ORIGINAL ARTICLE

Perceptions of undergraduate medical students regarding case based learning and tutorial format

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Abstract

Objective: To evaluate the perception of medical students regarding tutorial and case-based learning formats.

Metods: The within stage mixed model research was conducted at the Army Medical College, National University of Sciences and Technology, Islamabad, Pakistan, from April 2012 to March 2013, and comprised medical students of 4th year. Data-collection tool was a self-developed questionnaire, and it was statistically analysed using SPSS 16.

Results: Of the 144 students, 86(60%) were males. The overall age range was 21.5-23.4 years. Case-based learning method had significantly higher scores compared to tutorial method for learning process ($p<0.001$), for behavioural influence of facilitators ($p<0.001$), for group dynamics ($p<0.001$), and for learning environment ($p<0.001$). For open-ended questions regarding like or dislike of the two methods, majority named some faculty members as their role models and appreciated their support in better and in-depth learning through case-based learning format.

Conclusion: Case-based learning format was significantly more appreciated and favoured as a learning strategy by students.

Keywords: Case-based learning format, Tutorial-based learning format, Facilitator's role, Learning process. (JPMA 65: 1050; 2015)

Introduction

Medical education is undergoing major changes that require medical teachers to re-evaluate the standard conventional teaching and learning methodologies. This imposes a responsibility on medical teachers to develop new strategies that facilitate learning,[1] together with appropriate instructional strategies and relevant assessment techniques. Case-based learning (CBL) is practised at many institutions. Students' learning is being directly linked to teaching methods adopted by the teachers. When students are facilitated to participate actively in learning, they get involved with deeper learning.[2] The relationship between teachers' teaching approaches and reciprocated learning approaches by their students have been highlighted.[3]

The importance of environment on learning has also been emphasised.[4] It is beneficial for facilitators to create learning environment where learners with varying learning experiences can effectively learn and progress.[5]

The traditional ways of teaching are being replaced by learner-centred approaches. Other forms of learning, such as CBL, are being adapted for better learning outcomes.[6] Recently, Pakistan Medical and Dental Council (PMDC) has given a revised version of undergraduate curriculum[7] favouring integrated curriculum with CBL. This approach is resource-intensive, requiring progressive faculty training and development.[8] Faculty requires formal training in education to implement CBL strategy in its true spirit.

In medical colleges that implement subject/discipline-based curriculum and traditional teaching methods at the outset, fourth year medical students face difficulty in their training due to increase in volume, variety and the complexity of subject concepts. Use of only the traditional methods of learning also results in a poor understanding of subject concepts.

The current study was planned to evaluate the perception of medical students regarding tutorial and CBL formats.

Subjects and Methods

The within stage mixed model study was conducted at the Pathology Department of Army Medical College, National University of Sciences and Technology (NUST), Rawalpindi-Islamabad, from April 2012 to March 2013, after departmental and institutional ethical board permission.

Using universal sampling technique, all fourth year medical students taking Special Pathology classes at the Pathology Department were included. Those who opted out of the study or returned incomplete questionnaires were excluded. All the participants were informed about

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the study plan and their consent was obtained. The faculty was appropriately trained to conduct the tutorial sessions and student-centred CBL in small groups. The students of 2012-13 sessions were taught Special Pathology in tutorial sessions for the first six months. The questionnaire was designed to document the students' responses. The students were asked to respond with comments on their learning experience, process of facilitation, contents of subject discussed, learning environment during the tutorial format session and the behaviour as well as the influence of facilitators during the whole process. During the next 6 months, the same students were taught the remaining curriculum of Special Pathology through CBL sessions. At the end of their academic session, they were again given the questionnaires to document their opinion. It was a well-informed consent-based, self-filled response form.

Each question was to be marked on a continuum scale of 1 to 6 using Likert's scale; 1= never; 2= very rarely; 3= rarely; 4= occasionally; 5= frequently; 6= very frequently. They were at liberty to ask questions and seek clarifications if in doubt and were encouraged to write about their perceptions, opinions and feelings in the open-ended questions, especially for the content not addressed in the questionnaire. The responses after the case-based learning were referred to as CBL, and tutorial method of teaching as TM. The questionnaire was divided into 4 sections i.e. learning process, behavioural influence of facilitators, group dynamics and class room physical learning environment. The scores for each section were added for the total score given to that section by each respondent. The responses to open-ended questions were used for qualitative analysis and identification of common opinions.

Data was analysed using SPSS 16. Quantitative variables were described through mean and standard deviation (SD) or median and inter-quartile range (IQR) subject to normality of data; and frequency and percentages for qualitative variables. One sample Kolmogorov Smirnov test confirmed normality assumption of variables. Wilcoxon signed rank test was applied to assess any significant difference between the responses before and after the change in teaching format. P<0.05 was considered significant.

Results

All the 190 students were approached, but 144(76%) completed the study and represented the final study sample. Of the 144 students, 86(60%) were males and 58(40%) were females. The overall age range was 21.5-23.4 years. Of the females, 17(30%) and of the boys

Table-1: Significance of normality assumption of study variables.

