

Amalgamation of Clinical Case Scenarios with Integrated Teaching for First-Year MBBS Students

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Abstract

This complete enumeration, comparative, before-and-after study (without controls) was conducted on 60 first-year MBBS students (30 females and 30 males) at a municipal medical college in Maharashtra, India. The outcome studied was the difference in cognitive domain scores after attending didactic lectures (by a pre-test) and integrated teaching with case scenarios (by a post-test). The participants included all first-year MBBS students, who gave written informed consent after the purpose and procedure of the study was explained to them. Didactic lectures on anaemia were followed by a pre-test and integrated teaching with case scenarios, conducted by the same set of teachers. Next, the post-test was administered using a questionnaire that was identical to that of the pre-test. The difference between the overall pre- and post-test scores was highly significant ($Z=5.966$; $p<0.00001$). The differences between the pre- and post-test scores for female ($Z=3.463$; $p<0.00053$) and male students ($Z=3.636$; $p<0.00027$) were also significant. In the pre-test, the mean score (out of 20) was 8.40 ± 2.92 (95% CI: 7.36–9.44) and 8.07 ± 2.55 (95% CI: 7.16–8.98) for females and males, respectively and the gender difference in scores was not significant ($Z=0.466$; $p=0.641$). In the post-test, the mean score (out of 20) increased to 11.40 ± 3.74 (95% CI: 10.06–12.74) and 10.53 ± 2.69 (95% CI: 9.57–11.49) for females and males, respectively and the gender difference in scores was not significant ($Z=1.034$; $p=0.301$). The study results reveal that blending integrated teaching with case scenarios significantly increases cognitive domain scores.

Keywords: Anaemia, Clinical case scenarios, Integrated teaching, Physiology.

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INTRODUCTION

Integrated teaching (IT) involves linking different aspects of the same topic, which is routinely taught by different academic departments as parts of separate subjects [1]. Horizontal integration pertains to the fusion of teaching in two or more subjects that are taught in the same phase of the curriculum, while vertical integration is the blending of subjects taught in the different phases of the curriculum [2].

IT saves time and efforts of teachers by synchronizing dissemination of information on various subjects [3], provides learners with a holistic outlook and enables them to comprehend new perspectives [4], and precludes the patchy attainment of disjointed and segregated bits of information in isolation and converts knowledge into convenient tools for learning new know-how [5], and enables applied learning and constructive clinical reasoning [6, 7]. The challenges of teaching physiology in an integrated curriculum have been reported [8-12] and these include defining the core curriculum, sequencing content, faculty interest and expertise, and interdisciplinary integration.

The Medical Council of India has recommended IT between traditional subjects with clinical relevance to achieve both horizontal and vertical integration in different phases of the Bachelor of Medicine, Bachelor of Surgery (MBBS) course with the intention of providing medical students with holistic learning perspectives [13]. The implementation of IT has become widespread after the realization that the traditional modes of teaching pre-clinical subjects as water-tight compartments without cross-links and clinical applications frequently fail the students when they proceed to clinical clerkships [14, 15]. By and large, the topics selected for IT ought to be interdisciplinary in nature and portray basic science concepts [16] and should be part of the “must know” component in the curriculum [17].

Incorporating actual or hypothetical clinical scenarios while teaching first-year medical students along the lines of clinical scenarios will generate interest in a specific topic, assist in establishing a link among concepts, enhance long-term retention, facilitate recall of prior knowledge when necessary [18], bridge

the gap between academic knowledge and its practical application [19], and bring about deeper comprehension among students [20]. Case scenarios that extend over multiple topics enable the students to generate inter-concept linkages that boost retention of knowledge [21] and development of a holistic perspective [22]. It has been reported that students trained with integrated curriculum were more accurate in diagnosis of the clinical disorders than those trained in a conventional curriculum [23].

Early clinical exposure can enable first-year medical students to identify applied aspects of basic sciences and to expand on that knowledge as they progress into clinical education [20]. Inability to correlate the basis of clinical problems could lead to difficulty in the diagnosis and treatment of a patient [24] and the quality of health care delivered is directly related to the quality of teaching in medical colleges [25]. In recent years, though radically revised curricula are operational globally [26, 27], the majority of medical colleges in India still follow the traditional discipline-based, teacher-centred, and examination-oriented approach. The SPICES (Student-centred, Problem-based, Integrated, Community-based, Elective, Systematic) Model has been advocated for use in curriculum planning or review, to overcome curriculum-related problems and for steering teaching methods and assessment [28].

The objective of this study was to compare the cognitive domain scores obtained by first-year MBBS students after traditional didactic lectures with that obtained after integrated teaching that comprised clinical scenarios.

MATERIALS AND METHODS

This complete enumeration, comparative, before-and-after study (without controls) was conducted in September-October 2018 at Rajiv Gandhi Medical College, a municipal medical college located in Kalwa, Thane, Maharashtra state, India. The participants included all first-year MBBS students, who gave written informed consent. Those students who did not give written informed consent or those who were absent during the educational interventions or pre-test or post-test were excluded.

The purpose of the study was explained to first-year MBBS students and written informed consent was obtained from those willing to participate in the study. Didactic lectures on anaemia were followed by a pre-test comprising ten questions (two marks per

question; total 20 marks). After the pre-test, IT with case scenarios was conducted on the same topic by the same set of teachers. Later, the post-test was administered using a questionnaire that was identical to that of the pre-test. The outcome studied was the difference in cognitive domain scores after attending didactic lectures (by a pre-test) and after attending IT with case scenarios (by a post-test).

