Assessment of Attitudes of Medical Students and Faculty toward Integrated Teaching

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ABSTRACT

Background: Integrated teaching is defined as organization of teaching matter to interrelate or unify subjects frequently taught in separate academic courses or departments. A well-designed curriculum and good teaching methods will help students to understand the subject in depth leading to independent learning. Objectives: The objectives of the study were to study the effect of integrated teaching on clarity of perception and knowledge retention on the identified topic and to ascertain the response of students and faculty on integrated teaching. Methodology: A cross-sectional study was conducted in one of the medical colleges at Udaipur for 139 3rd-year part-I M.B.B.S students on the topic of antenatal, intra-natal, and postnatal care in July 2018. Both vertical and horizontal integration was adopted by involving the Departments of Physiology, Obstetrics, and Gynaecology, Community Medicine, Pediatrics, Medicine, and Psychiatry departments. The evaluation of better understanding and knowledge retention was done based on pre- and post-tests score consisting of multiple choice questions. The significance of pre- and post-score difference was confirmed through paired \( t \)-test. The feedback of students and teachers was assessed with Likert scale. Results: Overall 79.86% of the students agreed better inter-linkages of disciplines, about 67.63% felt better understanding of the topics through integrated teaching. All faculties agreed that it is a time saving approach with effective learning by students. The statistically significant difference of pre- and post-test marks implied the positive impact of the intervention. Conclusion: Integrated teaching increased the average score of participated students and it also reduced the variability of scores.

Key words: Integrated teaching, likert scale, medical education, post-test, pre-test

INTRODUCTION

Education in all branches of learning is undergoing rapid changes with utmost importance on quality improvement. Quality in education is possible with the warranted updation of curricula, its effective delivery mechanism, modernization of infrastructure in educational institutions, faculty upgradation, and balanced blending of curriculum with extracurricular activities. For decades, the process of learning focuses on traditional way of teaching. Traditional teaching takes place mainly through didactic lectures. Students are supposed to grasp the contents of the lectures and have to reproduce them on paper during their final examinations.\(^{[1]}\) Teaching medical curriculum is not an easy task as from student’s perception, they have to learn many subjects at a time and teachers are also burdened with a number of responsibilities such as administrative work, research work, and updating their knowledge; apart from their teaching and patient care work. This jet-setting pace of technical advancement has led to knowledge explosion but teaching has remained unchanged.\(^{[2]}\)
The traditional medical education system provides knowledge to the students in a defragmented and disjointed manner. Students are not able to develop sufficient skills to investigate, diagnose, and treat the patient as a whole. Students absorb information passively rather than actively. Students generally do not develop critical thinking, problem solving, and decision making skills.

Medical educationists realized that there was need for integrating pre, para, and clinical subjects. An integrated approach will improve the coherence of basic sciences with clinical subjects and thereby making the students to understand the concepts in depth.

Therefore, Medical Council of India (MCI) decided to incorporate the integration of medical curriculum for teaching undergraduate students with the specific objective of providing knowledge in a holistic manner rather than fragmented learning ways. It was understood that integrated thinking leads to individualize the learning in effective way. This will enable the students to learn the subjects in a coordinated manner.

At present, in a medical college, students are taught in different departments, subject-wise, without integration to interrelate or unify subjects, and these results in compartmentalization of medical education. “Knowledge Learnt in Isolation is Rapidly Forgotten.” To overcome, this problem MCI has suggested a number of innovative curricular strategies. One of them is the discipline-based teaching toward integrated teaching which would bridge the gap between theory and practice and hospital-based Medicine and Community Medicine.

Integration is defined as organization of teaching matter to interrelate or unify subjects frequently taught in separate academic courses or departments. In another definition, the term integration in education means coordination in the teaching learning activities to ensure harmonious functioning of the educational processes. Integration of teaching, research, and community services for effective teaching is in vogue in medical education system. However, interdepartmental integration to teach related topics by different departments is a new approach for effective delivery of the medical curriculum.

Integrated teaching involves the teaching of various subjects in a coordinated fashion so that the boundaries of the subjects are abolished and the teaching becomes system based rather than subject based. This makes learning process more holistic, systematic, and organized to students. The integration ladder is a useful tool for the medical teacher and can be used as an aid in planning, implementing, and evaluating the medical curriculum. The integration ladder has 11 steps from subject based at the bottom of the ladder to integrated teaching learning at the top as described by Harden.