Study variables	Case Based Learning		Tutorial Method	
	Z-value	p-value	Z-value	p-value
Learning Process	1.835	0.002	0.930	0.353
Behavioural influence of facilitators	1.573	0.014	0.963	0.311
Group dynamics	2.091	< 0.001	1.706	0.006
Learning environment	3.181	< 0.001	1.813	0.003

p< 0.05 (Significant)
p< 0.001 (Highly significant).

Table-2: Comparison of scores between CBL and TM group (n = 144).

Study variables	Case Based Learning	Tutorial Method	p-value
Learning Process	34.5 (24 - 44)	24 (19 - 29)	< 0.001
Behavioural influence of facilitators	17 (14 - 19)	14 (12 - 16)	< 0.001
Group dynamics	11 (6.2- 14)	7 (5 - 11)	< 0.001
Learning environment	4 (3 - 5)	3 (2 - 4)	< 0.001

CBL: Case Based Learning
TM: Tutorial Method
Values are expressed as median (inter-quartile range)
p< 0.001 (Highly significant).

64(75%) were hostel residents located on the college premises. All of them were familiar with internet and electronic information management. As regards previous academic exposure, only 29(20%) students had past experience of some sort CBL approach in their academic life by virtue of having attended O/A level stream of education.

All the variables were checked for the assumption of normality and were found non-normal except learning process and behavioural influence of facilitators for TM (Table-1). For learning process, median score was 34.50 (IQR: 24-44) for CBL group, and 24(IQR: 19-29) for TM group (p<0.001). For behavioural influence of facilitators, CBL group had significantly higher score (p<0.001) compared to the TM group i.e. 17(IQR: 14-19) versus 14(IQR: 12-16). For group dynamics, median score was 11 (IQR: 6.25-14) for the CBL group and 7(5-11) for the TM group. CBL group had significantly higher scores compared to TM group (p<0.001). Median of learning environment was 4(IQR: 3-5) for the CBL group and 3(2-4) for TM group (p<0.001) (Table-2).

Content analysis of the data obtained through open-ended questions at the end of the session revealed a clear appreciation of three main themes. The students expressed their liking for CBL firstly on the theme that the facilitators' efforts simplified the complex subject concepts. A few students found it convenient to learn without the stress of keeping track and taking notes in

Table-3: Themes, trends and frequencies.

Themes	Trends	Comments
Liking case based learning format	1. Facilitator's personality	C1.He has a charming way of communicating . C2. He knows how to talk and teach while he makes the class feel at home. C3. He makes learning an enjoyable experience with relaxed attitude.
	2. Learning process itself	C1. Case based learning is not new. We know it is better as it helps us learn complex ideas with group support. C2. Case based learning is more fun than a serious academic activity. C3. Case based learning encourages us to learn the subject independently to a level of detail as we want.
	3. Group Dynamics	C1. Learning in case based session encourages us to be supportive to each other as we learn to work together. C2. We get to know each other better.
Disliking case based learning format	Learning process and group dynamics	C1. Needs little more preparation and home work by us which is not always possible and we simply skip . C2. Case based learning is agood idea but takes longer time for completion. C3. It sometimes turns frustrating to be spending time in Case based learning in broader sense but not being able to prepare for exams by concise revision.
	Facilitator's Role	C1. Teachers are themselves not clear of this format and simply waste time C2. Facilitators discourage the students from in-depth study as wasteful effort. C3. Facilitators have free time to interact with students and some turn biased and unfair in assessment.
Liking Tutorial learning format	1. Facilitator's personality	C1. Teachers are senior or experienced and seasoned and conduct the class with discipline during tutorial sessions. C2. He knows how to talk and teaches while he keeps the class attentive. C3. Teachers facilitate by working hard themselves and conduct quizzes which help in memorizing important points and quick revision for exams.
	2. Learning process itself	C1. Tutorial format of teaching complements lectures. C2. Keeps subject learning as a serious academic activity? C3. Keeps us focused.
	3. Group Dynamics	C1. Prepares us for future by competitive learning. C2. Quicker feedback helps everyone realize own mistakes C3.helps identify peers who can be asked for support.
Disliking Tutorial learning format	Learning process and group dynamics	C1. Forces us to remain glued to senior's guidance and impression about subject. C2. In tutorial I feel old fashioned school student with no independent learning. C3. Students hide their responses from class fellows for better impression which in turn creates distaste.
	Facilitator's role	C1. Teachers stick to didactic teaching and conduct it like a mini lecture. C2. Sometimes I feel depressed as once my turn is over I lose interest as there is no attention from facilitator. C3. In order to maintain silence and discipline some of the teachers who have not prepared well, discourage the students from asking questions.

class for future sessions. Memorising long responses for TM even when concepts could not be clarified in class was disliked by most respondents. The third related to the appreciation of CBL approach with respect to the motivating and encouraging role of facilitators which steered the students to grasp the new and complex learning concepts with confidence and positive results. The main reasons for disliking the TM was not its content but its intimidating and didactic approach that students perceived to be an obstacle in the way of learning new concepts. Students appreciated the shorter time taken to quickly revise a subject in TM approach though they conceded it did not encourage the students to individually understand the whole concept as they wrote and expressed that they lost interest after their turn of question-and-answer session was over in the TM format (Table-3). Among respondents 74% responded about both liking and disliking of each process while 5% commented elaborately only about liking. Only reasons for disliking the two processes leaving out the other comments were given by 3% of students.