The data were statistically analyzed using EpiInfo Version 7.0 (public domain software package from the Centers for Disease Control and Prevention, Atlanta, GA, USA). Data were presented as mean and standard deviation (SD). The 95% confidence interval (CI) was presented as: [Mean-(1.96)*Standard Error] - [Mean+(1.96)*Standard Error]. Standard error of difference between two means was computed. Statistical significance was determined at $p < 0.05$.

RESULTS AND DISCUSSION

A total of 60 students (30 females and 30 males) participated in the study.

Overall Scores

The difference between the overall pre- and post-test scores was highly significant ($Z=5.966$; $p < 0.00001$). The differences between the pre- and post-test scores for female ($Z=3.463$; $p < 0.00053$) and male students ($Z=3.636$; $p < 0.00027$) were also significant. The present study revealed that the mean marks obtained by students after an integrated teaching approach was more than the marks obtained by students after the conventional teaching methods. Other Indian studies [29, 30] have corroborated the findings in this study. The overall mean scores (out of 20) in the post-test (10.97 ± 3.26) were significantly higher ($Z=5.966$; $p < 0.00001$) than that obtained in the pre-test (7.63 ± 2.86). Similar results have been obtained by other researchers [31, 32].

Gender Differences

In the pre-test, the mean score (out of 20) was 8.40 ± 2.92 (95% CI: 7.36 - 9.44) and 8.07 ± 2.55 (95% CI: 7.16 - 8.98) for females and males, respectively but the gender difference in pre-test scores was not significant ($Z=0.466$; $p=0.641$). In the post-test, the mean score (out of 20) increased to 11.40 ± 3.74 (95% CI: 10.06 - 12.74) and 10.53 ± 2.69 (95% CI: 9.57 - 11.49) for females and males, respectively but the gender difference in post-test scores was not significant ($Z=1.034$; $p=0.301$) (Fig-1).

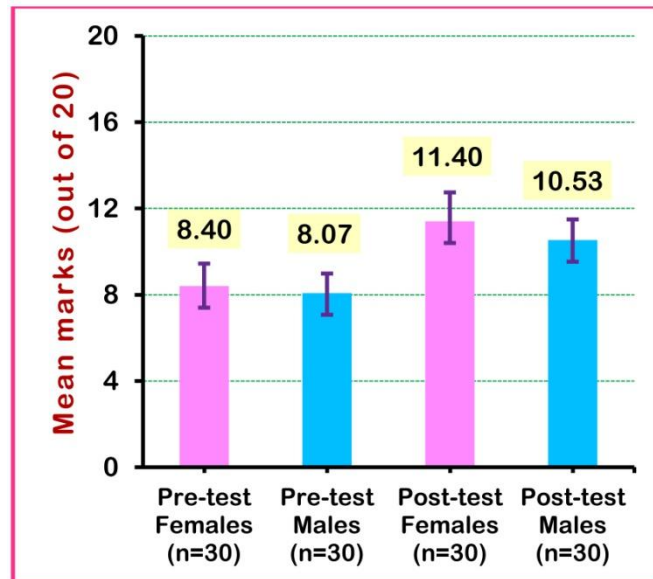


Fig-1: Gender-wise mean scores in pre- and post-tests Vertical bars indicate 95% confidence intervals

In the pre-test, the maximum score (out of 20), third quartile, median, and first quartile were marginally higher for female students. In the post-test, the maximum, third quartile, median, and first quartile and

minimum scores of female students exceeded that of their male counterparts and the median score for male students (10) was equal to the first quartile for female students (Fig-2).

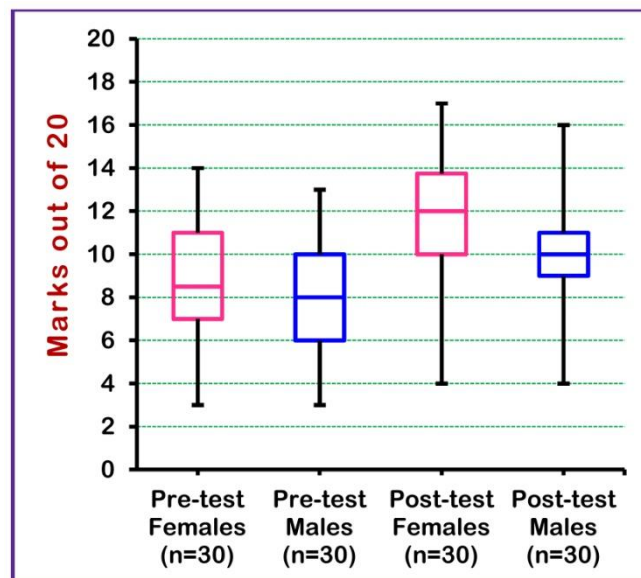


Fig-2: Boxplot of gender-wise pre- and post-test scores

In the present study, female students obtained higher mean scores in pre- and post-tests but the differences were not significant. Gender differences in learning styles have been reported by other researchers [33, 34]. Teachers who are aware of the multiplicity of learning styles can boost student motivation and performance by establishing suitable learning approaches to match the learning styles of students [35].

Limitations

This study was conducted on one batch of 60 first-year medical students. Follow-up could not be

done to ascertain the retention of cognitive domain skills among the participants due to the time restrictions for the first-year MBBS course, A larger study using similar educational interventions would be necessary in order to generalize the results.

CONCLUSION

The study results reveal that blending integrated teaching with case scenarios significantly increases cognitive domain scores. The gender differences in pre- and post-test scores were not significant. In spite of time constraints in the teaching

schedule for first-year medical students, it is feasible to conduct integrated teaching and impart early clinical exposure to first-year MBBS students. A larger study would be required in order to generalize the results.

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