**Research Article**

# Effect of small group teaching on the academic performance of first year MBBS students

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**Abstract**

**Introduction**: Medical Council of India 2012 regulations allow only four attempts to students to clear first University professional examinations. Some top achieving school students fail to perform well in medical colleges. Indian studies on effectiveness of small group teaching (SGT) on academic performance of students are scanty.
**Objective:** This study aimed to analyze the effect of SGT on first year MBBS students who scored less than 40% physiology internal assessment tests (IAT). Out of 99 students, 45 cases (less than 40% marks in IAT) were identified and the remaining 54(more than 40% marks) were controls.
**Methods**: SGT as remedial teaching was applied to the cases.
**Results**: The marks of the controls were significantly higher (p=0.001) than cases before SGT. The marks of cases before and after SGT were 36.41 ±3.76 and 51.93±6.34. Paired "t' test revealed statistically significant increase in marks. Cases showed a gain score of 15.52 marks. SGT benefitted both girls (36.99±3.66 and 53.3±6.43) and boys (36.54±3.45 and 53.01±6.6.0) equally.
**Conclusion**: SGT as remedial teaching is highly effective in promoting student- centered learning and needs to be implemented in all medical colleges uniformly.
**Keywords:** Small group teaching, internal assessment tests, cases, controls

## 1. Introduction

Accurate and early identification of struggling medical student[1] is important if we are to have the opportunity to remediate failures. It also ensures that inadequately performing students do not advance to the next stage of training. Medical Council of India 2012(MCI) regulations allow only four attempts to students to clear the first University professional examinations and also the first professional course must be completed within four years of admission[2]. Medical colleges are designed to produce an Indian medical graduate who would be a great professional, first level of doctor, good communicator and a better citizen. It is a well-known fact that medical education is tough and demanding and requires lot of physical, mental, psychological fitness and stamina.

World-wide medical colleges are open to the top achievers of schools. Some high achieving school students fail to perform well after entering into medical college. The reasons for failure could be sudden transition from school to medical

college, inability to cope up with medical curriculum, previous failures in school, self-assessed depression, peer pressure or even wrong choice in career decision[3]. Also poor learning skills, poor insight and any other major personal crisis could contribute to poor performance by the students as suggested by Richard *et al*[4]. Dudek *et al*[5] and Saleh *et al*[6] report that there is lack of documentation and knowledge about what to document and a lack of remediation options as a major setback in their study.

Indian medical schools have brought in intensive changes in their curriculum and made it student friendly. In spite of the integrated teaching system, excellent facilities and infrastructure provided, some students failed to perform well in the first year Physiology Internal assessment tests. We, in the department of Physiology, in a private medical college in Chennai, India, tried to analyze the effect of small group teaching on the academic performance of the first year MBBS (2012-13) students.

## 2. Methods

Out of 100, 99 first year MBBS students (boys n=46 and girls n=53) aged 17.89±0.76 years volunteered to participate in this prospective cohort study. Institutional ethical committee clearance was obtained. The study was carried out in the physiology department of a private medical college in Chennai between August 2012 and May 2013. Informed written consent was obtained from all the students.

Questionnaire containing the following details like name, physical characteristics like height, weight, BMI were administered. Details like nature of topics (boring or voluminous), ability to recollect after reading, ability to follow the standard textbooks, student-teacher interaction were also collected. Marks scored in the Physiology IAT were recorded.

### 2.1 Identification of cases and controls

Based on the IAT marks, study population was divided into cases and controls. Cases (n=45) were students with poor performance (average score less than 40% marks in the first 4 internal assessment tests) who were divided into small groups and given remedial teaching. Rest of the students did not receive any special remedial classes and served as the control group (n=54) (more than 40% marks in internal assessment tests). The mark of students who were absent was taken as zero.

