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Medical Education

Small-groups Application-based Learning Approach (SABLA): from Pilot to Curricular Change in Physiology

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Introduction

In most Medical schools in India including ours, teaching is discipline-based and Physiology is mostly taught as didactic lectures. Important topics are then reinforced through tutorials in small groups to ensure active learning and understanding. However, due to various reasons these tutorials end up as another teacher-driven didactic session to small groups of students thereby defeating the purpose. Informal feedback from Students about the tutorials showed that they perceived this form of teaching as less interactive and less engaging. Also, there was lack of uniformity of information provided during tutorials by different instructors to different sub groups of students of the same class. Medical education literature recognizes that learning is more effective when the learning environment includes instructional methods that require learners to actively gather and apply knowledge. Hence, an effort was made to develop, implement and evaluate the effectiveness of an instructional strategy of Small-groups Application-based Learning Approach (SABLA) that actively engages learners in small groups cascading to larger groups for shared learning and uses clinical case scenarios to motivate students to learn with understanding the physiological concepts after realizing the relevance of its application to clinical practice.

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Methodology

The annual intake of our institution is 150 for MBBS course with students gaining admission from CBSE, ICSE and various State Board syllabus streams.

As part of piloting the implementation of our SABLA educational strategy, concepts in endocrinology were taught by traditional didactic lectures to 150 first MBBS students followed by tutorials in small groups of 50 students where clinical case scenarios were used to promote interest through application of basic science concepts actively to engage learners by using questions that trigger discussion on application of concepts and eliminate instructor variability at the same time. All 150 students in groups of 50 attend tutorial sessions twice a week for 2 hours. During the monthly faculty meeting, the lesson plan for each of the tutorial session was planned. This ensured

uniformity in conducting the SABLA session by instructors deputed to conduct these sessions.

The students were further divided into groups of 7-8 members in each group. Application exercises that were administered contained case scenarios of endocrinological disorders. Cases were generally written as problems that provide the student with the history or background of a patient and the clinical situation of the patient. Additional supporting information such as vital signs, symptoms, and laboratory results are also provided. This was followed by a series of questions on physiological basis for the clinical features, diagnosis and management.

One instructor who was oriented to this method of teaching was present during the session. Students were encouraged to discuss and arrive at an answer to each of the questions posed in the case scenario. Resources such as text books were given for reference to each group.

At the end of each case scenario discussion in small groups which lasted for 20 minutes, a member was randomly picked from one of the groups and was asked to share the group's answer to the larger Tutorial group. The students of the other groups in the class were encouraged to ask questions for which the members of the presenting group had to answer. The instructor then gave feedback, cleared misconceptions if any and summarized the case.

Each tutorial session of 2 hours duration could accommodate 2-3 case scenario discussion in the above teaching learning format. Student perceptions about the process were collected by a pre-validated questionnaire (construct validity of items shows Cronbach's alpha value of 0.9). The questionnaire contained 4 items related to the new format of teaching that students had to respond toon a 5 point Likert scale. The 4 items were on enhanced learning due to the new method, on availability/creation/ existence of enjoyable learning environment in small groups, on perception about usefulness and on their wanting an extension of this method to other topics in physiology.

To demonstrate effectiveness of the new method in improvement in learning, student performance was assessed by marks scored in the subsequent examination. The subsequent internal assessment for 60 marks had one third questions from topics covered by this new method where application based learning was used instead of traditional tutorials method (20 marks), another one third from topics covered by lectures followed by traditional tutorials (20 marks) and the remaining one third from topics covered by didactic lectures alone (20 marks). The marks obtained by students in topics taught by new SABLA method was compared with that of marks obtained in topics taught by lectures followed by traditional tutorials and topics taught by didactic lectures alone.

