

Is Small Group Teaching among the Under Graduate Dental Students Really Effective?

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ABSTRACT

Background: Lecturing to a large group is the usual mode of teaching in most of the dental colleges in India. Only little research has been done to examine the effectiveness of the different teaching styles. Effective teaching is required to produce more efficient dentists and hence an effort was made to compare two different teaching styles among the dental students.

Objective: To compare the effectiveness of large group lectures with small group teaching among the undergraduate students of pharmacology.

Setting and Design: Department of Pharmacology, Kasturba Medical College, Mangalore. Randomized cross over design to cover two topics in pharmacology.

Methods: Ninety seven students studying for the second year dental course were randomized into one large group and four small groups. Each group was taught two topics in pharmacology,

either by lectures to a large group or by the small group teaching method, with each group crossing over after the first session with the other topic. At the end of each class, the students were tested by using objective questions.

Statistical Analysis: The mean marks of each group were compared by using the Student's t test.

Results: The mean marks of all the students in the four sub groups of group B, who were taught in small groups [BS = 43], 12.12 ± 2.2 , $P = 0.02$, were found to be higher than the mean marks of the students in the large group A [AL]. The mean score of the four small groups of group A [AS = 44students], 12.30 ± 1.7 , $P = 0.01$ was higher than that of group B in the large lecture group [BL].

Conclusion: The results of this study provide evidence that small group teaching is more effective and that it facilitates a better recollection of the topics than the large group lecture technique.

Key Words: Large Group, Lecture, Small group discussion, The students' preference of teaching

KEY MESSAGE

- Small group teaching is a more effective teaching method than lecturing to a large group.
- Ninety six percent of the students preferred small group teaching.

INTRODUCTION

The impact of teaching plays a major role in the learning outcomes in higher education. This is more important in generating effective professionals. Its effectiveness depends on how much has been received by the students or the target audience. There are different methods of teaching; lectures, tutorials, seminars, by having a panel of experts, brainstorming, videotapes, class discussions, small group discussions, case studies, role playing etc. Among the medical and dental colleges in India, lecturing to a large class is the usual mode of teaching and small group teaching is only limited to the bed side clinics. Lecturing or large group teaching is one of the oldest forms of teaching. Whatever their reputation, lectures are an efficient means of transferring knowledge and concepts to large groups. They can be used to stimulate interest, explain concepts, provide core knowledge and to direct student learning. However, they should not be regarded as an effective way of teaching or encouraging higher order of thinking among students.

According to some research projects such as Tennessee's STAR, reducing the size of the class will produce many benefits for the teachers and the students [1]. Because of the small numbers, the students will receive more individual attention, the teachers will be able to manage the students better, discipline problems are likely to be less and there is more interaction between the students and the teachers. When the teacher spends less time for managing the students, more time can be utilized in teaching [2]. Studies also show that promoting interactive sessions is equally important than just teaching to a mere small size of students [3]. There is only very little research material that is available, which examines the effectiveness of the different teaching styles among the dental students in India. There are also disadvantages of small class such as need to employ large number of teachers, investment on infrastructure like construction of new class rooms may be a major issue especially in developing countries. An effort was made to check whether there was a requirement for a change in the teaching method in the education system in our country,

which depends mainly on the large group teaching and to know about the students feedback on the teaching methods.

OBJECTIVE

To compare the effectiveness of large group lectures with small group teaching method among the second year undergraduate students of dental surgery and also to know the student preference among the two methods of teaching.

SUBJECTS AND METHODS

Study setting: Department of Pharmacology, K.M.C. Mangalore.

Design: Cross over design to cover two topics in pharmacology

Sample size: Ninety seven students

Subject selection: All the students who were present on the day of the study were offered the opportunity to participate in the study. Participation in the study was voluntary.

Ethical considerations: The study was carried out after obtaining the permission of the institutional ethical committee [Chairperson, Institutional Ethics Committee, Kasturba Medical College, Mangalore, Letter dated SEP 2009]. The previous sessional examination scores of the students were recorded after obtaining the informed consent from the students.