### 2.2 Small group teaching (SGT)

The cases (n=45) were subdivided into seven small groups. The first three groups comprised of 7 students and next four groups had 6 students each. Each small group received remedial teaching and supportive intervention by individual facilitators who had undergone 3 days Teachers Training Workshop organized by the MCI certified regional Training Center. The audio-visual methodologies emphasized by the MCI were implemented best to meet the demand of the student. SGT was initiated and continued for the cases over a period of 16-20 weeks.

### 2.3 Comparison of the average marks before and after SGT

Students (both cases and controls) appeared for the fifth and sixth IAT after SGT. The students' performance before and after SGT were analyzed.

### 2.4 Statistical analysis

Data analysis was done using student "t" test, ANOVA. The performance of girls versus boys was also compared.

## 3. Results

Physical characteristics of our study population are given in Table 1.

**Table 1: Physical characteristics of our study population**

| Variables | Mean ±S.D |
|---|---|
| Age(years) | 17.89±0.76 |
| Sex    Girls<br>         Boys | n=53<br>n=46 |
| Height(Cms) | 166.80±10.95 |
| Weight(Kgs) | 61.90±12.97 |
| BMI(Kg/m2) | 21.99±3.66 |

**3.1** Before SGT, the average marks of the controls were significantly higher than the cases in all the IAT as shown in table 2.

**Table 2: Average marks scored by cases and controls in the internal assessment tests**

| IAT | Cases (n=45) | Controls (n=54) | P value |
|---|---|---|---|
| First | 38.45±14.57 | 52.96±14.41 | <0.001** |
| Second | 34.3±14.19 | 52.39±15.51 | <0.001** |
| Third | 32.34±9.66 | 53.53±12.15 | <0.001** |
| Fourth | 40.57±14.15 | 57.59±14.71 | <0.001** |

**Statistically significant

**3.2 Comparison of the average marks of the cases before and after SGT:**

In our study, the average marks of the cases before and after SGT were 36.41 ±3.76 and 51.93±6.34 respectively as shown in Table 3. The marks scored by cases before and after the SGT were compared using paired "t" test and it was found that they were statistically significant and value was 1.57265E-08. It can be seen that gain score increased up to 15.52 with intervention.

**3.3 Comparison of the average marks of the controls:**

The average marks of the controls in the earlier IAT were 54.12±2.36 and in the later IAT was 63.68±0.79 respectively as shown in Table 3. Least gain score average marks were 9.56 in the control group which is definitely less than the cases as mentioned earlier.

**Table 3: Comparison of the average marks of the cases and controls**

| | I-IV IAT marks | V-VI IAT marks | Gain score |
|---|---|---|---|
| Cases | 36.41 ±3.76 (Before SGT) | 51.93±6.34 (After SGT) | 15.52 |
| Control | 54.12±2.36 | 63.68±0.79 | 9.56 |

**3.4 Comparison of the performance of girls versus boys before and after SGT:**

The average marks of the girls and boys before and after SGT are given in the Table 4. It can be observed from our study that there was no significant gender difference due to SGT and it can be concluded that both boys and girls were equally benefitted by SGT.

**Table 4: Comparison of the performance of girls versus boys before and after SGT**

| Cases | Before SGT (Mean marks) | After SGT (Mean marks) |
|---|---|---|
| Girls | 36.99±3.66 | 53.3±6.43 |
| Boys | 36.54±3.45 | 53.01±6.60 |
| Student 't' test | 0.553461 | 0.792471 |

**3.5** The average marks scored by the cases and controls in all the IAT are represented graphically as shown in the Figure 1. There is a definite surge in the performance of the cases when compared to the controls in the fifth and sixth IAT (after SGT).

