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RESEARCH ARTICLE

Role of various small group teaching methods in enhancing learning among medical undergraduate students – A comparative study

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ABSTRACT

Background: Small group teaching (SGT) has grown in popularity in medical education as it offers a dynamic setting for learning and it is also learner centered. **Aim and Objectives:** The aim of the study was (1) to compare the effectiveness of various SGT methods in enhancing students learning and (2) to assess the students perception on different small group learning methods. **Materials and Methods:** Sixty second year MBBS students who gave informed consent were divided randomly into five small groups of 12 each namely buzz groups, fishbowl structure, crossover group, circular group, and horseshoe group. The individual facilitator was priorly trained and assigned to each group to discuss the given clinical scenario and motivate them. Pre- and post-assessments were done based on multiple-choice questions. Students perception on different small group learning methods was evaluated based on five-point Likert scale. Data analyzed in SPSS software version 23 using paired *t*-test and ANOVA with Scheffe (*post hoc*). **Results:** There was a significant difference in pre-test and post-test mean scores in each group ($P < 0.01$) and also in the mean gain between the groups ($P < 0.01$). Gain in performance in post-test was high in circular group (4.08) followed by fishbowl (3.50) and crossover (3.50). Small group tutorial teaching was agreed on by students and the faculties as more effective. About 88% in horseshoe, 85% in fishbowl reported that their technique improved their confidence level. About 93% of buzz group and 82% of horseshoe group students were able to identify their competency gaps. **Conclusion:** Case scenarios should be included in all teaching-learning sessions to help to generate interest. Future avenues for research analysis of different SGTs and student-teacher perceptions across the educational continuum including undergraduate, postgraduate, and continuing professional education can be initiated.

KEY WORDS: Small Group Teaching; Physiology Tutorials; Student Feedback

INTRODUCTION

In the era of explosion of information, students are expected to master a large amount of academic load in a short duration making the entire learning process painful, instead of delight. The global trend for rationalizing teaching-learning is gathering momentum toward dynamic mindset instead of traditional didactic lectures. Innovative curriculum developments look afresh to work out solutions and ensure that tomorrow's medical students will receive the need-based education.[1,2]

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Small group teaching (SGT) has grown popularity in medical education as it offers a dynamic and collaborative setting for learning[3] and it is learner centered with group of students (5–12) joining in discussion of a particular topic

or a clinical scenario.[4] Problem-based learning (PBL) relies almost entirely on SGT methods and many schools with more traditional curricula have incorporated a significant number of SGT sessions into undergraduate programs for medical students.[5]

There are many factors that affect student performance, of which some are in the hands of teacher. Among these, motivation is the most relevant, and other factors that foster cooperative learning are feedback and individual participatory activities.[6]

SGT methods that foster learning and motivate active participation are buzz groups, fishbowl structure, crossover group, circular group, and horseshoe group.

Buzz Group

In this method, students (10–12) sit in a circular form and 2–3 participants discuss a specific question or issue to come up with many ideas in a short time. Since the small groups produce buzz sound while discussing, this method is known as buzz group. Buzz groups enable students to express their difficulties which they would have been unwilling to reveal to the whole class.[7]

Fish Bowl Method

The usual fishbowl configuration has an inner group discussing an issue or topic while the outer group listens, looking for themes, patterns, soundness of argument, or mark the group behavior checklist to give feedback to the group on its functioning. The inner and outer group roles may then be reversed.[7]

Crossover Groups

Students are divided into subgroups (three groups of four students). Discussion about the given topic or case scenario takes place. Later, they are split up to form new groups (four groups of three) in such a way as to maximize the crossing over of information. A color or number coding in the first groupings enables a simple relocation.[7]

Circular Questioning

The students sit in a circle and one member formulates a question relevant to the theme or problem and puts it to the person opposite to him. The questioning and answering continue clockwise around the group until everyone has contributed.[7]

Horseshoe Group

Groups are arranged around tables with each group in a horseshoe formation with the open end facing the front. In this, everyone can see everyone else, the teacher is placed so as to lead the discussions easily, and later the teacher can back off so as to allow the group to discuss issues themselves.[8]

The Department of Physiology in Karpagam Faculty of Medical Sciences and Research has been conducting weekly tutorials throughout the 1st year MBBS course and this is used to supplement the conventional lectures. The physiological facts with clinical relevance can be well explained. There has been widespread increase in the interest in PBL curriculum though problems exist in its complete implementation.[9]

The promotion of critical thinking in problem solving exercises can be executed efficiently by SGT. However, despite the increased use of SGT in medical education, relatively little is known about the different SGT methods and students perception about it. Hence, we need to assess the effectiveness of various SGTs from the students view and analyze how they perceive them as a means of the teaching-learning process.

Aim and Objectives

The aim of the study was as follows:

1. To compare the effectiveness of various SGT methods in enhancing students learning
2. To assess the students perception on different small group learning methods.

MATERIALS AND METHODS

This cross-sectional study was carried out at Karpagam Faculty of Medical Sciences and Research, Coimbatore, after obtaining Institutional Ethical Committee clearance. A tutorial topic from the already covered portion in lecture classes was chosen and the students were instructed to prepare from the topic. Sixty-first year MBBS students who gave informed consent were divided into five small groups of 12 each namely buzz groups, fishbowl structure, crossover group, circular group, and horseshoe group with an individual facilitator for each group. The facilitators motivated the students to discuss the given clinical scenario. The scheduled topic was given to the students 1 week before the SGT session.

Before the topic discussion, a pre-test questionnaire (ten multiple-choice questions) pertaining to the topic was given to them and collected. After the discussion was over in their respective small groups, a post-assessments were done using the same questionnaire. Perception of students on different small group learning methods was also evaluated based on five point Likert scale.

