MEDICAL EDUCATION

Perception about Case Based Learning among Medical Students of a Public Sector Medical University in Karachi

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ABSTRACT

Background: There has been a shift in medical education from didactic teaching to small group teaching which stresses on the importance of student active participation in problem-solving and critical thinking. We aimed to evaluate perception about Case Based Learning (CBL) as a learning strategy among medical students.

Methods: A cross-sectional study was conducted in Jinnah Sindh Medical University, Karachi. A structured questionnaire was distributed to 300 male and female students of 1st and 3rd semester, MBBS. Data was entered and analyzed by using Statistical Package of Social Sciences (SPSS) version 25. The Independent Samples t-test was used and $p<0.05$ was considered statistical significant.

Results: We reported an increase in the perception regarding CBL from Cambridge students and a reduced scoring of CBL in the non-Cambridge group ($p>0.05$). There was a significant difference in the perception score about CBL obtained from O-Level students (34.1±4.4) and Matric systems (35.8±2.9)($p=0.02$) in the first semester, however, it was not significant in the 3rd semester ($p>0.05$). A significant difference between the A-Level (33.3±5.4) and intermediate (35.8±2.8) college systems was observed regarding the opinion about CBL ($p=0.009$) in the first semester as compared to third semester but statistically insignificant.

Conclusion: Students tend to have better perception about CBL at the entry level. The educational background of students influences the perception. However, learning environment and quality of facilitation may influence their perception and opinion regarding CBL. It is therefore critical to consider the quality of facilitations and learning environment along with CBL.

Keywords: Education; Medical Students; Perception; Undergraduate.

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INTRODUCTION

Medical education has progressed rapidly in the past few decades with the improvement in scientific knowledge revolutionizing the medical curricula, from didactic teaching to small group teaching[1]. The small group learning technique is motivated by the importance of student's energetic involvement in learning, building up their own ideas, rationales, and developing novel notions, grounded on their existing understanding of the topic, testing their hypotheses and their application and integration of those ideas into future circumstances[1].

Case-based learning (CBL) is defined as a directed probing strategy where the teacher utilizes predefined queries to guide the students back to the main learning objectives. CBL also offers a more defined and structured discussion using small group methodology. The fore most objective of the implem-

enter of the CBL is to support the students in micro-analyzing the problem statement, helping them develop new strategies or the solutions[1-2]. In a Case-based learning format, the students study the given topic first and then solve the problem in the class. The CBL approach works best when applied to a small group, where it has shown to have a substantial positive effect on the overall learning and academic outcome of students[3].

Srinivasan et al. claimed that in contrast to problem-based learning (PBL), case-based learning (CBL) demanded preparation in advanced by the students and offers more structured learning to the students[4]. This strategy helps students to develop critical thinking, develop their ability to correlate so that they can integrate their knowledge and share among themselves and facilitators to get clear understanding of the topic[1,4].

In Pakistan, students in medical schools are still following the traditional teaching methods and only a few institutions have started to incorporate CBL in their curricula as well upon the insistence of Pakistan Medical and Dental Council (PMDC) to adopt CBL for undergraduate curriculum[5-6]. After the recommendation of the Medical Council of India, a medical college in North India adopted Case based learning for students to develop logical scientific reasoning and ability to gather and analyze information[7,8]. CBL also allows students to develop a collaborative team based approach to their education. Learners and facilitators favor CBL as it helps in development of clinical skills but it is necessary to have a stronger and deeper fundamental knowledge when following CBL as a learning modality along with trained faculty to lead discussion[9].

Case based learning (CBL) is a student-centered, facilitator-led approach of learning which have been reported as more effective than traditional[10]. Jinnah Sindh Medical University (JSMU) adopted a case based learning strategy recently. As Jinnah Sindh Medical University is a public sector university, most of the students belong to the Matric/Intermediate school system where case based teaching system has not yet been introduced. Whereas, relatively very few students belong to the Cambridge schooling system, where students are already exposed to problem or case-based learning techniques. The present study aimed to assess the perception of 1st and 3rd semester students of MBBS on the application of Case Based Learning system as a part of their MBBS curriculum.