Most of the areas of learning in medical education have interdepartmental relevance. While there are common areas for concerned departments, department specific knowledge is also important. Integrated teaching avoids repetition of common areas of teaching by different departments on one side and it enables students to have comprehensive learning of the topic on the other side.

In nutshell, instead of imparting knowledge on a topic in disintegrated manner, a particular topic can be taken by two or more departments by forming a coordinated integrated teaching program. It is similar to different systems in our body working in a coordinated manner to achieve homeostasis.

In India, some medical colleges have started integrated teaching program with student-centered and case-based learning to enhance clinical learning. The integrated teaching method provides multifocal benefits to the students, faculty, and the institution as a whole. In this institution, teachers teach medical students by the traditional method of teaching. By this method, students get segmented knowledge. To improve the quality of students, to have effective understanding and to develop diagnostic skills for a better patient care, integrated teaching is the need of the hour.

Integration can be of two ways. First is the horizontal integration in which two or more basic science departments teaching concurrently merge their educational identities. Second is vertical integration in which there is integration between disciplines traditionally taught in the different phases of curriculum. All these approaches are required to create interest as well as to have in depth knowledge of the subjects and to enhance critical thinking of the learners. There are four major components in it, namely:

1. Integration of experience
2. Social integration
3. Integration of knowledge and
4. Integration as a curriculum design.

Hence, this study was planned to assess the effect of introducing integrated teaching among the 3rd year part-I M.B.B.S students.

Objectives

The objectives of the study were as follows:

- To study the effect of integrated teaching on clarity of perception and knowledge retention of students on the topic of antenatal, intra-natal, and postnatal care and
- To ascertain the response of students and faculty on integrated teaching.

METHODOLOGY

A cross-sectional study was adopted to assess the impact of integrated teaching learning process. It was conducted in
July 2018 in one of the medical colleges at Udaipur among the 3rd-year part-I M.B.B.S students after obtaining approval from the Institutional Ethics Committee. The cluster sampling technique was used for the study. The 3rd-year part-I M.B.B.S class was selected as these students have already completed the basis science subjects and were exposed to clinical subjects. All students present on the days of study were included in the study. Prior informed consent was obtained from all the students of 3rd-year part-I M.B.B.S students. On the day of activity, out of 150 students 11 students were absent. Therefore, 139 students participated in the study on both the days.

A faculty development program was conducted for all the faculties of participating departments to take lectures for the students. A sensitization program was kept in relation to the importance of integrated teaching. After that the time table covering topics of different specialties and duration was finalized in successive meetings. The topic decided to be taken was antenatal, intra-natal, and postnatal care. It was scheduled to be taken for 2 consecutive days after obtaining prior permission from the Dean of the institute during the working hours. For this innovation, Department of Physiology, Community Medicine, Obstetrics, and Gynaecology, Pediatrics, Medicine, and Psychiatry were included in the study. The teaching program covering the department wise topics are depicted in Table 1. There were both vertical and horizontal integration, where pre-designed and pre-tested questionnaire was used to obtain the students response. The assessment was made using multiple choice questions (MCQs). For each correct answer one mark was assigned with no negative marking. The students were briefed about the project during the routine lectures. They were also informed that the score obtained in this project will in no way affect their regular internal assessment at college level. Thus, all efforts were made to minimize the Hawthorne bias.

In the beginning, a pre-test was kept having 20 questions which included MCQs. The lectures were taken as per planning with intermediate break in between for about 10–15 min. Again on the next day lectures were continued as per schedule.

At the end, a post-test was conducted having the same 20 questions. Furthermore, a feedback form was filled by 139 students and 9 faculties of different departments in relation to the importance of integrated teaching based on a five point Likert scale. The sequence of activities is also depicted in the flowchart, as shown in Figure 1.

The consistency in number of students giving correct answers was assessed using coefficient of variation (C.V) values of students giving correct answers to each MCQs.

$$C.V = (S.D/A.M) \times 100$$

Where C.V = Coefficient of Variation; S.D = Standard Deviation and A.M = Arithmetic Mean of the pre- and post-test scores obtained by the students. The paired “t” test was used to assess the impact of integrated teaching in relation to discipline oriented teaching using the formula, ($t = d/SE$) where d is the mean of difference of post and pre values and “SE” = sd/√n.

