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A Comparative Study to assess effectiveness of interactive lecture classes and small group discussion sessions for first year MBBS students

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A B S T R A C T

Competency based medical education (CBME) is skill and outcome based teaching methodology where a student learns a set of measurable competencies for early clinical exposure. There is an increasing interest in competency based medical education (CBME) due to the developments and changes in medical education and many medical schools have begun to apply it recently. The present study was conducted to compare the performance of students' following traditional interactive lecture classes and small group discussions learning sessions. Multiple studies on medical education need to be conducted to make implementation of this new curriculum a success. The present study was conducted in a Basaveshwara Medical College of Chitradurga in the Department of physiology to compare the performance of students' following traditional interactive lecture classes and small group discussions learning sessions. Ten SGD classes and ten interactive lecture classes was included in this study. The project was conducted in time span of 2months first September 2021 to 30 October 2021. For both lectures and SGD sessions seven days ahead of the commencing of classes the students were provided with all study material (competencies, objectives, power point presentations, learning methods, references to be used) in an email address created for the total batch of students, but only 10 student representatives were included in the group and they shared all information with rest of the class. Horizontal integration with other departments was done as far as possible as per new directives in the medical curriculum of National medical council. There was no difference in performance between interactive lecture classes and SGD sessions in Pre-test sessions (42.07±20.23 vs.44.03±09.05). Students performed better in post-test sessions (50.39 ± 19.41 vs. 63.38 ± 12.79; p value < 0.001) as compared to pre-test sessions in interactive lecture classes. Students also performed better in post-test sessions (55.09±23.5 vs.58.29±22.15; p value < 0.001) as compared to pre-test sessions in SGD sessions. Performances of students were better in SGD sessions as compared to interactive lecture classes in post-test assessment. Small group discussion sessions were more effective than interactive lecture classes for teaching Physiology to undergraduate medical students and for implementation of competency based medical education (CBME). Successful implementation of SGD sessions requires a greater number of teachers as compared to interactive lecture sessions.

Introduction

Competency based medical education (CBME) is skill and outcome based teaching methodology where a student learns a set of measurable competencies for early clinical exposure. There is an increasing interest in CBME due to the developments and changes in medical education and all medical colleges have begun to apply CBME as its mandatory to replace traditional old curriculum with this new approach of CBME.

Inspite of ample resources on CBME, there are limited studies on its implementation. This study will try to demonstrate improvement in the performance of students using CBME as a teaching tool over the traditional structured method (TS). Changes in educational thinking and in medical program accreditation provide an opportunity to reconsider approaches to undergraduate medical education. Current developments in competency-based medical education (CBME), in particular, present both possibilities and challenges for undergraduate programs. CBME does not specify particular learning strategies or formats, but rather provides a clear description of intended outcomes. This approach has the potential to yield authentic curricula for medical practice and to provide a seamless linkage between all stages of lifelong learning.

At the same time, the implementation of CBME in undergraduate education poses challenges for curriculum design, student assessment practices, teacher preparation, and systemic institutional change, all of which have implications for student learning. Some of the challenges of CBME are similar to those that can arise in the implementation of any integrated program, while others are specific to the adoption of outcome frameworks as an organizing principle for curriculum design. This article reviews a number of issues raised by CBME in the context of undergraduate programs and provides examples of best practices that might help to address these issues. (Prober and Khan, 2013; Englander *et al.*, 2013)

Competence, Competency, and Competency-Based Education

Competence

Competence means the acquisition of sufficient knowledge, psychomotor, communication and decision-making skills, and attitudes to enable the performance of actions and specific tasks to a defined level of proficiency (2019). Describing it in the professional clinical context Adkoli (2020) defined it as "the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values and reflection in daily practice for the benefit of the individual, and the community being served." Whereas the words competency and competence are often used interchangeably in the literature, the term competency is used for the skill itself and competence as an attribute of the performer's ability to perform the skill.

Advantages of Competency-Based Education

The advantages of competency-based education include:

The primary advantage is that the focus is on success of each participant by ensuring they achieve competencies required in the performance of their jobs. Other advantages include:

Being focused on learning for mastery of specific skills, it builds their confidence in being ready for the job.

Training time is used more effectively and efficiently as the trainer is facilitator of learning as opposed to a provider of information.

In addition, Banerjee (2020) have also highlighted the beneficial role competency-based education can play in improving Global Health particularly in resource-poor settings. This is because competency-based education is more focused and tailored to achieving competencies the graduates would need to

discharge their professional duties as health care professionals. This forces the curriculum planners to discuss and identify what competencies are needed to address the priority health care needs of the country. Once the list of competencies needed for health care of the people is arrived at, it helps academic policy makers and planners to consider whether some of these can be "task shifted" to other health care professionals rather than loading only doctors. Furthermore, competency-based education besides ensuring clinically competent professionals also focuses on leadership and thereby helps them to be job-ready to function effectively in the health system which in resource-poor settings badly needs capable leadership inputs to ensure policy formulation, effective management, and the direction of interdisciplinary teams.

