



Original Research Article

Students perception regarding integrated pathology teaching programme for medical laboratory science curriculum: An institutional study

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ABSTRACT

Introduction: Medical schools all over Indian mainly have lectures as the most widely used teaching and learning methods. Current medical education imparts knowledge in a disjointed manner and does not allow students to develop the skills to perceive the patient as a whole. There is need to teach the students by correlating the various subjects to create interest and promote active learning.

Aim: This study was conducted to find out the scope of integrated teaching in the undergraduate medical curriculum.

Setting and Design: A cross-sectional study was conducted in a medical college in the coastal region of South India.

Methodology: Objectives that are to be achieved by the end of the integrated teaching were clearly drafted, a detailed lesson plan was drafted and was circulated among the faculty and students, and it was decided that the integrated teaching would be conducted in coordination between Department of General Medicine, Department of Micro biology, and Department of Community Medicine.

Statistical Analysis: Collected data were using Likert scale.

Results and Conclusion: The pre- and post test scores showed that there was statistically extremely significant increase in the knowledge. Overall, 67.8% (38) students gave a feedback of very good for the integrated teaching on a whole. This method is an improvisation in the teaching methods to meet the expectations of the students and to improve the quality of teaching and has the ability to make the teaching-learning process more effective.

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1. Introduction

Most of the medical colleges in India have been following a traditional curriculum, characterized by "discipline wise model" with a high degree of compartmentalization into subjects of basic sciences, para-clinical and clinical branches. Several areas of redundancy, repetition and overlapping along with the observation of a gap between the qualitative and quantitative advancement in medical education and achievements in the field of health care are the lacunae with this model. To overcome these drawbacks, many medical colleges have started to teach students by using hybrid system with incorporation of various

methods of teaching, viz: integrated lectures, problem based learning, bedside clinics, case based teaching.¹

Case based learning (CBL) is a small group interactive teaching intervention, where cases are discussed under the guidance of a facilitator. The introduction of cases scenarios helps the learners understand the practical application of theoretical knowledge it uses a "guided inquiry approach".¹

Teaching (IT) and community orientation.¹ Integration of teaching is defined as the organization of teaching matter to interrelate or unity the subjects which are frequently taught in separate academic courses or departments.² It simply means bridging connections between academic knowledge and practical's.

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Integration can be done in the following ways: Horizontal integration means that two or more departments teaching concurrently merge their educational identities. Vertical integration is an integration between disciplines traditionally taught in the different phases of curriculum. There are four major components in IT namely.² - (a) Integration of experience (b) Social integration.

© Integration of knowledge (d) Integration as it curriculum design.³ Harden described 11 steps of the integration ladder-A tool for planning implementing and evaluating medical curriculum.⁴

2. Aims and Objectives

1. To develop vertical Integrated Learning Module with the help of interdepartmental faculty.
2. To evaluate the perception of student towards this early exposure to vertical integrated teaching methods when compared with didactic lecture.
3. To have a better learning amongst students as reflected by their better performances during assessment.
4. To have a contextual knowledge amongst students with a better ability to correlate integrate and think critically.

3. Materials and Methods

One group of 28 students (DL group) batch was taught through two didactic lectures of one hour duration each taken in two subsequent weeks by pathology faculties using power point and blackboard in combination.

There was group change-over with another 28 students batch in two phase i.e, the CBL group during first phase with microcytic hypochromic anemia sessions became DL group during second phase with voluntary blood donation sessions and the vice versa.

3.1. CBL sessions

Teaching through CBL, again was completed for each phase in two sittings of one hour duration each, taken in two subsequent weeks. Here, the sessions were conducted in small groups and during this process of CBL a nested pattern of integrated teaching was followed. For each small group there was two teachers, one each from pathology and from a medicine respectively. The learning objectives for didactic lectures and CBL sessions topics were the same.

3.2. Collection of feedbacks

At the end of the entire activity, feedback questionnaires were administered to the involved students and teachers and their responses were recorded. The feedback questionnaires were predesigned according to 5-point Likert Scale, where responses varied from “Strongly agree” (score with a neutral midpoint responses of “Not sure” (score value = 3).

The answer script of Multiple Choice Questions (MCQ) based pre and post tests were evaluated and the scores obtained by students were entered in SPSS data sheet.

To find out the efficacy of CBL the mean scores of the students in pre and post tests were compared by using paired samples “t” test and the mean scores of the students of DL and CBL groups in posttests of each phase were compared by using independent (unpaired) sample “t” test. A p-value of <0.05 was considered statistically significant.

3.3. Analysis of feedback questionnaires scores

The scores against the responses of feedback questionnaires collected from students and teachers were entered in excel sheet and from the total score against each question’s response by the students / teachers, mean scores and finally overall mean score were calculated.