### RESULTS

The integrated teaching program was conducted for third MBBS part I students consecutively for 2 days. Out of

<table>
<thead>
<tr>
<th>Departments</th>
<th>Topics</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiology</td>
<td>Physiological changes during pregnancy</td>
<td>30 min</td>
</tr>
<tr>
<td>Obstetrics and gynecology</td>
<td>Clinical examination and management</td>
<td>1 h 15 min</td>
</tr>
<tr>
<td>Community medicine</td>
<td>Preventive aspects</td>
<td>1 h</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>Newborn care (part of postnatal care)</td>
<td>30 min</td>
</tr>
<tr>
<td>Medicine</td>
<td>Drugs used in pregnancy</td>
<td>30 min</td>
</tr>
<tr>
<td>Psychiatry</td>
<td>Postpartum psychosis</td>
<td>15 min</td>
</tr>
</tbody>
</table>

**Table 1: Topics covered for 3rd-year part-I M.B.B.S during integrated teaching**

![Flowchart showing sequence of activities for integrated teaching](image)

At the end, a post-test was conducted having the same 20 questions. Furthermore, a feedback form was filled by 139 students and 9 faculties of different departments in relation to the importance of integrated teaching based on a five point Likert scale. The sequence of activities is also depicted in the flowchart, as shown in Figure 1.
150 students enrolled for third MBBS 139 were present on both the days.

It is revealed from the table that the average marks of participated students have gone up from 10.81 to 15.62. It is worth mentioning that the standard deviation of marks registered a decline from 3.52 to 2.41. The reduction in coefficient of variation of pre-test and post-test scenario implied the improvement in consistency of performance of participating students after the intervention. The calculated \( P \)-value also confirms statistical significance in the average marks before and after the intervention [Table 2].

The average number of students correctly answering the MCQs increased from 98 to 119 after the conduct of integrated teaching module for the identified topics. \( P \)-value which was \(< 0.0001\) is statistically significant. The rise in average number of students answering the MCQs correctly and its reduced standard deviation after post-test indicate the increased consistency in performance of the students due to integrated teaching [Table 3].

It was found that about 121 (87.05%) of students strongly agreed that integrated teaching will help them to better retain the subjects as well as the same number also strongly agreed to have more topics to be taught in this manner based on a five point Likert scale. It was also noted that 111 (79.86%) students strongly reported that the integrated teaching method clears the concept and the same number of students also revealed that this method will help them to correlate their basic sciences knowledge with clinical subjects.

Among 139 students, 101 (72.66%) were of the opinion that by correlating the basic sciences with clinical subjects they can treat the patients well and hence the individual patients as well as the whole community will be benefitted. In the present study, 97 (69.78%) students strongly agreed that the knowledge obtained by this method will help them to do well in clinical practice, 94 (67.63%) students reported that this method will help them to understand the subjects in depth and 88 (63.31%) agreed that it enhances their intellectual curiosity [Table 4].

It was found that 9 (100%) faculty strongly agreed that the integrated teaching avoids repetition of the topics. It was also noted that 7 (77.78%) teachers strongly agreed that this method will enable the student to learn the topic as a whole and 6 (88.89%) teachers strongly agreed that it will help them to understand the subject better. The present study also revealed that about 5 (55.56%) faculty strongly agreed that because of this method the interaction was much better among the faculties of other departments and the same number also agreed that more topics should be taught to the students in this method for better learning [Figure 2].

**DISCUSSION**

The integrated teaching methodology is a holistic, methodical, and planned approach which is beneficial to provide more benefits to students, teachers, and the institution as a whole. Integrated teaching methods for undergraduate medical students have problems as well as prospects. The problems include:

i. Distribution of total M.B.B.S course (starting from 1st year to final year) across the different subjects limits the scope to have a wider range of topics for integrated teaching as the extent of receptability by students would be more for such topics taught by different departments within a phase, as most of the students prefer examination oriented studies

ii. Identification of topics for integrated teaching requires a multi-departmental approach and departmental dominance in the teaching system limits the scope for integrated teaching and

iii. Operational problems are faced for integrated teaching as the mindset is more oriented for departmental teaching by the faculty members.

The prospects of integrated teaching include:

i. Time saving as there will be repetition of common areas of a topic by different departments in discipline oriented teaching

ii. Integrated teaching is more theme oriented for students over discipline orientation and hence development of comprehensive thinking process in students and

iii. Better chance for retention of knowledge by the students over a time.

It was found that there was improvement in the mean marks of the students in the post-test kept at the end of the integrated teaching. Similar findings were shown in a study conducted by Mudiraj et al.\(^{[19]}\) in Sangli, Maharashtra and Kanwar et al.\(^{[20]}\) in Kota, Rajasthan, in which there was a significant improvement in the mean scores of students after post-test.

