

Integrated teaching program using case-based learning

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ABSTRACT

Background: At present, in a medical school, students are taught in different departments, subject-wise, without integration to interrelate or unify subjects and these results in compartmentalization of medical education, with no stress on case-based learning. Therefore, an effort was made to develop and adopt integrated teaching in order to have a better contextual knowledge among students. **Methodology and Implementation:** After the faculty orientation training, four “topic committees” with faculty members from different departments were constituted which decided and agreed on the content material to be taught, different methodologies to be used, along with the logical sequencing of the same for the purpose of implementation. Different teaching methodologies used, during the program, were didactic lectures, case stimulated sessions, clinical visits, laboratory work, and small group student’s seminar. **Results:** After the implementation of program, the comparison between two batches as well as between topics taught with integrated learning program versus traditional method showed that students performed better in the topics, taught with integrated approach. Students rated “clinical visits” as very good methodology, followed by “case stimulated interactive sessions.” Students believed that they felt more actively involved, and their queries are better addressed with such interactive sessions. **Conclusion:** There is a very good perception of students toward integrated teaching. Students performed better if they are taught using this technique. Although majority of faculty found integrated teaching, as useful method of teaching, nevertheless extra work burden and interdepartmental coordination remained a challenging task.

Key words: Case based learning, integrated teaching, topic committees

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INTRODUCTION

Changing needs of the society advances in scientific knowledge and innovations in the educational field necessitate constant changes in medical school curricula. The latest Medical Council of India (MCI)^[1] guidelines stipulate that undergraduate medical education should be oriented toward health and community.

Students’ training must aim at inculcating scientific temper, logical and scientific reasoning, clarity of expression, and ability to gather and analyze information.

An integrated approach to the teaching of topics in a course is well-accepted as an effective educational strategy.^[2-4] The medical curriculum is vast and students are expected to learn many subjects at the same time. The teachers are also involved in a number of activities apart from teaching such as research, administrative, and updating their knowledge. In doing so, teaching undergraduate medical

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students frequently remains a separate academic department without integration to interrelate or unify subjects. Hence, current medical education imparts knowledge in a disjointed manner and does not allow students to develop the skills to investigate, analyze, and prepare to perceive the patient as a whole. Therefore, MCI desires the incorporation of integration in the medical curriculum in order to provide the students with a holistic rather than fragmented learning perspectives.^[4] Integrated thinking offers the capacity to individualize,^[5] and hence the method of integrated teaching that encouraged this concept was developed and adopted in this project.

It also promotes a holistic approach to patients and their problems. The students study the biological and biochemical foundations of an organ system, its structural properties, reactions to disease and injury and response to treatment with a minimum possible time gap in the delivery of different elements. The impact is further heightened by providing the relevant practical and patient care experience. In India, some medical colleges have introduced integrated teaching program with student-centered case based learning to enhance clinical learning.^[5-7]

The MCI has recommended both horizontal and vertical integration to be introduced throughout the curriculum. Horizontal processes are those between departments of the same academic year enabling the student to have a simultaneous view of different aspects. A vertical scheme unites subjects of various academic years through a topic or theme. Diabetes mellitus, for example, can draw contributors from biochemistry, pathology, pharmacology, medicine, and community medicine. A move toward integrated teaching is likely to reduce the fragmentation of the medical course, and motivate students for better learning.

Accordingly, the current study was planned with objectives of - to have a better learning amongst students, as reflected by their better performance during assessment, to have a better contextual knowledge amongst students with a better ability to correlate, integrate, and think critically, to develop better integration amongst faculties with a sharing of ideas and learning.

METHODOLOGY AND IMPLEMENTATION

The study was carried out in premier postgraduate medical college in North India. After taking due clearances from the Institutional Ethics Committee, 90 students out of 100 students of fifth semester underwent integrated teaching program. Before including these students for the study,

informed consent was received from the participating students. For the purpose of comparison, students of seventh semester, who were already, taught the same topics with traditional approach were also included in the study. The topics chosen for the integrated learning program (ILP) to the fifth-semester students were same which are to be taught to seventh-semester students as per their regular schedule by the traditional approach.

While framing ILP, during a sensitization meeting for the faculties, an effort was made to understand the importance of each teaching/learning method. Like for didactic lectures, the specific guideline was provided that each lecture of 1 h duration to be conducted by faculty of respective departments, to give the basic contextual concept to the students. These lectures should involve the students after the lecture to question and clarify doubts. Every lecture should end up with student, teacher interaction. Similar guidelines were provided for each and every methodology used.