RESULTS

Data entry was done in excel and analysis was done by SPSS software version 23. Mean pre-test and post-test

was compared using paired *t*-test. The statistical difference between groups was measured by ANOVA.

Table 1 shows a significant difference in the pre-test and the post-test scores of each group ($P < 0.01$).

The mean post-test scores were more in fishbowl group. The gain in post-test scores was high in circular group (4.08) followed by fish bowl and crossover (3.50) and it was very less in buzz group (1.84).

Table 1: Mean pre- and post-test scores of five different small groups

Groups	Pre-test mean	Post-test mean	Mean difference	*P*-value
Buzz group	10.08	11.92	1.84	0.001**
Horseshoe groups	10.02	13.58	3.56	0.000**
Fishbowl group	10.67	14.17	3.50	0.000**
Circular group	9.67	13.75	4.08	0.000**
Crossover group	10.17	13.67	3.50	0.000**
Overall	10.30	13.42	3.12	0.000**

**Statistically significant

Table 2: Comparison of mean between pre- and post-test by ANOVA

Questionnaire results	Sum of squares	Mean square	F	*P*-value
Pre-test	220.600	2.942	0.775	0.546
Post-test	110.583	9.042	6.683	0.000

Table 2 shows that all groups have almost similar pre-test, but there is a significant difference in post-test scores between all the five groups after the SGT session. All the groups were similar in the pre-test score. However, after the SGT session, there is a significant difference between the means of each group, which clearly tells us SGT had a good impact on student learning and especially circular group had a great mean difference while buzz group had a minimal mean difference.

DISCUSSION

SGT helps to achieve skills from the collective contribution of the teacher and class members, thereby differ from the traditional passive and expository methods which rely on the sole efforts of the lecturers. Newer curriculum innovations motivate learning in interactive groups which enhance critical thinking, problem-solving, communication skills, and both interpersonal and team skills.

From Table 1, we can say that the mean post-test scores were more in fishbowl group. This can be attributed to the seating arrangements in fishbowl technique. The outer group people carefully listen to the inner group discussion which is additive to their discussion part. Post-test scores were less in buzz group, the reason could be, that the discussion took place between only 2 and 3 participants and they might have been carried by misconception about the problem assigned to them or not taking the task given to them seriously. From Table 3, we can say that small group tutorial teaching was agreed on

Table 3: Perception of students on different small group learning methods

Questionnaire	Buzz group (%)	Horseshoe groups (%)	Fishbowl group (%)	Circular group (%)	Crossover group (%)
1. I understand what is expected of me in preparation and participation	85	85	81.6	81.6	78.4
2. The section assignments make sense to me; I understand their purpose	78.4	80	83.4	63.4	78.4
3. I was able to identify my competency gaps during the session	93.4	81.6	65	71.6	71.6
4. I get clear responses to what I did in class; I find out how to improve	71.6	83.4	70	66.6	71.6
5. The discussion process was made clear to me; I know what the task is	86.6	81.6	66.66	80	73.4
6. Instructor treats students with respect	95	93.4	86.6	80	80
7. The instructor effectively directs and stimulates the student	93.4	86.6	91.6	78.4	86.6
8. The feedback sessions motivated and increased my confidence	71.6	88.4	85	75	86.6
9. The session confined to the allotted time	91.6	86.6	88.4	85	88.4
10. The Feedback session motivated them for further learning	78.4	81.6	76.6	73.4	71.6

Likert scale: 5-strongly agree, 4-agree, 3-neutral, 2-disagree, 1-strongly disagree

by students and the faculties as more effective. About 80% of horseshoe group and 83% of fishbowl group students felt that the section assignments made sense to them. About 88% in horseshoe, 85% in fishbowl reported that their technique improved their confidence level. About 93% of buzz group and 82% of horseshoe group students was able to identify their competency gaps. About 83% of horseshoe group and 72% of buzz group students found out ways to improve their analytical skills in PBL. About 95% of buzz group and 93% of horseshoe group felt that the instructor treated them with respect and motivated them. About 82% of horseshoe group and 78% of buzz group accepted that the feedback session motivated them for further learning.

Usually, only few students open in large group teaching, but in SGT, they can ask questions with confidence and get their doubts cleared. Students obtain increased understanding of the subject, develop greater ability to present information, and develop ability to think critically. They develop personal rapport with the teacher and our results are consistent with the study of Dawane *et al*.[10] Johnson also had proved, students generally like the case-based exercises, as this method is basically used to develop critical thinking and problem-solving skills, as well as to present students with real-life situations.[11] Our study findings were supported by Steinert who had documented that effective cases emphasized the importance of clinical relevance, critical thinking and the integration of basic, and clinical sciences.[12]

Neetha *et al*.[13] and Pillai[14] have also observed that most of the students preferred SGT. The students actively participated in the small group discussions with a healthy competitive spirit in SGT and they come out their shell and interrogate their doubts in a positive manner.

Strength of the study is exposing the students to different SGT methods. Moreover, no study on this topic has been reported so far in this region, though research in teaching-learning has gained paramount importance.

Limitations of this Study

Sample size can be more.

CONCLUSION

The educational effectiveness of different SGT was statistically significant and the perception of students was in favor of it. SGTs help for self-identification of lacunae by student and resolution of his/her confusions by adopting a problem-solving approach. Hence, case scenarios should be included in all teaching-learning sessions to help to generate interest. Future avenues for research analysis of different SGTs and student-teacher perceptions across the educational continuum including undergraduate, postgraduate, and continuing professional education can be initiated.

Recommendations

Thereby, it is strongly recommended to train the faculty for interactive methods of teaching and learning.

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