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The Comparison Of Traditional And Integrated Teaching To Assess Learning And Academic Outcome Of First MBBS Students.

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ABSTRACT

Many new trends are being adopted in the medical education to achieve outcome-based teaching. The students trained with such integrated curriculum make more accurate diagnosis than did students trained in conventional curriculum. To compare the efficacy of traditional and integrated teaching method and to analyze their perception towards integrated teaching. It is a cross over study with 1st year students as subjects. Two groups of students were taught the same topics by integrated and traditional methods. Efficacy was compared by taking MCQ based tests. Students taught by integrated method scored better than those in the traditional lecture. Students found the integrated teaching interesting and useful. But they preferred traditional teaching for exam purpose. Integrated teaching is an impressive and effective tool to teach core concepts as well as clinically applicable concepts. Concepts need to be confined to the syllabus.

Keywords: Integrated, 1st MBBS, perception, concepts, efficacy.

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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. Implementation of an integrated curriculum in its true sense is really not easy and appears to be a monumental task. 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. The students trained with such integrated curriculum make more accurate diagnosis than did students trained in conventional curriculum [2].

Integrated teaching could be a solution to achieve required outcomes in a holistic way. Hence the aim of this study was to develop, implement, and evaluate an integrated teaching module. Temporal coordination of the basic sciences, along with correlation of learned topics to clinical settings is done.

Aim

To compare the efficacy of traditional and integrated teaching method

Objectives

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

METHODS AND MATERIALS

This is an interventional study. Students were imparted both the traditional lectures and horizontally integrated lectures in a cross over manner.

Study subjects

1st year MBBS students from batch 2020-2021.

Inclusion criterion for study

- Student of first year MBBS
- Willingness to participate in the study.

There were no exclusion criteria.

The students were briefed about the activity and the aims of the study being undertaken. Students were requested to sign a written informed consent for the same.

Sample size calculation

Formula for finite population size

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

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

At Power 80% $Z_{1-\beta} = 0.8416$

σ_t = Standard deviation of Marks by Traditional method = 5

σ_i = 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

A total of 150 students were divided into 2 groups as per odd & even roll numbers. The topic planned for teaching was Adrenal gland: Glucocorticoid hormones. 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 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 the methods.

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

To analyze the perception of students towards integrated teaching, 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. Descriptive statistics were used for demographic data. The mean scores of pre-tests and post-tests of odd roll numbers & even roll numbers were compared using paired t-test. The post test scores of traditional lectures & integrated lectures were also compared using unpaired 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% students felt integrated teaching is easy to understand. 78.4% stated that integrated teaching is more effective in developing interest in the topic. Majority 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. Majority 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 mean scores of both formats for lecture 1 (Glucocorticoid Hormones). Students scored better in the post-test as compared to the pretest, in both formats of lecture, traditional as well as integrated. The mean score of even number batch in the pre-test was 49.25 ± 10.25 . The mean score of the post-test for the same batch was 53.41 ± 8.24 . The difference in the scores was statistically significant ($p=0.0000$). Similarly, the mean score for the pretest in the odd roll number batch, (integrated lecture) was 48.87 ± 10.45 and that in the post-test was 56.4 ± 8.46 . Again, the difference in the scores was significant ($p=0.0000$).

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 was 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 ($p=0.000$).

For lecture 2 (Ascending tracts) 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. The mean score of odd number batch in the pre-test was 49.25 ± 10.25 . The mean score of the post-test for the same batch was 53.41 ± 8.24 . The difference in the scores was statistically significant ($p=0.0000$). Similarly, the mean score for the pretest in the even roll number batch, (integrated lecture) was 48.87 ± 10.45 and that in the post-test was 58.64 ± 10.38 . Again, the difference in the scores was significant ($p=0.0000$).

Table 5 shows the comparison of mean scores of post-tests after 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 ($p= 0.08$).

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 (paired t test)

LECTURE 1 – GLUCOCORTICOID HORMONES				
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 of traditional & integrated classes (unpaired t test)

LECTURE 1 - GLUCOCORTICOID HORMONES				
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 (paired t test)

LECTURE 2 - ASCENDING TRACTS				
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				

Table 5: Comparison of scores of traditional & integrated classes (unpaired t test)

LECTURE 2 - ASCENDING TRACTS				
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				

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.

Similar to 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 of students also opined that integrated teaching is better suited for small group discussion, workshops, and symposia or out of classroom teaching (bedside, laboratory) [3].

Similarly, Behera et al (2017) also reported that 48% of students found the integrated lectures too lengthy and time consuming in their cross-sectional study. Similar to our study, this study also found that students perceive the integrated teaching to be useful for concept building and clinical application of knowledge [4].

Kolhe et al (2018) conducted a cross sectional study among first year MBBS students to analyse the 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 [5].

To assess the efficacy of teaching methods, we made the students undertake tests after the class. Pre-test were also conducted before the lectures. 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 (Glucocorticoid hormones) & lecture 2 (Ascending tracts), 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 [6].

Gaddam et al (2015) compared traditional & integrated teaching for the first year MBBS curriculum. The students in the case (integrated teaching) group scored significantly higher as compared to those receiving traditional teaching [7].

Behera et al (2017), 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 [4].

Chandrashekhar et al (2020) compared problem-based learning by traditional theory lecture, with integrated lecture (vertical) based upon the same clinical condition. The scores of pre-tests were similar, but the scores of post-tests were significantly better in the integrated lecture group [8].

Even though the post-test scores were statistically significant in lecture 1, the difference in the 2 mean scores was only of approximately 3 marks (53.41 ± 8.24 & 56.42 ± 8.46). The situation with post-test scores of lectures 2 are similar (55.85 ± 8.49 & 58.64 ± 10.38). Similar results are also present in the studies mentioned above. So, even though integrated teaching is good for concept building, it is not helping the students very much in scoring better marks. The reasons could be threefold. Firstly, the books and the syllabus for MBBS is not integrated. Students may face difficulty in looking up for topics in their books. Secondly, the integrated teaching is imparted by different teachers of different subjects. Often, teachers are unable to interconnect with each other's lecture content while simultaneously trying to cover all essential information related to that topic in their subject. Thirdly, most topics in medical science are lengthy. Trying to teach all information about a single topic in a single setting makes the lecture too long and heavy. So, ultimately students are not capable of retaining the information.

CONCLUSION

Integrated teaching is an impressive and effective tool to teach core concepts as well as clinically applicable concepts. Concepts need to be confined to the syllabus and delivered in concise manner. Integrated teaching should be planned with smaller topics and in interactive settings to gain maximum advantage of this method.

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