METHODS

An observational cross-sectional study was conducted at the Department of Community Medicine, Jinnah Sindh Medical University, Karachi, Pakistan. After obtaining the ethical approval from the institutional review board committee, 350 students from 1st semester and 3rd semester MBBS were enrolled in the study. Year back students and those who did not give consent to participate in the research study were excluded from the study.

After taking written informed consent, a structured questionnaire was distributed among the students of 1st semester and 3rd semester students of MBBS. The questionnaire was distributed to all the available students. It was distributed and collected by the principal investigator at the end of the lecture. The content validity of the questionnaire was established by getting feedback from four experienced persons in medical education through the internet. A pilot study was done on a group of ten students before finalizing the questionnaire. The reliability of the questionnaire was determined by using Cronbach's alpha for identifying the internal consistency of the responses. The mean scores for the perception and opinion of participants about the CBL system were recorded.

Data was entered and analyzed by using Statistical Package of Social Sciences (SPSS version 25). Mean+ SD was used for the numerical variables. Categorical data was represented in frequency or percentages. The Independent Samples t-test was used to compare the perception of the respondents by gender and type of pre-medical schooling system. The statistical significance was taken at $p<0.05$. The internal reliability of instrument items was determined through Cronbach's alpha. A Cronbach's alpha value of 0.68 and 0.73 was obtained for perception and opinion about benefits of CBL respectively[10].

RESULTS

A total of 300 students participated from 1st and 3rd Semester, 150 each. The mean age of the study participants from 1st semester and 3rd semester was 18.3±0.9 years and 19.3±3.2 years respectively. Among the 1st semester students, 12 (8%) students completed their higher secondary education in a Cambridge schooling system while 138 (92%) students belonged to the Board of Intermediate Education (BIEK) system. Among the 3rd semester students, 20 (13.3%) belonged to the A-levels, Cambridge, while 128 (85.3%) belonged to BIEK.

The responses of the students regarding their perception and opinions about CBL are shown in Table 1. Almost all 149 (99%) students of first semester and 100 (66.7%) students of 3rd semester agreed that CBL triggers their prior knowledge, 148 (98%) student of first semester and 78 (52%) students of third semester agreed that CBL improves their ability for understanding the case. Responding to the question that CBL helps in developing diagnostic skills, 142 (95%) of first semester and 86 (57.3%) agreed with the statement. Responding to the question that CBL has no benefit, 143(95%) of first semester and 59(39.3%) of third semester students disagreed that they do not find any benefit of using CBL strategy for learning (Table 1).

Table 1: Perception and opinions of students (1st and 3rd semester) about case based learning (CBL) (n=150).

Perception about CBL						
Perceptions	**Disagree n (%)**		**Neither Agree nor Disagree n (%)**		**Agree n (%)**	
	1st	**3rd**	**1st**	**3rd**	**1st**	**3rd**
There is no benefit of CBL	143 (95.3%)	59 (39.3%)	5 (3.3%)	14 (9.3%)	2 (1.3%)	8 (5.3%)
CBL triggers prior knowledge	---	8 (5.3%)	1 (0.7%)	9 (6%)	149 (99.3%)	100 (66.7%)
CBL improve my ability for understanding the case	1 (0.7%)	3 (2%)	1 (0.7%)	15 (10%)	148 (98.7%)	78 (52%)
CBL helps in developing diagnostic skills	2 (1.3%)	7 (4.7%)	6 (4%)	10 (6.7%)	142 (94.7%)	86 (57.3%)
I enjoy CBL	1 (0.7%)	13 (8.7%)	8 (5.3%)	26 (17.3%)	141 (94%)	67 (44.7%)
CBL methods is useful strategy for life-long learning	3 (2%)	15 (10%)	15 (10%)	31 (21.7%)	132 (88%)	65 (43.3%)
CBL helps me in developing lateral thinking	1 (0.7%)	4 (2.7%)	18 (12%)	32 (21.3%)	131 (87.3%)	81 (54%)
CBL increases my self-confidence in clinical reasoning	2 (1.3%)	10 (6.7%)	20 (13.3%)	37 (24.7%)	128 (86.3%)	69 (46%)