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**Table 2:** Difference in average marks of pre- and post-tests (\(n=139\))

<table>
<thead>
<tr>
<th>Test</th>
<th>Average marks</th>
<th>Standard deviation</th>
<th>Coefficient of variation</th>
<th>(P)-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>10.81</td>
<td>3.52</td>
<td>32.56</td>
<td>(&lt;0.0001)</td>
</tr>
<tr>
<td>Post-test</td>
<td>15.62</td>
<td>2.41</td>
<td>15.43</td>
<td></td>
</tr>
</tbody>
</table>

**Table 3:** Comparison of number of correct responses of 20 multiple choice questions by participating students in pre-test and post-test

<table>
<thead>
<tr>
<th>Test</th>
<th>Number of students</th>
<th>Mean±S.D</th>
<th>Coefficient of variation</th>
<th>(P)-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>139</td>
<td>97.90±18.34</td>
<td>18.73</td>
<td>(&lt;0.0001)</td>
</tr>
<tr>
<td>Post-test</td>
<td>139</td>
<td>119.35±13.97</td>
<td>11.71</td>
<td></td>
</tr>
</tbody>
</table>

*\(P<0.05\) is significant
From the students feedback, it was found that nearly 87.05% of students agreed that the integrated teaching was helpful for better retaining the subject and the same percentage of students also agreed that they would like to have more topics to be taught in an integrated manner. Similar findings were shown in a study conducted by Anjenaya et al.\textsuperscript{23} at Navi-Mumbai in which about 86% students felt that this method helped them to retain the subject better. In a study conducted by Khan,\textsuperscript{9} 98% students felt that integrated teaching should be implemented for topics from the beginning of the curriculum itself. It was reported that 79.86% of students agreed that this method was helpful for them to correlate their basic sciences knowledge with their clinical knowledge. Similar findings were shown in a study conducted by Kumari et al.,\textsuperscript{22} in which 82% agreed that integrated teaching improved the performance in clinics. In the present study, 62.59% students agreed this method would help them to do better patient care while in a study conducted by Shah and Jain\textsuperscript{23} concluded that 68.75% students agreed that the knowledge and skills learn from integrated teaching method would help to do better clinical practice.

From the teacher’s feedback questionnaire, it was found that 100% of faculty stated that the integrated teaching method was a time saving approach as repetition was avoided. The study conducted by Khan\textsuperscript{9} concluded that 75% of faculty agreed integrated teaching method as a time saving approach. The study showed that only 55.55% of the faculty agreed to take more topics by this method while in a study conducted by Kate et al.,\textsuperscript{12} 75% of faculty was agreeable to take topics by this teaching method.

**CONCLUSION**

The integrated teaching increased the average test score and decreased the score variability of the participated students significantly. It helped to have better conceptual clarity and higher knowledge retention by students. It also helped the students to correlate the basic sciences with clinical subjects. For faculty, it helped to save teaching time by avoiding repetition.

**RECOMMENDATIONS**

- In spite of all the challenges the integrated teaching methodology can be introduced in medical undergraduate teaching.
- For the integrated medical curriculum to gain interdisciplinary acceptance, the curriculum should be designed by involving all related medical disciplines, including both basic medicine and clinical medicine. Initially, it can be started for few topics and later on it can be further extended to cover more topics of the syllabus.
- The curriculum committee plays an important role in promoting this type of medical education.
- Above all, integrated teaching can succeed only through a strong official institutional policy.

**LIMITATIONS**

- The faculty from the pharmacology could have been included instead of medicine for better teaching of the drugs used in pregnancy.
• The students were only informed about this new teaching method in the form of written informed consent. Appropriate sensitization program for the students could not be carried out
• The SWOT analysis of the program has not been done
• There was only limited preparatory work done by involving all the concerned departments.

AUTHORS’ CONTRIBUTIONS

Dr. Dilip Kumar L: The selection of the topic, manuscript writing, and ethical permission related work were done by Principal author. Dr. Nitesh Mangal: The overall coordination with other departments in organizing the teaching as per the schedule was done. Dr. Meet M. Chauhan: The work related to the results and manuscript reading was done. Dr. Medha Mathur: The framing of pre- and post-test questionnaires. Dr. Piyushkumar C Parmar: Played a role in writing discussion part.

REFERENCES