Before implementing the integrated teaching approach, faculties, and students were provided with 1-day orientation training on the integrated teaching program. After the faculty orientation training, four “topic committees” were constituted. In a topic committee, one member from each participating department namely, Community Medicine, Microbiology, Medicine, and Obstetrics and Gynecology was selected. Every “topic committee” was assigned the responsibility for selection of one topic each, for the purpose of integration. Each topic committee decided and agreed upon the content material to be taught, different methodologies to be used, along with the logical sequencing of the same for the purpose of implementation. Different teaching methodologies used, during the program, were didactic lectures, case stimulated sessions, clinical visits, laboratory work, and small group student’s seminar.

After the orientation meeting, the timetable for ILP was prepared under the guidance from Medical Education Department for separate months and was approved from the dean’s office. For the assessment part, faculties who were not the members of the “topic committees” were requested to prepare questions. The questions were in the form of 20 multiple choice questions (MCQs), where a clinical vignette was used to assess the in-depth knowledge about the topic. On the first day of ILP, students underwent a pretest with the same set of 20 MCQs. At the end of ILP, a post-test with the same MCQ was given. The data were analyzed using Student’s *t*-test. For comparing results, the same questions were given to seventh semester students, who were undergoing their clinical posting and were learning these topics by traditional teaching methods (interbatch comparison), and the results

were compared with the posttest results of 5th semester students. The scores obtained by students of the fifth semester in different topics (other than these four selected topics for integration) were also assessed and compared.

A separate questionnaire was used for the perception of faculties and the students for this approach, which was developed with the help of pretested questionnaire used in a study, conducted by Ghosh and Pandya.^[8]

RESULTS

In different sessions, conducted under ILP, mean (standard deviation) student attendance was 83.1 (3.41%). The pretest and posttest results of fifth semester students showed statistically significant ($P < 0.001$) difference [Table 1]. Same questionnaire was also given to seventh semester students, who have already studied these topics with traditional teaching methodology and were presently undergoing their clinical rotation, their test results were compared with the posttest results of fifth semester students, and data were analyzed using unpaired t statistics, which also showed a significant difference [Table 2]. In fifth semester, the posttest results of tuberculosis were compared with the results obtained in the MCQs designed for malaria (taught with traditional approach, to fifth semester students).

Student's feedback

About 44% of students rated clinical visits as a very good method for integrated teaching whereas only 14% rated for the didactic lecture. A significant proportion of students believed that more topics should be taught with the integrated methodology. Students believed that they felt more actively involved, and their queries are better addressed with such interactive. Sixty-two percent students believed that ILP would help them to perform better in university exam. Different responses are shown in Tables 3 and 4. Sixty-two percent students believed that ILP would help them to perform better in university exam.

Faculties feedback

The majority (72%) of teachers believed that ILP is a very useful method of teaching. Thirty percent teachers opined they had to work extra hours to prepare for the ILP sessions. Thirty-nine percent perceived it too difficult to coordinate amongst different departments; even intra-departmental coordination was equally difficult.

DISCUSSION

The medical colleges in India have traditionally been following a curriculum stuffed with a large body of knowledge pertaining to pre, para and clinical disciplines. Lack of integration of course material; poor coordination between the basic science

Table 1: Topic-wise comparison between pre- and post-test results of fifth semester students

Topic	Analysis of Scores	Paired differences					t	df	P
		Mean	SD	SEM	95% CI difference				
					Lower	Upper			
Tuberculosis	Posttest-Pretest	8.86	4.136	0.468	7.93	9.79	18.915	77	<0.001
Diabetes and hypertension	Posttest-Pretest	8.92	4.181	0.429	8.06	9.77	20.784	94	<0.001
Anemia	Posttest-Pretest	9.36	4.264	0.465	8.43	10.28	20.111	83	<0.001

CI: Confidence interval; SEM: Standard error of mean; SD: Standard deviation

Table 2: Interbatch comparison

Topic	Analysis of Scores	Unpaired t-test for equality of means				t	df	P
		Mean difference	SE of difference	95% CI				
				Lower	Upper			
Tuberculosis	Posttest-seventh semester	6.7	0.57	5.577	7.831	11.75	150	<0.001
Diabetes and hypertension	Posttest-seventh semester	6.13	0.537	5.066	7.187	11.4	179	<0.001
Anemia	Posttest-seventh semester	4.82	0.568	3.702	5.947	8.49	161	<0.001

