Medical Students’ Perceptions Concerning Problem Based and Lecture Based Learning: An Exploratory Study

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ABSTRACT

Objectives: To compare students’ perceptions and satisfaction concerning lecture based learning (LBL) versus problem-based learning (PBL) curricula in Taibah University. Methods: A cross-sectional study was conducted in Taibah University including third year medical students (n= 294), involved in both curricula. A self-administered questionnaire was used including demographics and domains investigating students’ perceptions concerning the teaching method and adequacy of the current curriculum they are involved and satisfaction regarding the academic environment, measured on a five point Likert scale. Total response rate (45.91%). Results: Fifty seven percent of the respondents were involved in LBL compared to 43% in PBL. About 31% of the PBL students strongly agree that it is good method for teaching and learning versus only 5.2% of students in LBL and 24.1% of them strongly agree that PBL curriculum covers a wide range of knowledge and skills compared to only 5.2% of students involved in LBL. Thirty nine percent of students in LBL disagree as regards being satisfied about the academic environment compared to 17.2% of PBL students, who are widely ambivalent (41.4%). Conclusions Students involved in PBL have more significant positive perception and satisfaction towards their course materials teaching tool compared to the LBL students.

Key words: Medical students, perceptions, satisfaction, Problem-Based Learning, Lecture-Based Learning.

Introduction

The introduction of new educational methods goes hand in hand with research scrutinizing the effectiveness of the method as a whole or elements of that new method. The body of research on specific elements of PBL such as problem characteristics, tutor, and learning issues was highlighted earlier in many researches (Spronken-Smith and Harland, 2009; Kiernan et al., 2008). These studies target the development of ‘the ideal PBL format’, but are less concerned with the effectiveness of PBL as a whole.

Problem-Based Learning (PBL) is being increasingly used worldwide in many medical schools due to its recognized advantages (AlHaqwi et al., 2015), including increased knowledge retention, better integration of basic science and clinical skills and improvement of problem solving abilities (Hmelo-Silver 2004; Yaqinuddin, 2013). In addition, PBL promote students active participation and

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communication (Azer, 2011). A recent study looked more closely into why students benefit from group discussion and determined that actively providing explanations during a discussion was crucial, yielding benefits for long-term memory (Van Blankenstein, et al. 2009).

On the other hand, the traditional Lecture Based Learning (LBL) curriculum had reported inaccuracy, overcrowding of the curriculum, and presence of many non-relevant subjects which reflected negatively on educational environment and student’s academic achievements (Elfaki, 2004). However, many previous literatures showed various strength and limitations of both the PBL and traditional LBL tools of teaching and learning in different regional environments (Berry, 2008; Klegeris and Hurren 2011). With respect to the effectiveness of PBL over traditional strategies, two lines of research were done, namely perceptions of and experiences with PBL and PBL’s effects on knowledge and competency acquisition. The image that emerges from several studies within this line of research is that students are enthusiastic about PBL (e.g., Barman et al., 2007). Severiens and Schmidt, (2009) showed that PBL students were more satisfied with the quality of formal and informal contacts with their instructors as well as with the quality of formal- but not informal –contacts with their peers compared to students in conventional and mixed (i.e., lectures with some forms of active, small group learning) curricula.

There is a scarcity of information on medical students’ satisfaction level in regards to their academic activities (Manzar and Manzar 2011). The Academic satisfaction as part of the evaluation system represents an educational planner to produce better consequences and further improvement (Albarrak et al. 2013).

Recently, the hybrid PBL curriculum has been adopted in College of Medicine, Taibah University in academic year 2014/2015 as a new tool of teaching and learning which is consistent with the trend now in all the medical faculties of Saudi Arabia. It is a unique experience as the curriculum is still under construction and only Phase I (pre-clinical) was accomplished. As the traditional LBL is currently implemented for old undergraduates in parallel to the new approach applied to the newest ones, so from this point of view, the present study was carried out to explore and compare students’ perceptions and satisfaction concerning the LBL versus this new approach of the PBL curricula as this is an essential step in the process of the preparation of the faculty to enter phase II after completion of phase I in the new approach.

Objectives

To compare students' perceptions and satisfaction concerning traditional LBL versus the PBL curricula in Taibah University.

Methodology

Study design, setting and study period:

A cross sectional study was conducted in the faculty of medicine, Taibah University (male and female sections) Al Madinah, KSA, among the 3rd year LBL students attending the final written exam and the PBL students after completing the “nutrition and metabolism” module at the end of the academic year 2015-2016.

