RESEARCH ARTICLE

The Comparison of Traditional and Integrated Teaching to Assess Learning and Academic Outcome of First year MBBS Students

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Abstract

Background: Many new trends are being adopted in the medical education to achieve outcome-based teaching with integrated teaching method, is one of them. The students trained with such an integrated curriculum make more accurate diagnosis than did students trained in conventional curriculum.

Objectives: To compare the efficacy of traditional and integrated teaching methods and to analyze their perception towards integrated teaching.

Methods: It is a cross over study with first year students as subjects. Two groups of students were taught the same topics by different methods i.e., integrated teaching and traditional methods. Procedure was repeated for another topic while the student groups were switched over between the 2 methods Efficacy of methods was compared by comparing MCQ based tests scores.

Results: Students taught by integrated method scored better than those in the traditional lecture (p = 0.03 for lecture 1 & p=0.08 for lecture 2). Students found the integrated teaching interesting and useful. But they preferred traditional teaching for exam preparations.

Conclusion: Integrated teaching is an impressive and effective tool to teach core concepts as well as clinically applicable concepts. Concepts need to be kept confined to the syllabus.

Keywords: Concepts, Efficacy. Perception,

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Introduction

The National Medical Commission (erstwhile MCI) has stressed upon the CBME – based curriculum that should stimulate student's interest and inculcate drive to learn more. Various integrated medical curricula have been adopted by many medical schools all over the world to ensure wholesome approach rather than a fragmented one which in turn encourages conceptual learning in medical education.[1]

There are many newer trends in medical education that have been undertaken all over the world which include self-directed learning, problem-based learning, integrated teaching and community orientation. It is very inspiring to note that after having taught an integrated teaching class, students score better in comparison to only traditional teaching.2 The students trained with such integrated curriculum make more accurate diagnosis than did students trained in conventional curriculum.[3]

Integrated teaching could be a solution to achieve required outcomes in a holistic way. Integrated teaching methods need to be compared with the traditional methods in terms of efficacy and acceptance from students. This will help us to learn the best ways to impart teaching and improve ourselves.

Aims

To compare the efficacy of traditional and integrated teaching method and investigation.

Objectives

1. To evaluate 1st MBBS students learning outcome by comparing traditional and integrated teaching method
2. To asses and compare their perception of conceptual thinking of the topic

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Conflict of interest: None

Methods and Materials

Sample size calculation:

Formula for finite population size

$$n = \frac{\left(\frac{Z_{1-\frac{\alpha}{2}} + Z_{1-\beta}}{2}\right)^2 * \left(\sigma_t^2 + \sigma_i^2\right) * N}{d^2 * (N-1) + \left(\frac{Z_{1-\frac{\alpha}{2}} + Z_{1-\beta}}{2}\right)^2 * \left(\sigma_t^2 + \sigma_i^2\right)}$$

At 5% level of Significance $Z_{1-\frac{\alpha}{2}} = 1.96$

At Power 80% $Z_{1-t} = 08416$

σ_t = Standard deviation of Marks by Traditional method = 5

= Standard deviation of Marks by Integrated method = 4

d = mean difference in marks of both the method =1

$$n=\frac{(1.96+0.8416)^2*(5^2+4^2)*150}{1^2*(149)+(1.96+0.8416)^2*(5^2+4^2)}$$

$$= 48271.12/470.81 = 102.52 \approx 103$$

15% non-response rate and 10% No follow up

Final sample size n = 103 + 25% of 103 = 103 + 25.75 = 128.75 ≈ 129

After obtaining the Ethical approval, the authors briefed the students about the activity and the aims of the study being undertaken. Students were requested to sign a written informed consent for the same.

The total strength of first year MBBS class is 150 students. Although we needed only 129 students, it was unfair to leave 21 students without teaching. So, we invited all 150 students to participate in the study. 8 students were absent on the day of lecture 1. So only the remaining 142 students were included in the study. The same 142 students were considered for the next lecture also. The scores of remaining 8 students, if present, were not included in the analysis. The students were divided into 2 groups as per odd & even roll numbers. The topic planned for teaching was Adrenal gland: Glucocorticoid hormones (Lecture 1). The even roll number group was imparted traditional lecture and the odd roll number group was imparted the integrated lecture by the faculties of Anatomy, Physiology & Biochemistry.