Multiple studies on medical education need to be conducted to make implementation of this new curriculum a success. The present study was conducted in a Basaveshwara Medical College of Chitradurga in the Department of Physiology to compare the performance of students' following traditional interactive lecture classes and small group discussions learning sessions.

Materials and Methods

The study was conducted in the Department of Physiology, Basaveshwara Medical College of Chitradurga. Competency based medical education provides an effective outcome-based strategy where various domains of teaching including teaching learning methods and assessment form the framework of competencies are included. Ten SGD classes and ten interactive lecture classes was included in this study. The study project was conducted in time span of 2months first September 2021 to 30 October 2021.

For both lectures and SGD sessions seven days ahead of the commencing of classes the students were provided with all study material (competencies, objectives, power point presentations, learning methods, references to be used) in an email address created for the total batch of students, but only 10 student representatives were included in the group and they shared all information with rest of the class. Horizontal integration with other departments was done as far as possible as per new directives in the medical curriculum of National medical council (NMC). A topic for SGD sessions and lectures has already been decided by NMC in the new curriculum implemented in 2019. So we followed the same guideline for SGD and lecture sessions.

Inclusion Criteria

All students enrolled in the first MBBS program were included in the study. According to the competencies of the new curriculum interactive lecture and SGD classes were arranged with specific educational objectives.

The topics for the study for SGD classes included application of basic Physiological concepts in clinical settings through case-based scenarios following the competencies. Cases were constructed for SGD. Guiding questions were focused to make the students learn about relevant physiological concepts.

The students were informed about the classes ahead of time. Information regarding the topics and the mode of teaching, learning and assessment were provided.

Interactive Lecture Sessions

Each lecture class lasted for 40 minutes and was made interactive as far as possible**.**

Assessment of lecture session

In the pre-test MCQs (Multiple Choice Questions) test was given, students were asked to fill up their answers in Google sheet before the session. In the post test session students had to answer 10 MCQs (to be answered in 10 minutes) for a maximum of 10 marks. The MCQ assessments were carried online

using Google form and scores were released immediately in the end of the class. No negative marking was done. Pre and post MCQs were the same set of questions. IL and SGD groups received same set of MCQs.

SGD Sessions

The students were divided into ten batches according to their roll numbers, and each batch was provided with a facilitator during the session. During the SDL session, the students had to go through each topic independently. The facilitator for each group followed the students' discussion closely and encouraged critical thinking.

Flow chart of SDL session

No of students =100.

Divided into 10 batches according to roll number.

Each batch having 10 students.

The contents of the session were divided into 10 subdivisions and each member was allotted 1 subdivision to study. So ten students got same topic to study.

These ten then discussed their understanding among themselves.

Following this they returned to their original batch and explained what they had learnt to the rest nine batchmates.

Jig-Saw pattern was followed to make the SGD sessions more interactive. Students were organized into jigsaw groups with 10 participants in each group. The topic to be learned in the session was divided into 10 parts. Each member of the group was assigned to a different reading material and 5 minutes was allowed for this reading. A facilitator was present to facilitate the group movement and discussions. Group members then joined members of other groups assigned to the same reading piece to form expert groups with the goal to become experts in the topic. Peer assistance was provided to them. The expert group members interacted for 10 minutes. The students themselves decided how to present the information.

Finally, trainees left their expert groups and returned to their original groups with a task to 'piece together' and solve the overall outcome of the problem based on their respective expert topics. For the next 25 minutes, they taught each other about their specific reading material. The session lasted for 40 minutes. Methods of assessment of SGD session were similar to the traditional lecture classes. The facilitators selected for both SGD and lecture classes were faculties of physiology department. The facilitators received training from the medical education unit (MEU) which provided them effective guidelines for successful implementation of the new curriculum implemented by NMC. Students' feedback was collected following the sessions and students were provided with feedback following each session. Feedbacks from facilitators were also taken following the sessions. In this way, we did both direct and indirect assessment in the present study.

Statistical Analysis

SPSS version 16 was used to analyse the data. Unpaired T- test was used to compare the two groups and paired T-test to compare the outcome of intervention in the two groups.

Results and Discussion

The present study was conducted in a Basaveshwara Medical College of chitradurga on two hundred undergraduate medical students. According to feedback provided by the students they were more satisfied with the SGD sessions as they could interact freely in small groups with their facilitators and were easily able to clear their doubts regarding different problems. According to the teachers the students participated and interacted in SGD sessions better as compared to interactive classes.