Sampling:

All medical students of 3rd year LBL "N=159 (50.9% female, 49.1% male).” and the corresponding phase I PBL students of the nutrition and metabolism module “N=140 (51.4% female, 42.8% male).” were invited to participate in the study. Students who suffered from chronic diseases were excluded from the study (3 students from LBL, 2 students from PBL), as chronic diseases impair attention, cognitive functions, observational, understanding and thinking skills as reported previously by Frier, (2011). So, total number of students included and responded to the questionnaire is 135 (77 involved in LBL and 58 in PBL). The response rate was overall 49% of the LBL students and 42% of the PBL students.
Students in the LBL in the 3rd year were taught research methods, parasitology, microbiology and pathology curricula in a traditional way involving lectures and practical sessions. Students in the PBL were involved in a nutrition and metabolism module for ten weeks. Ten Case scenarios (a case per week), and practical sessions were conducted by trained faculty members that facilitated the case discussions and agenda setting according to the required learning objectives and outcomes at the start of the week (each Sunday). Students were then referred to the sources of information to fulfill the case agenda and at the end of the week, the case is re-visited once more by discussions. A description of the PBL program is detailed in the introduction section of the current study.

Data collection:

A Pre-constructed, validated self-administered questionnaire was distributed to all students in these two curricula. The questionnaire was previously applied to compare students involved in LBL and PBL as regards their perceptions concerning the method of teaching and their satisfaction about academic environment (Meo, 2014).

An informed consent was attached to the questionnaire including contact information of one of the researchers and clarifying the aim of the study and its benefits. Confidentiality and privacy were reassured as well as autonomy of the student to participate in the study. The Medical Education research is waived of the ethical committee of Faculty of Medicine, Taibah University as the questionnaires are anonymous.

The questionnaire included demographic characteristics of the students (age and sex) and items investigating students’ perceptions concerning adequacy of the current curriculum (whether LBL or PBL) they are involved in. Four areas were asked about; their views of the teaching method, whether it covers a wide range of knowledge and skills, whether the intended learning outcomes (ILOs) were achieved from their point of view as well as their satisfaction about the academic environment. These areas were measured on a 5 point Likert scale (from strongly disagree to strongly agree). A total score was calculated for each student representing his/her perception about the curriculum and their overall satisfaction about the academic environment. The time required by the student to fill the questionnaire was on average 10 min to 15 min.

Statistical analysis:

Data were entered and analyzed using SPSS version 21. Categorical variables were expressed as frequencies and percentages. For continuous variables, normality tests (Shapiro-Wilk test) were performed and accordingly, the mean (±SD) was used if the data were normally distributed; otherwise the median (min, max) was used. For normally distributed continuous variables, the independent student t-test was performed to test significant difference between the means of the total perception score of both groups of students (LBL compared to PBL). For the GPA score of both PBL and LBL groups of students, the Mann-Whitney test was performed as it was not normally distributed. Pearson correlation was performed to test the correlation between the overall perception score and the grade point average (GPA) of the students in both the LBL and the PBL. Statistical significance was set at $p \leq 0.05$.

Results

Table 1 shows that female respondents were more than males (54.1% and 45.9% respectively). Respondents in the LBL course were more than the PBL one. The median age of the respondents was 21 years (20 years – 25 years).

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N = 135</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Male</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>73</td>
</tr>
<tr>
<td>Medical school curricula</td>
<td>Lecture based</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td>Problem based</td>
<td>58</td>
</tr>
<tr>
<td>Age (years)</td>
<td>Median</td>
<td>21</td>
</tr>
</tbody>
</table>
As regards their perceptions to the teaching method, table 2 demonstrates that 31% of the students in PBL strongly agree that this method is good for teaching and learning compared to only 5.2% of those involved in the LBL method. More students of the LBL curriculum disagree that their current teaching method is good for teaching and learning compared to the PBL students (28.6% of the LBL versus 10.3% of the PBL), while 34.5% of the students involved in the PBL curriculum agree about this compared to 29.9% of the students in the LBL curriculum. More students in the PBL (24.1%) strongly agree that their current curriculum covers a wide range of knowledge and skills compared to students in the LBL (5.2%) and 41.4% of them agreed that the intended learning outcomes were reached compared to only 28.6% of the students in LBL. More LBL students disagree (39%) as regards being satisfied about the academic environment compared to the PBL students (17.2%), while a 41.4% of whom are ambivalent.