SE: Standard error; CI: Confidence interval

Table 3: Comparison between posttest results for topic taught with ILP and topic taught with traditional approach, amongst fifth semester students

Topic	Mean	Unpaired sample tests				t	df	P
		Unpaired t-test for equality of means						
		Mean difference	SE of difference	95% CI of difference				
			Lower	Upper				
Tuberculosis (posttest with ILP)	15.73	3.52	0.345	2.839	4.204	10.2	143	<0.001
Malaria (conventional teaching)	12.21							

SE: Standard error; CI: Confidence interval; ILP: Integrated learning program

Table 4: Students' rating of teaching/learning method for ILP

Teaching/learning method	Poor	Satisfactory	Good	Very good	Excellent
Didactic lectures	10.3	28.6	33.8	14.3	13
Case stimulated interactive sessions	11.6	16.9	33.8	29.9	7.8
Demonstration	20.8	29.6	32.7	7.8	9.1
Small group lab work	27.3	20.7	24.7	18.2	9.1
Clinical visit	3.9	14.2	24.7	44.2	13

All values are in percentage. ILP: Integrated learning program

Table 5: Students' rating of usefulness of teaching/learning methods, used during the ILP

Teaching/learning method	Not at all	To some extent	To a great extent
Greater understanding as well as application of a topic			
Didactic lecture	27.3	63.6	9.1
Case stimulated interactive sessions	5.1	45.5	49.4
Demonstration	16.9	57.1	26.0
Small group laboratory work	28.5	45.5	26.0
Clinical visit	6.5	26.0	67.5
More involvement with greater attention, concentration and motivation			
Didactic lecture	40.2	42.9	16.9
Case stimulated interactive sessions	15.6	44.1	40.3
Demonstration	26	54.5	19.5
Small group lab work	31.1	42.9	26
Clinical visit	2.6	36.4	61.0

All values are in percentage. ILP: Integrated learning program

departments and clinical specialties; and use of only traditional didactic pedagogic methods of instruction deter it to achieve the overall goal. In today's scenario, there is an utmost need that every medical teacher should present the "must know" information to the students in a planned, organized and integrated manner.^[5] This study was undertaken with the overall objective of comparing ILP with the traditional approach with an attempt to find out possibilities of its implementation while considering the perception of students as well as teachers. The results of the present study revealed that students performed in a better way, with improved scores when taught with the integrated approach. Similar results were shown in a study conducted by Kate *et al.*^[9]

The ILP was perceived to be useful by the majority of students and most faculty with regard to the performance of students in university as well as later days of clinical exposure. Amongst different methods used, 34% students believed that demonstrations are a very good method for integrated learning sessions while only 11% rated didactic lecture as a very good method for the same. In the present study, the majority (72%) of teachers believed that ILP is a very useful method of teaching. Similar results were shown in a study conducted by Ghosh and Pandya.^[8] Students felt their greater participation

and perceived that ILP helped them to become an active learner [Table 5]. Similar results were seen in a study, which was carried out by Steinert to assess students' perception of effective small group teaching in the medical college at McGill University in Canada. The findings of this study suggested that small groups should include effective small group tutors, a positive group atmosphere, active student participation and group interaction, adherence to small group goals, clinical relevance and integration cases that promote thinking and problem-solving.^[10]

The overall objective of teaching in medical colleges is to have a competent medical graduate who should have a basic understanding of disease process, and sufficient skills to manage a case comprehensively. For years, together medical colleges in India are using the traditional approach to meet these objectives. However, to be true it all resulted in too much of theoretical facts, unnecessary repetitions, as well as failing of these graduates to apply or integrate knowledge.^[11]

Looking at the vast curriculum of MBBS, large number of students in a classroom and fix duration, it is not altogether possible to replace didactic methods of teaching completely with the small group teaching or case-based learning. However, an attempt can be made to identify topics which are of much clinical importance and which are been taught repeatedly in different departments or specialties. This will really prevent unnecessary repetitions as well as can avoid confusion to some extent which is sure to arise when a same topic or management is taught in different departments. Students will be able to learn more effectively if they are taught with case based approach and can be able to apply facts taught by pre- and para-clinical departments to understand the disease process as well as management.

Limitations

The method of assessment was not integrated and no multiple methods of assessment were used, subsequently.

CONCLUSIONS

Significant improvement in performance of students with their active participation was seen. It also proved the feasibility of implementation of ILP with few operational difficulties. Integrated teaching is perceived well with students as well as faculties.

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Conflicts of interest

There are no conflicts of interest.

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