Results

The intervention was introduced among 150 first MBBS students in the department of Physiology. Of the 150 students, 145 students (96.67%) responded to the questionnaire. Half (52%) of the students felt that working within small groups facilitated their learning. A few (25%) perceived that the good (non-threatening) learning environment enhanced their learning and working with friends in groups was an enjoyable experience. A large number (69**%**) found this method extremely useful. The consensus measure among the students for the question on wanting to extend this method to other topics in physiology was the greatest (83.95%) indicating good acceptance by students.

During subsequent internal assessment, students had attempted all the questions from topics taught by this application based approach delivered in small groups. The scores obtained for questions covered by this method were significantly higher (12.80±2.04) than those that were covered by lectures followed by traditional tutorials(11.39±1.55) and didactic lectures alone (10.85±1.02). Student t test done to compare the marks scored in the two groups revealed significantly higher marks in topics taught by application based approach as compared to the traditional tutorials ($p<0.05$). This indicates that knowledge retention and cognitive performance is improved by this form of active learning. Students

found it easier to remember and write answers for questions covered by the new method during examinations.

Student t test also revealed that marks scored in topics covered by didactic lectures alone was significantly lower than those covered by didactic lectures followed by tutorials, be it traditional or application based approach. The results also suggest that tutorials in addition to lectures enhance student performance. Student perceptions gathered by questionnaire and student performance evaluated by analysis of marks scored in internal assessment revealed that Application based learning approach works and the learning process is appreciated by students.

Discussion

The small-group application based learning approach (SABLA module) is built on adult learning principles (1) and social learning theories. Here the students through a small group process had to identify and state the physiological basis of clinical features of a disease to the larger group. This small-group process creates a non-threatening (good) active learning environment where the answer by the presenting student represented the group's consensus rather than that of an individual student in a typical tutorial where a possible wrong answer by an individual student could lead to that student being ridiculed by either the teacher or laughed at by other students. Enhanced learning attributed to working in small groups is similar to the improved student engagement with course content team-based learning session where the majority of the students felt that Team based Learning supplementation enhanced their understanding of course content and believe that it will help them perform better in their exams (2). Presentation by the small group to the larger group also helps to reinforce physiological concepts already taught by traditional lectures and to promote application of these concepts of basic science in clinical scenarios. The introduction of questions in the case scenarios that were predesigned in the lesson plan tilts the balance towards students from a teacher driven to teacher facilitated learning process. The case scenarios also facilitated the MCI recommended early clinical exposure to medical students during their MBBS course and helped to apply the basic science information into clinical context. The idea was to convert the student from passive receiver of information to active participants more involved in the learning process. Results of studies using case based learning have revealed that students valued the inclusion of these resources in the form of case vignettes, which they have identified as having contributed to their understanding of the subject area and inclusion of case vignettes was found to have had an impact on student interest (3). The observation that students had attempted all the questions taught by this method and scored relatively higher indicates improvement in learning and better retention of information. The results also suggest that tutorials in addition to lectures enhance student performance as compared to lectures alone. The undergraduate students perceive the SGTs as a necessary component of their learning and in spite of time constraints, expressed that they effectively supplement lecture classes and improves their performances (4). Student perceptions gathered by feedback questionnaire and student performance evaluated by analysis of marks scored in internal assessment revealed that application based learning approach used during tutorials is found to be more useful than traditional tutorials. This is also found in another study where following completion of an application-based pharmacy focused biostatistics course, students had more confidence in their ability to perform tasks associated with interpretation of statistics and medical literature (5).

Conclusion and impact of the study

Application based learning approach, a participatory form of educating students where the teacher creates conditions so that students can take charge of their own learning within small groups, moves the learner beyond the role of passive listener and note taker and thereby promoted active learning. The greater amount of time spent in solving a single case under supervision might have also contributed to the better performance seen with application based learning approach.

As this pilot study generated the evidence that it is effective and do-able, this format of tutorials teaching has now been extended to other topics in physiology. It also got recognition at the University level with the Board of Studies recommending this method for Tutorials in their curriculum document.

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