Strongly agree ☐
2. Agree ☐
3. Neither Agree nor Disagree ☐
4. Disagree ☐
5. Strongly Disagree. ☐

7. The current method is a good tool of teaching and learning

1. Strongly agree ☐
2. Agree ☐
3. Neither Agree nor Disagree ☐
4. Disagree ☐
5. Strongly Disagree. ☐

8. The current method covers wide range of knowledge and skills

1. Strongly agree ☐
2. Agree ☐
3. Neither Agree nor Disagree ☐
4. Disagree ☐
5. Strongly Disagree. ☐

9. I achieved the outcomes documented in the course materials

1. Strongly agree ☐
2. Agree ☐
3. Neither Agree nor Disagree ☐
4. Disagree ☐
5. Strongly Disagree. ☐

10. I am satisfied with the overall academic environment

1. Strongly agree ☐
2. Agree ☐
3. Neither Agree nor Disagree ☐
4. Disagree ☐
5. Strongly Disagree. ☐

Results

In response to the question about which approach was good for teaching and learning in their own academic environment, 11(36.7%) students in the PBL group strongly agreed; 13(43.3%) agreed; 4(13.3%) neither agreed nor disagreed; and 1(3.3%) each disagreed and strongly disagreed. Corresponding scores in the LBL

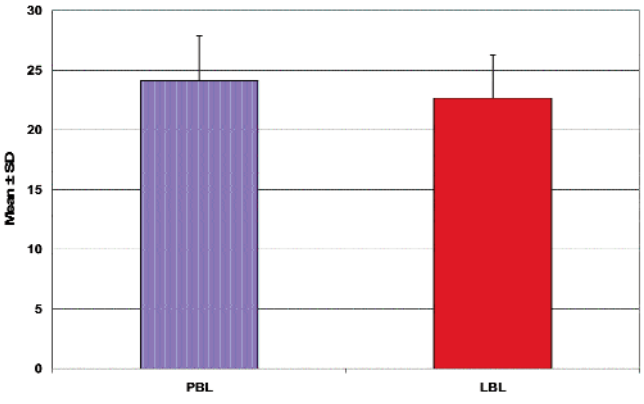
Table-1: Undergraduate medical student's perceptions.

Parameters	Lecture Based Curriculum (n=30)	Problem Based Curriculum (n=30)	Total
(a) Question about which approach LBL or PBL good for teaching and learning			
Strongly agree	5 (16.7%)	11 (36.7%)	16 (26.7%)[a]
Agree	13 (43.3%)	13 (43.3%)	26 (43.3%)[a]
Neither agree nor disagree	9 (30%)	4 (13.3%)	13 (21.7%)[a]
Disagree	3 (10%)	1 (3.3%)	4 (6.7%)[a]
Strongly disagree	0 (0%)	1 (3.3%)	1 (1.7%)[a]
(b) Question about whether LBL or PBL covered a wide range of knowledge and skills			
Strongly agree	5 (16.7%)	8 (26.7%)	13(21.7%)[b]
Agree	15 (50%)	15 (50%)	30 (50%)[b]
Neither agree nor disagree	7 (23.3%)	6 (20%)	13 (21.7%)[b]
Disagree	3 (10%)	1 (3.3%)	4(6.7%)[b]
Strongly disagree	0 (0%)	0 (0%)	0 (0%)[b]
(c) Question whether achieved outcomes in course materials and examinations			
Strongly agree	2 (6.7%)	9 (30%)	11(18.3%)[c]
Agree	15 (50%)	12 (40%)	27 (45%)[c]
Neither agree nor disagree	10 (33.3%)	7 (23.3%)	17(28.3%)[c]
Disagree	3 (10%)	2 (6.7%)	5(8.3%)[c]
Strongly disagree	0 (0%)	0 (0%)	0 (0%)[c]
(d) Question about satisfaction of students with their academic environment			
Strongly agree	10 (33.3%)	13 (43.3%)	23 (38.3%)[d]
Agree	12 (40%)	13 (43.3%)	25(41.7%)[d]
Neither agree nor disagree	6 (20%)	3 (10 %)	9 (15%)[d]
Disagree	1 (3.3%)	0 (0%)	1 (1.7%)[d]
Strongly disagree	1 (3.3%)	1 (3.3%)	2 (3.3%)[d]

[a]Pearson Chi-Square value= 6.173; P=0.187; [b]Pearson Chi-Square value= 1.769; P=0.622; [c]Pearson Chi-Square value= 5.517; P=0.138; [d]Pearson Chi-Square value= 2.431; P=0.657.
PBL: Problem-based learning. LBL: Lecture-based learning.

group were: 5(16.7%), 13(43.3%), 9(30%), 3(10%) and 0. The Pearson Chi-Square value between the groups was 6.173 (p=0.187) (Table-1a).

When asked whether the LBL or PBL method covered wide range of knowledge and skills in their own academic settings, The PBL group response was: 8(26.7%) strongly agree, 15(50%) agree, 6(20%) neither agree nor disagree, 1(3.3%) disagree, and no student strongly disagreed. The corresponding LBL response was: 5(16.7%), 15(50%), 7(23.3%), 3(10%) and 0. The Pearson Chi-Square value between the groups was 1.769 (p=0.622) (Table-1b).