Table 2: Medical students’ perceptions about the current teaching tool differentiated by type of medical curricula

<table>
<thead>
<tr>
<th>Perceptions</th>
<th>Lecture-based (N = 77)</th>
<th>Problem-based (N = 58)</th>
<th>Total (N=135)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good tool for teaching and learning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Strongly disagree</td>
<td>6 (7.8%)</td>
<td>4 (6.9%)</td>
<td>10 (7.4%)</td>
</tr>
<tr>
<td>2. Disagree</td>
<td>22 (28.6%)</td>
<td>6 (10.3%)</td>
<td>28 (20.7%)</td>
</tr>
<tr>
<td>3. Ambivalent</td>
<td>22 (28.6%)</td>
<td>10 (17.2%)</td>
<td>32 (23.7%)</td>
</tr>
<tr>
<td>4. Agree</td>
<td>23 (29.9%)</td>
<td>20 (34.5%)</td>
<td>43 (31.9%)</td>
</tr>
<tr>
<td>5. Strongly Agree</td>
<td>4 (5.2%)</td>
<td>18 (31%)</td>
<td>22 (16.3%)</td>
</tr>
<tr>
<td>Covers wide range of knowledge and skills</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Strongly disagree</td>
<td>11 (14.3%)</td>
<td>6 (10.3%)</td>
<td>17 (12.6%)</td>
</tr>
<tr>
<td>2. Disagree</td>
<td>14 (18.2%)</td>
<td>10 (17.2%)</td>
<td>24 (17.8%)</td>
</tr>
<tr>
<td>3. Ambivalent</td>
<td>23 (29.9%)</td>
<td>6 (10.3%)</td>
<td>29 (21.5%)</td>
</tr>
<tr>
<td>4. Agree</td>
<td>25 (32.5%)</td>
<td>22 (37.9%)</td>
<td>47 (34.8%)</td>
</tr>
<tr>
<td>5. Strongly Agree</td>
<td>4 (5.2%)</td>
<td>14 (24.1%)</td>
<td>18 (13.3%)</td>
</tr>
<tr>
<td>Achieved the intended learning outcomes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Strongly disagree</td>
<td>6 (7.8%)</td>
<td>4 (6.9%)</td>
<td>10 (7.4%)</td>
</tr>
<tr>
<td>2. Disagree</td>
<td>15 (19.5%)</td>
<td>6 (10.3%)</td>
<td>21 (15.6%)</td>
</tr>
<tr>
<td>3. Ambivalent</td>
<td>31 (40.3%)</td>
<td>16 (27.6%)</td>
<td>47 (34.8%)</td>
</tr>
<tr>
<td>4. Agree</td>
<td>22 (28.6%)</td>
<td>24 (41.4%)</td>
<td>46 (34.1%)</td>
</tr>
<tr>
<td>5. Strongly Agree</td>
<td>3 (3.9%)</td>
<td>8 (13.8%)</td>
<td>11 (8.1%)</td>
</tr>
<tr>
<td>Satisfied about the academic environment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Strongly disagree</td>
<td>13 (16.9%)</td>
<td>8 (13.8%)</td>
<td>21 (15.6%)</td>
</tr>
<tr>
<td>2. Disagree</td>
<td>30 (39%)</td>
<td>10 (17.2%)</td>
<td>40 (29.6%)</td>
</tr>
<tr>
<td>3. Ambivalent</td>
<td>16 (20.8%)</td>
<td>24 (41.4%)</td>
<td>40 (29.6%)</td>
</tr>
<tr>
<td>4. Agree</td>
<td>15 (19.5%)</td>
<td>14 (24.1%)</td>
<td>29 (21.5%)</td>
</tr>
<tr>
<td>5. Strongly Agree</td>
<td>3 (3.9%)</td>
<td>2 (3.4%)</td>
<td>5 (3.7%)</td>
</tr>
<tr>
<td>Overall students’ perception score</td>
<td>Mean (±SD)</td>
<td>Mean (±SD)</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>26.35 ±6.72</td>
<td>30.20 ±7.78</td>
<td>0.003*</td>
</tr>
<tr>
<td>GPA score</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median (MinMax)</td>
<td>4.00</td>
<td>4.36</td>
<td>0.01*</td>
</tr>
<tr>
<td>Median (MinMax)</td>
<td>(2.50-4.99)</td>
<td>(3.60-4.65)</td>
<td></td>
</tr>
</tbody>
</table>

Note: * denotes significant values

There is a statistically significant higher mean overall satisfaction score among students of the PBL curriculum compared to students in the LBL (30.20 ±7.78 versus 26.35±6.72 respectively, P= 0.003). Also students in the PBL have a significantly higher median Grade Point Average (GPA) score (4.36, min 3.60 – max 4.65) compared to students in the LBL (4, min 2.50- max 4.99). (Table 2). A box plot showing the median GPA scores of students involved in LBL and PBL is displayed in figure 1.

Figure 2 illustrates that for the students involved in LBL, there was no significant correlation between the overall students’ perception score and their academic achievement (GPA score) (r = 0.047, P 0.743) and this is similar for students involved in PBL (r = 0.029, P = 0.888) as demonstrated in Figure 3, no statistically significant correlation was found as well between the overall perception score of all students, whether involved in LBL or PBL and their GPA score (r = 0.084, P= 0.468).
Fig. 1: Median (min-Max) of GPA score among students involved in LBL and PBL

Fig. 2: Correlation of the Overall LBL students’ perception score with their GPA score

Fig. 3: Correlation of the Overall PBL students’ perception score with their GPA score
Discussion

Student satisfaction has been identified as one of the factors that affects the quality and overall effectiveness of an academic program (Albarrak et al. 2013) and helps medical students in achieving a higher academic performance and protects them from stress (Abdulghani et al. 2014).