**Figure 1: Comparison of the marks of cases and controls in the internal assessment tests**
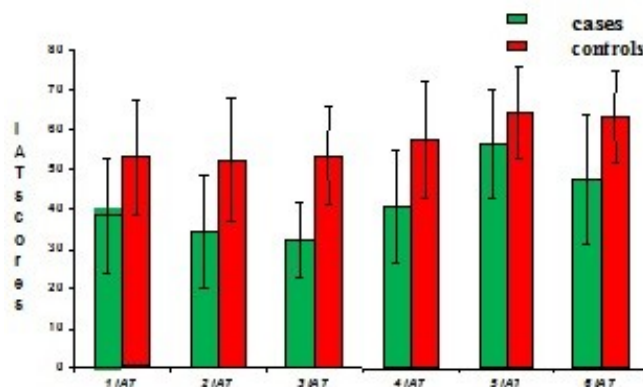
## 4. Discussion

Our study has shown that teaching and learning in small groups has a valuable part to play in all round education of students as suggested by Jacques in 1991[7].

**4.1** Before SGT, the average marks scored by the controls were significantly higher than the cases in IAT in our study. After counseling, the cases came out with some common reasons for their poor performance. Boring or voluminous topics (25%), inability to recollect after reading (22%), inability to refer all the standard textbooks as advised by the teacher (18%), monotonous teacher- centered teaching (15%), lack of student teacher interaction (didactic lectures are mostly one-way) (13%), even well learnt topics are poorly presented by the student in IAT due to poor time-management (7%) were some commonly listed difficulties of our cases.

Struggling or poor performers or slow learners[1] refer to those who are not able to cope up with their work normally expected of their age group. These students need to be given extra teaching using innovative methods along with continuous motivation. There is a definite transition for students from school to the college. Most of the school students get better attention from their teachers as they are in small numbers and learning is mostly from the textbooks alone. Whereas students in medical colleges are in larger numbers, professionally treated by the professors and they need to learn outside their text books also. Students joining medical colleges come from different schools and different states of the country and hence they take their own time in adapting to newer environmental and cultural conditions.

**4.2** After SGT, the overall marks of cases increased from an average score of 36.41 ±3.76 to 51.93±6.34 which was statistically very significant (p value 1.57265E-08) in our study. The average gain score was 15.52.

Advantages of SGT listed out by our students are many. Most of the important topics were made interesting by the facilitator who insisted on active participation of all the students. Also students were made to read upfront and reading material was given as handouts. It was also found that repetitions of the same topics taken in the lecture class helped the students to recollect easily. Student centered learning. Better student-teacher interaction was established as student's personal problems were also addressed. Emphasis was given to the student to present the topics in flow charts or points marked by bulletin and support with appropriate diagrams wherever needed in the exams. Emphasis on better presentation was given and time –management reinforced.

**4.3** A similar study done by Sugapriya *et al*[8], from India, have also shown an improvement in the mean scores of the poor performers after teaching with computer animated models. In their study, the average scores of the cases had improved from 33.80±3.70 to 42.80±5.15 which was statistically significant. The average gain score was 9.56 which was much lesser than the gain score of our study (15.52). The probable reasons for higher gain score in our study is along with SGT, one to one counseling was done and personal problems like hostel stay, difficulty in following English as the medium of instruction, previous academic failures were also addressed.

Guraya *et al* from Saudi Arabia have shown that there was statistically significant difference in marks obtained by male and female students of their study cohorts (p=0.000). In their study, 2011-2012 group, male students` mean score was 43.1±2.99 which was higher than the 2010-2011 male students` (mean ± SD: 38.7±2.81; p=0.000). Similarly, the 2011-2012 female students attained a higher mean score than those in the 2010-2011 (39.8±4.0 and 35.6 ±3.88 and p=0.000) [9].

Small group teaching (SGT) refers to any method of student-teacher interaction involving a group of 3-25 students which may meet only once or several times in a term focusing their discussion on a pre-defined subject material. Brown G, Atkins[10], Jacques[7], Gibbs[11], Johnson DW, Johnson FP[12] and McKeachie[13] are well known for their pioneering research work in the field of SGT. Many international studies have highlighted the importance of SGT. Literature shows that small group teaching is a boon to the students in schools as well as colleges.