A second integrated lecture (Lecture 2) was planned some weeks later. The topic was- Ascending tracts of the spinal cord. The even roll number group that had earlier received traditional lecture only were taught by the integrated teaching. The odd roll number group that earlier received the integrated teaching was now taught via didactic/traditional lecture.

In this way all students were exposed to both methods.

An MCQ based pre-test was administered to all students prior to the lectures to ascertain whether there is significant difference in the level of knowledge of the two groups of students. A post-test (MCQ based) was administered to the students after both the lectures to assess the efficacy of the teaching method. Both pre-test & post-test were administered via Google forms.

To analyze the perception of students towards integrated teaching, a feedback was collected via a Google form questionnaire.

Data processing and analysis plan

Data was recorded in Microsoft excel sheet and processed using statistical software as Epi Info 7.2. The mean scores of pre-tests and post-tests of all lectures were compared using paired t-test. The post test scores of traditional lectures & integrated lectures were compared using independent t-test. P-value of less than 0.05 was considered to establish statistically significant difference between the 2 groups.

Results

A total of 142 students participated in the study.

Table 1 shows the responses of students to the feedback questionnaire.

72.3% of students felt integrated teaching is easy to understand. 78.4% stated that integrated teaching is more effective in developing interest in the topic. The majority of students found the integrated teaching more useful for understanding the applied aspects of the topic (75%) and for covering the information useful for multiple choice questions (77.7%). For the same questions, the traditional teaching had a smaller number of affirmative responses.

In some of the questions students favored traditional teaching more than integrated teaching. 83.1 % said that traditional teaching is also easy to understand. The majority of students felt that traditional teaching is better for getting a better score in exams (81.8%), it covers exam questions effectively (79.7%) and it covers all relevant competencies (80.4%). For the same questions, the integrated teaching had a smaller number of affirmative responses.

Table 2 shows the comparison of pre-test & post-test scores of lecture 1 in both methods/formats of teaching, traditional as well as integrated. Students scored better in the post-test as compared to the pretest, in both formats of lecture. The difference in the pre & post-test scores was statistically significant (p=0.0000) for both groups.

Table 3 shows the comparison of mean scores of pre-tests & post-tests after traditional and the integrated lecture. The mean scores of pre-tests for both groups were not statistically significant (p= 0.83). The mean score of the post-test after integrated teaching was significantly better than that in the traditional lecture (p=0.000).

Table 1: Perception of students about integrated teaching versus traditional teaching

Question	Traditional	Integrated
Teaching is easy to understand	83.10%	72.3%
Teaching clears the concept as it covers applied aspects	76.4%	75.0%
Teaching develop interest in topic	62.8%	78.4%
Teaching method covers examination questions effectively	79.7%	60.1%
Syllabus taught by teaching method is easy to remember	68.9%	68.9%
Teaching method help in good scoring in exam	81.8%	72.3%
Teaching the content of topic covered are more than required for exam	73.6%	55.4%
Teaching help in covering all competencies	80.4%	62.2%
Teaching better to cover Multiple choice question	58.1%	77.7%
Teaching helps to cover topic from all aspects	60.8%	73.6%

Table 2: Comparison of pre-test & post test scores in lecture 1 in traditional & integrated methods Paired t test

Format of lecture	Pre-test score (Mean ± SD)	Post-test score (Mean ± SD)	t-Statistics	P-value
Traditional teaching	49.25±10.25	53.41 ± 8.24	3.94	0.00000*
Integrated teaching	48.87 ± 10.45.	56.42 ± 8.46	6.26	0.00000*
All scores in percentages. * = statistically significant				

Table 3: Comparison of scores between traditional & integrated teaching for lecture 1 unpaired t test

Format of lecture	Traditional teaching (Mean ± SD)	Integrated teaching (Mean ± SD)	t-Statistics	P-value
Pre-test score	49.25 ± 10.52	48.87 ± 10.45	0.2159	0.83
Post-test score	53.41 ± 8.24	56.42 ± 8.46	2.1476	0.03*
All scores in percentages. • * = statistically significant				

Table 4: Comparison of pre-test & post test scores in lecture 2 in traditional & integrated methods paired t test

Format of lecture	Pre-test score (Mean ± SD)	Post-test score (Mean ± SD)	t-Statistics	P-value
Traditional teaching	48.19 ± 8.97	55.85 ± 8.49	8.95	0.00000*
Integrated teaching	45.96 ± 8.46	58.64 ± 10.38	12.77	0.00000*
All scores in percentages. * = statistically significant				

For lecture 2 also, in both formats of lecture, students scored better in the post-test as compared to the pretest. Table 4 shows the mean scores of both formats for lecture 2 in the pre-test & post-test.