Table.1 Results of MCQ Assessments of Students in Pre-and Post-Test Session in Interactive Lecture Sessions

Pre-Test (Percentage of Marks) Mean ±SD	Post Test (Percentage of Marks) Mean ±SD	P value
42.07±20.23	55.09±23.5	< 0.001**

Table.2 Results of MCQ Assessments of Students in Pre-and Post-Test Session in SGD

Pre-Test (Percentage of Marks) Mean ±SD	Post Test (Percentage of Marks) Mean ±SD	P value
44.03±09.05	58.29±22.15	< 0.001**

Table.3 Results of MCQ Assessments of Students in Pre-Test Session in Interactive Lecture classes and SGD Sessions

Pre-Test (Percentage of Marks) Mean ±SD	Pre Test (Percentage of Marks) Mean ±SD	P value
42.07±20.23	44.03±09.05	< 0.001**

Table.4 Results of MCQ Assessments of Students in Post-Test Session in Interactive Lecture classes and SGD Sessions

Post-Test (Percentage of Marks) Mean ±SD	Post Test (Percentage of Marks) Mean ±SD	P value
55.09±23.5	58.29±22.15	< 0.001**

It was also easier to monitor students in SGD sessions, but teachers had to put much more effort to the SGD sessions as compared to interactive lecture sessions to make these sessions effective.

There was no difference in performance between interactive lecture classes and SGD sessions in Pre-test sessions (42.07±20.23 vs.44.03±09.05). Students performed better in post-test sessions (50.39 ± 19.41 vs. 63.38 ± 12.79; p value < 0.001**) as compared to pre-test sessions in interactive lecture classes (Table 2; Figure 2). Students also performed better in post-test sessions (55.09±23.5 vs.58.29±22.15; p value < 0.001**) as compared to pre-test sessions in SGD sessions. Performances of students were better in SGD sessions as compared to interactive lecture classes in post-test assessment.

The present study conducted on hundred first year undergraduate medical students demonstrated that performance of students in SGD sessions were significantly better as compared to interactive lecture sessions. We took multiple assessments for our students and they could obtain 50 % marks in all post-test sessions in both methods of teaching.

In the new curriculum implemented by NMC there is decreased emphasis on passive didactics lectures. The new curriculum advocates teaching only one third of the curriculum in lectures.

All competencies need assessments and students have to get atleast 50% marks to be declared as competent and results need to be entered in log books and certified by faculties. In the present study

we were able to achieve this objective in both the teaching methods used (Khilnani *et al.,* 2020; Banerjee, 2020). The small group activities require the use of multiple faculty facilitators. The present medical curriculum advocates active learning, and this requires more involvement of faculties and availability of faculties in more numbers may pose a huge challenge. Our SGD sessions were more interactive, and we could effectively engage the learners in these sessions but required more number of faculties (Pai *et al.,* 2014; Zia *et al.,* 2016).

A study conducted by Nirvani Goolsaran *et al.,* (2019) was aimed to assess the effectiveness of the jigsaw method as a method of small group learning. Results indicated that there was significantly more improvement in tests scores with the jigsaw method. We also used jigsaw method in SGD sessions.

The objective of a study conducted by Phillips *et al.,* (Bharati Bhandari and Bharati Mehta, 2017) was to evaluate the effectiveness of the jigsaw technique. The study was also conducted to engage students in a clinical controversy exercise and assess student engagement during the procedure. A quiz was taken individually and was used to measure the effectiveness and this method of teaching was observed to be significantly effective. In the present study we have observed positive effects of the jigsaw technique on SGD sessions.

An interventional study was conducted among ninety-six students studying in the third semester, in the academic year 2014 by Devi *et al.,* (2016) the study centre was Pondicherry Institute of Medical Sciences. The study was conducted by the Department of Physiology. Lectures and SGD sessions were conducted for the students simultaneously. The sessions were assessed by using pre-test and post-test MCQs as assessment tool. Students' feedbacks were also collected. Feed back from students revealed that SGD classes were more interesting and helped in better understanding of the topics; stimulated reasoning; and also helped in the active learning process. The findings are similar to the present study.

A biomedical researcher is interested in explaining the cause-and-effect relationship between different variables; predicting an event, while the educational researcher would like to mostly explore new interventions and describe those interventions to gain insight into the problem (Adkoli, 2020). So in the present study we tried to implement jigsaw in SGD sessions and study the effects in implementation of CBME.

Small group discussion sessions were more effective than interactive lecture classes for teaching microbiology to undergraduate medical students and for implementation of competency based medical education. Successful implementation of SGD sessions requires a greater number of teachers as compared to interactive lecture sessions.

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