SGT is slowly gaining momentum in the field of medical education as proved by Jaques D, Exley K and Cartney P[14,15,16.] Understandably, SGT enables to establish a friendly rapport among the students and the facilitators and establishes greater confidence in the student each time he/she is correct. Students learn to collaborate with each other, develop keen awareness and collect information on the topic from varying sources. With due appreciation from the facilitator, the students raise healthy debates on the issues that are being discussed. Also when given a tough task, students in groups tend to support each other and complete the task in lesser time than when questioned individually.

A recent Iraqian study has concluded that the existing medical education system needs to be overhauled and

comprehensive improvements are essential in different areas. 45% of the study students have agreed that the present teacher-centered teaching to large number of students need to be replaced with student-centered learning, especially to small groups of students[6].

Not only in pre-clinical areas, SGT has been very effective in the clinical settings also. The marks of the traditional teaching cohort during long –case and OSCE when compared with that of the SGT cohort have proved that SGT is indeed a valuable tool in helping the students to acquire practical knowledge and skills[9].

Many remedial teaching methods for poor performers have been adopted in the past with varying results. Studies highlighting the importance of SGT as an effective remedial teaching technique are scanty and not documented properly. Very few Indian studies have documented the effectiveness of SGT which prompted us to initiate our study. A North Indian study by Pal *et al* have stated that there is better relevance of the topic, depth and interaction, all, given a significant rating in SGT than other teaching- learning methodologies[17]. In South India, Sugapriya *et al* have exposed the cases in her group to computer animated models and the controls to chart and picture reading and highlighted the improvement in the cases before and after the intervention.

All the facilitators had undergone 3 day intensive workshop on Teacher training conducted by the regional MCI trained centre. This was to ensure uniformity among the facilitators approach to the students. We had collected details for the poor performance in our students and solutions were sought to these problems during the small group remedial teaching sessions. Emotional instability, health and language problems were also addressed. Students who were staying in hostel away from home were also counseled and feedback on their new environment and food was obtained. Success of small-group teaching and learning depends on involvement of facilitator and its group members. In our study, group dynamics was very positive.

Student –teacher interaction methodology is also important. It is well known that for a class of 100, the preferred mode of teaching is didactic lectures or seminars. But the disadvantage is absence of eye contact with the student. Also in a large group, some students don't come up with their doubts due to internal inhibition. But in small group discussions, it was observed that there is better student –teacher eye contact and also students open up easily to clarify their doubts.

Before SGT, the mean score of girls was 36.99±3.66 and after SGT their mean score was 53.3±6.43. Before SGT, the mean score of boys was 36.54±3.45 and after SGT their mean score was 53.01±6.60. It can be observed from our study that there was no significant gender difference due to SGT and hence concluded that both boys and girls were equally benefitted by SGT. In Guraya's study, male students` mean score before and after SGT was 38.7± 2.81 and 43.1±2.99. Similarly, female students' mean score before and after SGT was 35.6±3.88 and 39.8±4.0. The male students in their study performed better than the female students both before and after SGT.

**4.4** In another Indian study by Lata *et al*[18], she has concluded that though boys (mean score 23.18) performed better than girls (mean score 21.62) gender difference was not statistically significant. Mohapatre and Mishra[19] and Haggerty[20] have also concluded that boys perform better in biological science than girls which is statistically significant.

## 5. Limitations

Studies need to be carried out in large numbers in all medical colleges across India.

## 6. Conclusion

Struggling medical students can be attributed to both curricular and extra-curricular causes. We have clearly concluded from our study that SGT is extremely effective in improving the academic performance of the medical students. Both girls and boys have derived equal benefit. The overall performance of cases increased after SGT which was statistically significant. Early identification and intervention with small group teaching along with supportive measures surely helped the students. Further studies are also planned to correlate emotional intelligence and student performance.

## Acknowledgements

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