PBL: Problem-based learning. LBL: Lecture-based learning.

Figure: Comparison of overall score.

Regarding their achieved outcomes documented in course materials and examination relevance, 9(30%) students of the PBL group strongly agreed, 12(40%) agreed, 7(23.3%) neither agreed nor disagreed, 2(6.7%) disagreed, and none strongly disagreed. as the respective response of the LBL group was: 2(6.7%), 15(50%), 10(33.3%), 3(10%), and 0. The Pearson Chi-Square value between the groups was 5.517 (p=0.138) (Table-1c).

As for their satisfaction with their academic environment, 13(43.3%) PBL students strongly agreed, 13(43.3%) agreed, 3(10%) neither agreed nor disagreed, none disagreed, and 1(3.3%) strongly disagreed. The corresponding LBL response was: 10(33.3%), 12(40%), 6(20%), 1(3.3%) and 1(3.3). The Pearson Chi-Square value

between the groups was 2.431 (p=0.657).

Students who belonged to the PBL curriculum obtained higher scores in opinion (24.10±3.63) compared to those who belonged to LBL (22.67±3.74) (Figure).

Discussion

Undergraduate medical education requires ongoing improvement in order to keep pace with times, especially with medical practice. The older medical schools are reviewing their curriculum, while new schools are moving from traditional to problem-based curricula. In this situation, it must be kept in mind that before shifting from one curriculum to another, we need to conduct a series of studies in our own educational environment to get the students' perceptions in the selection of an appropriate tool of teaching and learning. In this study, students who belonged to the PBL curriculum obtained marginally higher scores in perceptions compared to students who belonged to traditional types of medical schools. However, this difference in the perceptions did not achieve the level of statistical significance.

Blumberg et al.[10] described the experience of students in a problem-based and a traditional pre-clinical curriculum and showed that PBL students were satisfied with the essential aspects of their curriculum. However, the LBL students were less satisfied with the essential elements of their curriculum. Similarly, in the present study, PBL students were more satisfied compared to those with traditional curriculum students. Nevertheless, the overall rating was non-significant between the groups. Studies have shown that students in a PBL setting have more positive perceptions towards their curriculum than do the students in a conventional class.[11-13] Seon and Mi[14] observed no significant difference between the PBL and LBL groups in the level of opinion toward learning. Monica et al.[15] also reported that no differences in learning styles or opinion were found between the PBL and LBL curriculum. In addition, Sahin and Yorek[16] compared the expectations of the PBL and LBL students and their results suggest that there was no different between PBL and LBL instructions in influencing students' expectations. Similarly, in the present study we found that PBL students had marginally more positive perceptions compared to LBL students. However, no significant difference was observed between the perceptions of PBL and LBL thoughts of medical students. The results of the present study are in agreement with the findings of Seon and Mi,[14] Monica et al.[15] and Sahin and Yorek.[16] Dehkordi and Heydarnejad[17] observed a more positive learning attitude and motivation in the PBL group than the LBL one.

Will[18] demonstrated that PBL graduates were more satisfied than their LBL counterparts. Similarly, in the present study we found that PBL students were more satisfied compared to traditional students. While both groups of students were satisfied within their own learning contexts, but the PBL group achieved higher score, though it did not attain the level of statistical significance. It could have been possible that the students in the PBL group received more attention from the tutor than those in the lecture group. In the present study, the PBL students expressed slightly greater levels of motivation toward learning than did their traditional counterparts. The reason for improvement of learning motivation and satisfaction in PBL students is thought to be the learning independence offered to them in the PBL method.[19] The finding that PBL students had higher satisfaction is congruent with few reports published in Korea[20,21] and Canada.[22]

Habib et al.[23] conducted a study in Pakistan and reported that students supported the PBL as an effective method of learning, and majority of students were motivated towards self-learning. They were convinced that PBL helped them in building up communication skills, interpersonal relationship and problem-solving ability. Ambreen et al.[24] conducted a study in Pakistan and found that students' perception and understanding of the learning methodology under PBL were favoured by 1st year and 2nd year medical students. Furthermore, Baig and Asad[25] observed that PBL students have an opinion that the curriculum refined their problem-solving capabilities and also enhanced their communication skills and interpersonal relations. Dehkordi and Heydarnejad[17] found a significant difference in PBL students compared to LBL students in the level of attitude toward learning. They also suggested more positive learning views and higher learning motivation in the PBL group. Similarly, Klegeris and Hurren[6] demonstrated that PBL has a significantly positive impact on student motivation to attend and participate in the course work. In the present study, we found that students who belonged to PBL curriculum obtained slightly higher scores while evaluating their perceptions compared to the students who belonged to traditional types of medical schools. However, this difference did not reach the level of significance.

There are few strengths and limitations of this study. All the students belonged to similar age, gender, ethnic and socioeconomic backgrounds in their home and medical school environments. The limitations include small sample size and duration. Besides, it was based on a two-week course in respiratory physiology, lung function lab, and only male students were invited to participate.

Conclusions

PBL students had more positive perception on teaching and learning, knowledge and skills, outcomes of their course materials and satisfaction compared to the LBL students. However, this difference in the perceptions did not achieve a level of statistical significance. The study has contributed to further understanding of the rapport between two different educational approaches.

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