4. Results

Total number of particular students and teachers were 56 and 8 respectively. Effectiveness of DL and CBL in 1st phase (sessions on microcytic hypochromic anemia)

5. Discussion

CBL uses virtual cases to stimulate interest in a particular area of the curriculum. In this study, students as well as faculty perceptions revealed that CBL was very well accepted and it could be used as a T/L tool along with didactic lectures to increase the interest of students in the subject of biochemistry. Some of the other medical education researchers stated that CBL seems to be a good method of teaching, based on results of the evaluation test and feedback questionnaire results, wherein the whole process can be made students-centered.⁵

In the present study, it was also observed that the performance of students in the test administered after conducting CBL was better than after the didactic lectures, which was also supported by the student’s perception, which revealed that CBL enhanced their critical thinking, and their understanding on the topic became better. A feedback from students from a study on CBL revealed that CBL was superior in imparting knowledge and cultivating the habit of self-directed learning and group discussions. CBL enhances the ability of the students to work as a team and identify and analyze case histories and find out solution to increase physician competencies, especially in social and cognitive dimensions.⁵

Most of the faculty members felt that this innovative method promoted active participation of the students, which helped them in deep and strategic learning. CBL is an active learning tool that enhances clinical correlation and critical thinking, encourages team participation, group discussions, and motivates students to become lifelong learners.

Table 1: Student feedback questionnaire scores analysis (Figure in parenthesis indicates score for that choice)

S. No	Questions	Strongly agree (5)	Agree (4)	Nor sure (Neither agree, nor disagree)	Disagree (2)	Strongly Disagree (1)
01	CBL stimulated my desire to learn	30	26	0	0	0
02	I feel confident to apply basic science and pathology concepts to solve clinical cases	30	20	4	2	0
03	CBL is good method to practice integration of knowledge and skill	30	24	0	2	0
04	CBL improved my clinical reasoning	25	20	11	0	0
05	I don't think CBL is better than traditional teaching	30	22	4	0	0
06	I was motivated to learn pathology by CBL	30	26	0	0	0
07	The emphasis on clinical	30	20	4	2	0
08	The CBL helped to reinforce concepts taught in class	30	24	0	2	0
09	CBL is time-consuming and hinders the normal speed of the classes	30	24	0	2	0
10	CBL promoted myself directed learning skills	25	20	11	0	0
11	CBL has increased my self-confidence and attitude towards learning	30	22	4	0	0
12	I was not comfortable during CBL discussion sessions	25	20	11	0	0
13	CBL improved my communication skill and team work	30	22	4	0	0
14	I would recommend CBL to other department at our institution	30	24	0	2	0
15	I was satisfied with CBL approach of leaning	30	24	0	2	0

The project was introduced to the students toward the end of their first professional course; therefore, only two CBL sessions could be held. The sessions can be introduced early for the next batch of students, giving them more time to enhance learning and introduce more topics to CBL sessions.⁶

A good case study, according to Professor Paul Lawrence is: "The vehicle by which a chunk of reality is brought into the classroom to be worked over by the class and the instructor. A good case keeps the class discussion grounded upon some of the stubborn facts that must be faced in real life situations."¹ Case-based learning (CBL) was first applied at Harvard law School in 1870.¹ Later the method was adopted by Harvard Business School in 1920.⁶

For medical education it was first applied by anatomy department of a medical school in Newfoundland.⁶ Clinical

case studies allow students to effectively apply acquired knowledge to the clinical problems they face in simulated or real situations.⁶

Regarding the effectiveness of the CBL as a learning vehicle, most studies are unanimous when affirming it. The effects of CBL using video on clinical decision making and learning motivation in undergraduate nursing students should significant group differences in clinical decision-making and learning motivation, and the post test scores of clinical decision-making in the CBL group were statistically higher than the control group.⁵ Various studies done over a period of time indicate that students rated the CBL approach positively, mainly due to the interactive session.⁷

The demand for knowledge and skill development among the MLT science student is high but the current method of their training learning and evaluation is

Table 2: Teachers feedback questionnaire scores analysis (Figure in parenthesis indicates score for that choice)

S.No	Questions	Strongly agree (5)	Agree (4)	Nor sure (Neither agree, nor disagree)	Disagree (2)	Strongly Disagree (1)
01	CBL stimulated students desire to learn	6	2	0	0	0
02	Students felt confident to apply basic science and pathology concepts to solve clinical cases	5	3	0	0	0
03	CBL is good method to practice integration of knowledge and skill	4	4	0	0	0
04	CBL increased students clinical reasoning ability	6	2	0	0	0
05	I don't think CBL is better than our present traditional routine pattern of teaching	5	1	2	0	0
06	Student were motivated to learn pathology by CBL	5	3	0	0	0
07	The emphasis on clinical concept was detrimental to learning pathology for the students	4	4	0	0	0
08	The CBL helped to reinforce concepts taught in class	6	2	0	0	0
09	CBL is time-consuming and hinders the normal speed of the classes	5	3	0	0	0
10	CBL improved students desire and skill in teaching themselves of new materials through self directed learning (SDL)	4	4	0	0	0
11	CBL has improved the students attitude towards learning	5	3	0	0	0
12	Students were not comfortable during CBL discussion sessions	4	4	0	0	0
13	I was not comfortable with the CBL system of teaching	6	2	0	0	0
14	CBL improved students communication skill	5	3	0	0	0
15	I was satisfied with CBL approach of teaching-learning	5	3	0	0	0
16	I would recommend CBL to other departments at out institution	4	4	0	0	0

Table 3: Effectiveness of DL and CBL on microcytic hypochromic anemia(Paired "t"-test: CI 0.95).