Table 5 shows the comparison of mean scores of post-tests of traditional and the integrated lecture. The pre-test scores in both the groups were similar and not statistically significant (p= 0.13). The even roll number batch, who took the integrated lecture had a higher mean score than the odd roll number batch who took the traditional lecture. But the difference in the means was not statistically significant (p= 0.08).

Discussion

In our study we have found a mixed response from the students about integrated teaching. Students have found it interesting and useful for clinical application of topics that are taught. But on the questions of integrated teaching being useful for syllabus completion and theory exams, they found the traditional teaching more advantageous.

Table 5: Comparison of scores between traditional & integrated teaching for lecture 2 unpaired t test

Format of lecture	Traditional teaching (Mean ± SD)	Integrated teaching (Mean ± SD)	t-Statistics	P-value
Pre-test score	48.19 ± 8.97	45.96 ± 8.46	1.5239	0.13
Post-test score	55.85 ± 8.49	58.64 ± 10.38	1.7531	0.08
All scores in percentages. * = statistically significant				

Like our study, Prasad et al (2015) collected feedback of students about integrated teaching where 35.4% of students reported that integrated teaching is lengthy and boring. Majority opinion was that integrated teaching is better suited for small group discussion, workshops, and symposia or out of classroom teaching.[4]

Similarly, Behera et al (2017) in their cross-sectional study also reported that 48% of students found the integrated lectures too lengthy and time consuming but useful for concept building and clinical application of knowledge.[5]

Kolhe et al (2018) analyzed first MBBS students' perception about the horizontal integrated teaching. Majority of students agreed to the fact that integrated teaching is better for clarity of concept. But almost 50% students also reported that it is lengthy and time consuming.[6]

To assess the efficacy of teaching methods, we made the students undertake tests before and after the class. The results of the pretest were similar for both the groups in both the lectures, thus ensuring that the students had similar level of knowledge.

In both, lecture1 & lecture 2, the post-test results of integrated teaching were better than that of traditional teaching. Only the difference in lecture 1 post-test scores was statistically significant (p=0.03). In lecture 2, the difference in post-test scores was not statistically significant (p=0.08). Nevertheless, these results point out that integrated teaching is more effective for concept building and ease of learning. Other authors have also found similar results, not only in the first year curriculum but also in 2nd and 3rd year MBBS curriculum according to the following examples:

Kate et al (2010) compared the efficacy of vertical integration versus traditional teaching. The student group who underwent integrated teaching, scored significantly higher, than those undergone only traditional teaching. The students agreed that the method helps them to correlate the various aspects of diseases. Few students felt that the method was more time consuming.[7]

Gaddam et al (2015) conducted a case control study to compare the efficacy of traditional & integrated teaching for the first year MBBS curriculum. The students in the case (integrated) group scored significantly higher as compared to those receiving traditional teaching.[8]

In the cross-sectional study by Behera et al (2017), the authors compared the effect of integrated teaching with traditional didactic lectures among the students of 3rd semester MBBS. The group who received integrated teaching, scored significantly better than the didactic lecture group when a test was conducted on the topics taught.[5]

Chandrashekhar et al (2020) compared problem-based learning by traditional theory lecture, with integrated lecture (vertical) based upon the same clinical condition. They administered pre-test & post-test to both classes. The scores of pre-tests were similar, but the scores of post-tests were significantly better in the integrated lecture group.[9]

So, the integrated teaching definitely appears better in terms of concept building and gain of knowledge as indicated by the scores of the students. The main negative perception about integrated teaching is about too lengthy lectures and vast syllabus to cover.

The post-test scores of the integrated teaching lecture are only slightly better than the traditional teaching. This could be because the syllabus is not integrated for all the three subjects. So, when faculties from different subjects teach, the contents of lectures are not always correlated. So, it becomes difficult for the students to assimilate the knowledge.

Secondly, if the topic to be taught is difficult then also the students find it difficult to learn it by either method.

Conclusion

Integrated teaching is an impressive and effective tool to teach core concepts as well as clinically applicable concepts. This new method of teaching should be embraced as it stimulates interest and desire to learn in the students. To prevent the session from being too lengthy, concepts need to be kept confined to the syllabus and delivered in concise manner.

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