Pharmacology is taught during the second year of the four year course for undergraduate students in dental surgery, in India. There were 97 students during the current study, in the year 2008–2009. They were stratified into four groups according to the mean marks which were obtained [Maximum marks=100] during the previous two sessional examinations. There were 19 students in the group who scored less than 49 marks, 33 students who scored 50-59 marks, 30 students with 60-69 marks and 15 who obtained 70 marks or more. These students were further randomized into two groups [A and B] by using computer generated random numbers. Each group was taught two topics in Pharmacology viz calcium metabolism and hormonal contraceptives. When the large group was being taught calcium metabolism [AL, n = 46], the other group [BS, n = 43] was randomly divided into four groups, each not of more than 15 students and they were taught the same subject in small groups, four teachers [4]. All the teachers who participated in the study had a comparable experience of teaching dental students and had the same designation. The teachers were calibrated by predeciding the contents of both the chapters which had to be taught and by using the same teaching material. The duration of the class was 40 minutes. After one week, the students who were taught in the large groups were randomized into four small groups as was done earlier [AS, n = 44] for small group teaching and the students in the small groups were combined into one large group [BL, n = 43] for the lectures. The topic which was taught was hormonal contraceptives. The same teachers who taught topic 1 [Calcium metabolism] in first session were assigned to teach topic 2 [Hormonal contraceptives] to similar groups in the second session after crossover for 40 min. At the end of each of the classes, the students were tested with objective type of questions which were prepared by a teacher who was not involved in the study. There were 15 objective type questions and one mark was awarded for each correct answer. The maximum marks were for 15. The mean marks of each group were calculated and compared. All the students were also requested to give their opinion about the usefulness of the two methods of teaching.

STATISTICAL ANALYSIS

The Student's t test was employed to compare the mean marks of the different groups. The data was analyzed by using the SPSS, version 14. P values which were <0.05 were considered to be statistically significant.

RESULTS

There were 89 students who were available for the first class [calcium metabolism]. The students in group A were taught calcium metabolism by lectures [AL]. The mean marks scored by the students [AL=46students] in the objective type of written test which was conducted at the end of the lecture were 10.96 ± 2.7 . The mean marks of all the students in the four sub groups of group B who were taught in small groups [BS=43], 12.12 ± 2.2 , were found to be higher than the mean marks which were scored by the students in the large group lectures [AL]. This difference between the groups, AL and BS was found to be statistically significant [$p=0.02$]. The mean marks of the students were also calculated after the next class [hormonal contraceptives, n=87]. During this session, the students who earlier were taught by [AL] the lecture method were now taught in four small groups [AS= 44students]. The mean score of this group was 12.30 ± 1.7 . The students in the other group, BS, now crossed over to the large group lecture B [BL=43]. Their mean score was 11.21 ± 1.8 , which was less than the marks which were scored by the students in the small group A [AS] 12.30 ± 1.7 . This difference was [AS and BL] also found to be statistically significant, $p=0.01$ [Table/Fig-1]. The differences between the mean marks of the students in the two large group lectures [AL= 10.96 ± 2.7 , BL= 11.21 ± 1.8] and the mean marks of the students in the two small groups [AS= 12.30 ± 1.7 , BS= 12.12 ± 2.2] were found to be statistically not significant, the p values being 0.63 and 0.67 respectively [Table/Fig-2].

The mean marks which were obtained by the same set of students after the large group lecture A [AL] and by the small group teaching [AS] were also compared. The difference in the marks [AL= 10.96 ± 2.7] [AS= 12.30 ± 1.7] between these groups was found to be statistically significant [$p=0.02$]. The difference in the mean marks which were scored by the other group of students in the large lecture [BL= 11.21 ± 1.8] and by the small group teaching

Topic	Large Group lecture		Small group teaching	
	Group [n]	Marks mean \pm SD	Group [n]	Marks mean \pm SD
Calcium metabolism	AL [46]	10.96 ± 2.7	BS 43[43]	$12.12 \pm 2.2^*$
Contraception	BL [43]	11.21 ± 1.8	AS [44]	$12.30 \pm 1.7^*$

[Table/Fig-1]: Distribution of number of students and Marks [Mean \pm SD] obtained by students in Large Group lectures and small group teaching AL = Lecture group A, BL = Lecture group B, BS = Small subgroups of Group B, AS = Small subgroups of Group A, * $p < 0.05$.