TL method	Evaluation test (by MCQ)	Mean Score + SD (Full marks =15)	Significance (n=43)
DL	Pre - test	20.12 + 1.77	P = 0.00 3
	Post-test	20.95 + 2.30	
CBL	Pre -test	20.07 + 1.77	P < 0.001
	Post-test	21.95 + 1.83	

Table 4: Effectiveness of DL and CBL in 2nd phase (sessions on pulmonary tuberculosis) (Paired "t"- test: CI 0.95).

TL method	Evaluation test (by MCQ)	Mean Score + SD (Full marks =15)	Significance (n=43)
DL	Pre -test	19.33 + 1.86	P < 0.001
	Post -test	19.12 + 1.97	
CBL	Pre - test	17.98 + 2.02	P < 0.001
	Post -test	21.49 + 2.08	

Table 5: Comparison of effectiveness of DL & CBL in 1st phase (sessions on microcytic hypochromic anemia) (Independent “t” test, CI 0.95).

Tests	Groups	Mean Score + SD	Significance
Pre-test	DL	10.12 + 1.77	P = 0.904
	CBL	10.07 + 1.77	
Post -test	DL	10.95 + 2.30	P = 0.029
	CBL	11.95 + 1.83	

Table 6: Comparison of effectiveness of DL & CBL in 2st phase (sessions on pulmonary tuberculosis) (Independent “t” test, CI 0.95).

Tests	Groups	Mean Score + SD	Significance
Pre-test	DL	7.33 + 1.86	P = 0.125
	CBL	7.98 + 2.02	
Post -test	DL	9.12 + 1.97	P = 0.029
	CBL	11.99 + 2.08	

inadequate because under the current system the students tend to “compartmentalize” and have difficulty integrating laboratory findings and their corresponding diagnostic implications from one laboratory discipline to another. However, the proposed “Integrated Teaching Program” is a student centered activity within a small group by facilitators where case information will be provided gradually, in a sequential order as the case progress. The role of the facilitator is to motivate the students to explore and understand the case objectives. Students will discuss and debate the existing information, form hypotheses, explore student-identified learning objectives and assess their progress through the case in a self-reflective process. The Medical Laboratory Science is undergoing a paradigm shift with the introduction of newer technologies, coupled with automation and increasing emphasis on accreditation by various national and international bodies.⁷

Hence academic programs in medical laboratory science have the responsibilities of preparing graduates with broad-based problem – solving skills, independence, flexibility, and a willingness to work collaboratively with other health care professionals. Integrated teaching program with student centered case based learning for Medical Laboratory Science curriculum could be a novel innovative technique which will enable students to learn scales, encourage the development of critical reasoning skills within the context of their respective professional disciplines, along with the motivation for lifelong learning which is vital for adaptation to a changing environment.⁸

Medical education all over the world recognize that the integrated in medical education is one of the major education reforms required. The Medical Council of India also strongly recommended integration in undergraduate medical education. The purpose of integration is to increase the effectiveness of teaching –learning process. The advantages of integrated teaching over traditional lectures are: (a) Integrated teaching reduces fragmentation of medical courses (b) Prevents repetition and waste of

time (c) Students learn to apply their knowledge to clinical practice (d) Promotes interdepartmental collaboration € Rationalization of teaching resources.

For generations, medical students have spent the pre-clinical years in classrooms and laboratories, memorizing body parts and dissecting specimens, eagerly anticipating the clinical years when they would see and learn from patients. This divide between pre-clinical and clinical years has been the norm since a century years has been the norm since a century ago providing a theoretical basis for clinical medicine.⁸

Traditionally the foundation years of medical students have been made thorough in biomedical sciences but have hardly provided them with any clinical experience. Lack of early clinical experience has shown to demotivate students and make them prone to negative emotions when they finally enter the clinical environment, On the other hand early clinical exposure helps medical students socialize to their chosen profession. It helps them acquire a wide range of subject matter and makes their learning more real and relevant. It has potential benefits for other stakeholder, notably teachers and patients and can influence career choices.⁹

6. Conclusion

Although integrated teaching with CBL has been highly effective for medical and nursing education but no study has been done with regard to the feasibility of using the same for medical laboratory science curriculum and also for assessment of the MLT students perception regarding the CBL.

Implementation of vertical integration among pre, para and clinical subjects is beneficial as observed by the improved performance of students when exposed to CBL and as indicated by their response in the feedback.

Our study conclusively proves that integrated teaching program with student centered case based learning for medical laboratory science curriculum is an effective mode

of intervention for teaching learning and evaluation and calls for urgent review of the existing MLT curriculum so that CBL can be used for routine academic purposes to successfully meet the existing and potential challenges of modern health care system of the communities.

7. Source of funding

None.

8. Conflict of interest

None.

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