The current study highlights the perceptions and satisfaction among medical students toward LBL and PBL curricula in a public sector medical university in Saudi Arabia.

This study documents that a large portion of the medical students who belonged to the PBL curriculum demonstrated higher frequency of agreed, strongly agreed in perceptions of PBL as a good tool for teaching and learning compared to students who belonged to traditional LBL (34.5%, 31% vs. 29.9%, 5.2% respectively).

These findings were consistent with other studies. For example, a study conducted in Pakistan by Habib et al. (2006) documented that students had supported PBL as an effective method of learning, and majority of students were motivated towards self-learning. Another Two studies were conducted by Fischer et al. (2004) and Costa et al. (2007) found that interactive style of teaching and group discussions in PBL sessions were more preferred by the undergraduate students than didactic LBL. Further, Meta analyses study carried out by Nandi et al. (2000) reported that students of the PBL curriculum found learning to be “more stimulating and more humane” whereas students of the conventional curriculum found learning to be “no relevant, passive, and boring”.

In addition, the results of the present study regarding curriculum satisfaction toward covering a wide range of knowledge and skills, it was found that PBL students were more satisfied than LBL students. The reason for this higher satisfaction in PBL students compared to the traditional LBL students could be attributed to the learning independence offered to students in the PBL curriculum which gave them chance to do better with their own hard work, also created their capability of self-directed learning skills, and purifying their acquired knowledge. Thus, PBL is not only a problem solving issue, but rather developing skills and knowledge as reported by Albarrak et al. (2013).

Approximately less than half of PBL students (41.4%) agreed that the intended learning outcomes were reached compared to only 28.6% of the students in LBL. Moreover, 40.3% of LBL students were undecided if lectures achieved the intended learning outcomes or not. These results could be attributed to the fact the most respondents were of the view that (PBL) and small group discussions could be more helpful than boring traditional style of teaching (Yawar and Shah, 2003; Farida et al., 2006).

Concerning academic environment satisfaction, the traditional LBL students (39%) are less satisfied compared to PBL students (17.2%). These results might be attributed to conventional curriculum learning problems as overcrowding, inaccuracy, boring which reflected negatively on student’s academic achievements and educational environment (Albarrak et al., 2013).

Unexpectedly, 41% of PBL students were feeling uncertain regarding the academic environment despite the provision of services and facilities which help them in their learning such as free Wi-Fi access, lab top for every group, …etc rather than traditional LBL students. This relatively high rate of ambivalence among PBL students regarding the academic environment may be attributed to their high ideal expectations than the already present regarding the educational environment which is multidimensional and involves several elements such as the college atmosphere, teaching, human aspects (including students, and faculty staff members) as well as non-human aspects (such as educational equipment and physical environment) (Aghamolaei et al., 2014). Also Stress is an additional factor as medical students usually experience higher levels of psychological distress as reported by Benbassat, 2014, and sometimes poor time management. However, this uncertainty could be resolved with proper counseling, motivation and believe that even if the system conditions is not that good and they are not satisfied well with it, but they can still do better with their own resources available, and explaining for them that no such facility exists could never interrupt their progress nor their achievement.

Another important finding in the current study is that there was, a statistically significant higher mean overall positive perception and satisfaction score, median GPA score among students of the PBL curriculum compared to students in the LBL (P= 0.003, 0.01 respectively).

These results could be due to intrinsic motivation enhanced by multiple ways of active and independent studies in PBL curriculum, such as small-group teaching and early exposure to patients.
and clinical case studies rather than that used in the traditional LBL which is mostly teacher centered (Kusurkar et al. 2011).

Finally, there was weak positive correlation between overall students’ perception score whether involved in LBL or PBL and their academic achievement (GPA score) However, this correlation did not reach the level of significance.

The limitations of this study include a small sample size and the period of data collection was following the students’ final written exam directly which may have played a role on their perceptions. Another one is the fact that students in both groups were studying on different courses, which might influence their satisfaction.

In conclusion, students involved in PBL have more significant positive perception and satisfaction towards their course materials teaching tool compared to the LBL students. There was no significant correlation between overall students’ perception score whether involved in LBL or PBL and their academic achievement. Nonetheless, this study would help to determine future strategies and plans needed to be undertaken to tackle students’ problems and satisfaction with their curriculum and academic environment at the root level taking into consideration the novelty of the PBL approach implemented at the university that still needs further evaluations.

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Declaration of interest:

The authors declare that they have no competing interests.

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