Groups	AL	BL	AL	BS	AL	BL
		10.9 ± 2.7	11.2 ± 1.8	10.9 ± 2.7	12.1 ± 2.2	10.9 ± 2.7
	BS	AS	BL	AS	AS	BS
	$12.1 \pm 2.2^*$	$12.3 \pm 1.7^*$	11.2 ± 1.8	12.3 ± 1.7	$12.3 \pm 1.7^*$	$12.1 \pm 2.2^*$
t value	2.2	2.6	0.48	0.42	2.64	1.96
p	0.02	0.01	0.63	0.67	0.02	0.05

[Table/Fig-2]: Comparison of Marks [Mean \pm SD] of different groups AL = Large group lecture A, BL = Large group lecture B, BS = Small subgroups of Group B, AS = Small subgroups of Group A, t = Student test, p = Probability, * $p < 0.05$.

[BS=12.12±2.2] was also found to be statistically significant, $p=0.05$ [Table/Fig-2].

When the students were asked their opinion about the usefulness of the two teaching methods, 50.57% of the students strongly agreed and 45.97% agreed that small group teaching was more useful. Three [3.44%] of the students could not decide about the teaching methods.

DISCUSSION

It is often suggested that lectures may not be the best way to impart knowledge to students [5]. Though a majority of the medical and dental schools in India depend upon lecturing to a large group of students to impart knowledge, medical schools in U.S.A and Europe adopt small group teaching in medical programmes [6]. Researchers have found that there are many advantages in teaching students in small groups. Some even say that "smaller classes are a key ingredient of student success" [7].

The present study too demonstrates that small group teaching is more effective than large group lectures. The effectiveness of small group teaching was demonstrated in the teaching of two different topics and similar significant results were obtained even when the groups crossed over from large group lectures to small group teaching. There was also no significant difference between the two lecture groups [BL and AL]. Statistically significant differences were also observed when the marks which were scored by the same group of students in the large group lecture were compared with the marks scored by the students in the small group teaching but in a different topic [AI and AS, BL and BS]. There was no statistically significant difference in the mean marks of the students in the two large group lecture classes [AI and BL] or in the two small groups [AS and BS].

The results from this study provide evidence that small group teaching is more effective and that it facilitates a better recollection of the material which is taught, than by lecturing to a large group, in the undergraduate teaching of Pharmacology among the students of dental surgery.

Not many similar studies are available for comparison among the dental colleges in India. Many of the studies which are available in the literature compare problem based learning [PBL] in the small groups with that in large group lectures. However, small group discussions are said to promote a deeper approach to learning than the large group lecture methods. Small groups provide more opportunities to ask questions [8]. A study in which problem oriented small group [POSG] sessions were compared to the large group lectures, the students in the small groups were found to perform better [9]. Curtis et.al have also found that the students who were taught in small groups scored higher marks as compared to the scores in the subjects which were taught by the large group lectures [10]. Hofer et.al also concluded that small group teaching facilitated high quality results [11]. However, there are some studies which have not positively favoured small groups [12, 13]. White et.al. found that small group teaching was only as effective as the large group lectures approach and not superior to it [14]. Xailers et.al. have found that small group teaching when supplemented by large group lectures, appeared to increase the student's knowledge of the subjects which were being taught [15].

This study also throws some light on the student preferences about the two methods of teaching. More than 95% of students felt that small group teaching was a more useful method than large group

lectures. In a similar study, according to 86% of the students, small group discussions [SGD] helped them to understand the topics of discussion very well whereas 8% of the students said that SGD did not help [16].

Probably the small group study is more effective because the students are less distracted when in small groups, they remain focused, can easily get their doubts cleared and also there is more student-teacher interaction. There are many advantages of having a small class, but there are also disadvantages when implementing small classes in a professional college. Small group teaching programmes require more qualified teachers. As most of the professional colleges have only adequate teachers to conduct large group lecture classes, these institutions need to hire more teachers. Employing more teachers increases the expenditure of the teaching institutions. Reducing the class size is said to be the single most expensive item of the education reform [17].

CONCLUSION

In summary, this study provides evidence that small group teaching is a more effective method of teaching Pharmacology as compared to teaching the students of a large group. This trial also shows that the students prefer small group teaching to large group lectures. However, a larger study involving multiple colleges and other dental subjects is required before this finding can be generalized to other dental colleges in India.

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DECLARATION ON COMPETING INTERESTS:

No competing Interests.

Date of Submission: **Apr 25, 2011**
Date of Peer Review: **Jun 01, 2011**
Date of Acceptance: **Jun 01, 2011**
Date of Publishing: **Aug 08, 2011**