Discussion

The study was conducted for perceptions of medical students regarding the two different methods of teaching and learning. The CBL approach carried with it the dual requirement of its implementation on students' learning and teachers' motivation. All of these were comparable to experiences of students in other settings in a similar study[9] where the students in an educational institution were exposed to concurrent parallel approaches of CBL alongside TM, ultimately turning into an authoritarian environment with predominant role of facilitators turning into teachers dealing with conventional student attitude. In CBL, students placed more emphasis on meaning than on memorising, used journals and online databases as sources of information; and felt more confident in information-seeking skills. Moreover, the students used a more in-depth approach of learning, employed a backward directed hypothetic-deductive model of reasoning and exhibited better interpersonal skills, psychosocial knowledge/attitudes. Institutions with CBL found improved student motivation and enjoyment. Tutors who adapted CBL, content expertise and tutor training aspects were identified as main factors affecting group function.[10] A qualitative constructivist research study employed a unique professional case-based pedagogy to investigate how concurrent Education of undergraduate students made sense of the complex dilemmas inherent in the cases and in particular, the factors that influenced their critical thinking processes.[11] In a study, more than 60% students appreciated the non-intimidating and stimulating approach of CBL compared to the traditional small group TM format.[12] In another study, similar results of effective learning among medical undergraduate students with better group dynamics in CBL and open-minded learning approach was seen.[13] Another study investigated students' response to case based learning sessions and results reflected their response to a changed and better learning environment. Green and Ellis in their study of similar objectives also confirmed identical response.[13,14] A step by step learning through case based learning was adopted to assess students' appraisal of interactive learning environment and findings supported our present study.[15]

However, some studies noted that the students had disliked the CBL approach as it was perceived as a more time-consuming learning strategy which hampered preparation for exams.[16] A study in Karachi assessed the prime need for the development of a framework for optimal learning of medical undergraduate students with a mix of traditional and innovative strategies.[17] It was noted that understanding, clarity of concepts, confidence and command on the subject was improved from 58% to 86% of students by innovations to implement the learner-centred education strategies.[18] Another study from Hong Kong also identified the importance of effective implementation of any learning strategy being intimately related to training of teachers. This study, in its results for both open-ended responses as well as close-ended ones, evaluated the behaviour of teachers which highlighted the need for their appropriate training. CBL had its weak points requiring thorough preparation by both the students and the teachers for academic activity.[19] The setting of the learning environment and training of various aspects of group dynamics during CBL was appreciated by majority of the learners in another two studies with similar objectives.[20] The setting of the learning environment and training of various aspects of group dynamics during case based learning was appreciated by majority of the learners in another two studies with similar objectives,[20,21] similar results were recorded in our study where 60% favoured case based learning and only 20% liked tutorial format of learning. However some author groups have preferred to appreciate the blend of didactic and case based learning formats for optimal results in exams.[22-24] Though explicit concern for adult learning principles was not considered in our study while designing the questionnaire, adult learning principles were considered specifically in designing the CBL approach with deliberate avoidance of pedagogic approach and a positive response in both learning environment, process and group dynamics in an earlier study.[25] Innovative approaches in learning again confirmed a positive response in most aspects of learning[26] though similar results were seen in a landmark study[27] whereby the best response to CBL formats was seen in the form of student motivation.

Apart from quantitative responses on Likert's scale to the structured questionnaire, the students also readily expressed their opinion about the learning process, facilitator's role, learning environment and group dynamics experience of both the teaching and learning formats. As for the facilitator's role, their personality and disposition was appreciated in both cases. But it was more needed in successful conduct of a CBL session for achieving its true intended benefits. A study[28] explored the effect of facilitators' role on students' opinion about CBL experience and their level of knowledge besides familiarity with the method was identified as important factors by students. In another

study,[28] there was a difference in approach by two types of tutors i.e. content experts and those with better know how of learning strategy applied. A different view was, however, expressed in another study[29] where content expert facilitators tended to dominate the learning process most of the time which left little time for students to independently explore the case with experiential learning. Overall, there was no significant difference between the students' performances in the groups led by experts and those led by non-experts.

In a study,[30] there was a specific effort to design facilitating learning environment for case-based/student-centred inquiry-oriented learning sessions.

In a study by Sarala al,[31] there was a successful use of case based/student centered inquiry oriented learning sessions.

As for the students' opinion of group dynamics, they expressed better cohesion among class in the quest for solving cases presented for approach to learning rather than in a more didactic style TM format. CBL was more effective than lecture for intermediate achievers. Similarly, students' opinion in current study coincided with those in similar studies[32] where students' opinion for TM learning was compared with CBL and students focused on learning environment and enhanced group dynamics.

In terms of limitation, the study was a public-sector, single-centre research which limits the generalisability of its results.

Conclusion

CBL format was favoured against TM by medical students at a public-sector facility.

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