Opinion about CBL								
Options	**Less than half n (%)**		**About half of the Time n (%)**		**Most of the Time n (%)**		**Always n (%)**	
	1st	**3rd**	**1st**	**3rd**	**1st**	**3rd**	**1st**	**3rd**
The discussion in CBL helps me to understanding of the topic	1 (0.7%)	2 (1.3%)	6 (4%)	33 (22%)	100 (67%)	101 (67%)	43 (28.7%)	14 (9.3%)
The discussion session facilitate interaction between teachers and students	1 (0.7%)	22 (14.6%)	13 (8.7%)	30 (20%)	44 (29%)	71 (47.3%)	92 (61.3%)	27 (18%)
I collect new information after every CBL session	2 (1.3%)	25 (16.6%)	13 (8.7%)	41 (27.3%)	55 (37%)	54 (36%)	79 (53%)	30 (20%)
The cases presented are interesting	0	19 (12.7%)	12 (8%)	50 (33.3%)	72 (48%)	63 (42%)	66 (44%)	18 (12%)

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The cases presented involve several disciplines	4 (2.7%)	18 (12%)	19 (13%)	57 (38%)	79 (53%)	62 (41%)	48 (32%)	13 (8.7%)
Through CBL, we have more efficient use of our time	3 (2%)	13 (8.7%)	13 (8.7%)	56 (37.3%)	51 (34%)	62 (41.3%)	83 (55.3%)	19 (13%)
CBL provides more opportunity for participation	2 (1.3%)	17 (11.3%)	9 (6%)	29 (19.3%)	46 (31%)	62 (41.3%)	93 (62%)	42 (28%)

Table 1 showed the responses of the students' opinion (effect of perception) about the benefits of CBL; 43 (28.7%) of first semester students and 14 (9.3%) responded that the discussion in CBL always help them to understand the topic. When asked does discussion sessions facilitate interaction between teachers and students, 92 (61.3%) of first semester and 27 (18%) students affirmed the efficacy of CBL in enhancing the facilitator and student interaction. There were 79 (53%) of first semester and 30 (20%) of third semester medical students who agreed that CBL sessions help them collect new information every time.

The mean score of students' perception of CBL was 35.7±3.2 and maximum possible score was 40. Similarly, the mean score of the students for the opinion about benefits of CBL was 23.7±2.9 and maximum was 28. The 1st year students from secondary school education (O-Level) had a mean score of 34.1±4.5 for the perception about CBL as compared to students from the Matric school system score of 35.9±2.9 (p=0.02) (Table 2). No such significance was observed in 3rd year students. No significant difference was observed in the opinion of benefits of CBL between the students from O-Level or Matric schooling system. However, the mean score of 1st semester students from A-Level group was 33.3±5.4 which was significantly lower as compared to the score of students from Intermediate Board which was 35.9±2.9 (p=0.009). However, for the 3rd semester students no significant difference between the groups was observed (p>0.05) (Table 2).

Table 2: Assessment of 1stand 3rdsemester CBL Score with various factors.

Assessment of 1st Semester CBL Score				
Variables	**Score of Students Perception about CBL (n= 40)**		**Score of Students' opinion about benefits of CBL (n=28)**	
	Mean ± SD	***p*-value**	**Mean ± SD**	***p*-value**
Overall Mean Score Male Female	35.7 ± 3.2 35.7 ± 2.9 35.6 ± 3.3	0.88	23.7 ± 2.9 23.6 ± 2.9 23.7 ± 2.9	0.96
Secondary School O-Level (n=20) Matric (n=129)	34.1 ± 4.5 35.9 ± 2.9	0.02	22.9 ± 3.0 23.8 ± 2.8	0.19
Higher School A–Level (n=12) Intermediate (n=138)	33.3 ± 5.4 35.9 ± 2.9	0.009	22.6 ± 3.4 23.7 ± 2.8	0.18
Assessment of 3rd semester CBL Score				
Overall Mean Score Male Female	35.7 ± 3.2 19 ± 3.4 19.1 ± 3.7	0.86	23.7 ± 2.9 17.1 ± 3.6 18.2 ± 3.4	0.096
Secondary School O- Level (n=20) Matric (n=129)	20.3 ± 4.3 19 ± 3.4	0.06	17.5 ± 3.9 17.9 ± 3.4	0.54
Higher School A–Level (n=12) Intermediate (n=138)	19.1 ± 4.1 19 ± 3.6	0.98	18.2 ± 3.4 18 ± 3.5	0.83

Independent sample t-test shows no significant difference ($p>0.05$) between the perception and opinions of CBL in two groups i.e. Cambridge and non-Cambridge. Independent sample t-test on the data shows significant increase ($*p<0.05$) in the positive perception of CBL in 3rd semester. Similarly, when independent sample t-test was applied, a significant increase ($*p<0.05$) in a positive opinion regarding CBL was observed among the 3rd semester students which were exposed to the CBL system as compared to 1st year students who had no exposure of CBL system as of yet.

DISCUSSION

Case based learning (CBL) is student-centered, interactive and instructor-led learning approach. To implement CBL students and teachers are required to be very much motivated. It is a good method of teaching, exciting, motivating, practical and effective strategy[11,12]. The present study evaluated the difference of perception and opinions of Case Based Learning (CBL) as an effective learning strategy of 1st year MBBS students of Jinnah Sindh Medical University, in context of gender and students coming from O/A levels and Matric/Intermediate schools.

Study by Joshi[13] also reports that case based learning is motivating and interesting similar to our study showing about half of the students confirming CBL as interesting and motivating. Flynn and Klein[14] also report that students enjoy more while working in groups rather than be alone, supporting our results in which more than half of the students said that they enjoy small group sessions as in CBL[14]. The results were supported by another study by Jesus et al, which reports that case based learning session helps in improving interaction and increased participation in discussions[15]. The results confirmed that CBL is interesting and helped learners in improving their educational performances and motivated them to actively participate[16]. This study showed that Case based learning promotes active learning, which is also supported by other studies[17,18]. There also exist some studies which have shown no preference for CBL by students who thought CBL had no benefits[5,19]. While another study on CBL perception found no significant differences in perception regarding CBL[20].

Interestingly, CBL facilitates improved communication skills, better problem solving skills and increased motivation consistent with our findings[21]. Scott[22] observed similar findings where case based learning resulted in acquiring improved problem solving skills. We consistent with other studies[23] have observed student satisfaction and positive effect on their learning. The study did not find any significant difference between the male and female students regarding their perception of CBL and their opinion about benefits of CBL. While assessing students of secondary education about perception of CBL, the Matric system students had a higher score regarding the perception about CBL, but there was no significant difference between the O-level and Matric students regarding their opinion about benefits of CBL. There was also no difference between the A-level and Intermediate system students regarding their perception about CBL as well as about their opinion about benefits of CBL.

It was interesting to observe a decline in overall scoring of perception by 3rd year students. The decline in the overall scoring may be due to the following factors: The sample group from 3rd semester was of the same as that of the first semester. This difference is observed due to several factors including absenteeism. In addition, the non-availability of the same group is due to the preference of students for a particular session or a particular facilitator as the data was collected immediately after an on-going session. Moreover, the faculty involved in taking sessions is not usually the same therefore; the students may reflect high scoring for a particular facilitator and session in mind. While the same facilitator for a different subject may influence the scoring on perception and opinion.

We may not ignore the influence of educational background on the overall scoring of CBL. It was surprising to observe a positive perception and opinion regarding CBL by non-Cambridge students, since these students are not previously exposed to such learning strategy. A similar study by Baher-Horenstein[24] has recognized the effectiveness of CBL in developing ownership of learning and increases active participation. Hashim et al.[5] have shown that students preferred case based learning. Vora et al[6]. observed a positive effect by case based learning in developing critical thinking and self-learning approach. In accordance with Gade et al[25].

CONCLUSION

The results of this study showed that the CBL is motivating, increases interaction among themselves and with teachers, increased participation and efficient use of time and helps in developing critical thinking. Further studies are needed to address the issues with more extensive data. More comparative group studies should be conducted in future.

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CONFLICT OF INTEREST

There is no conflict of interest reported in the study.

AUTHORS' CONTRIBUTION

The author designed, directed and coordinated the study, created study design, analyzed the data, studied and drafted the article.

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