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Original Article: Case Study

Performance Improvement in Examination by Re-Teaching the Underperforming Undergraduate Medical Students

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ABSTRACT

Background: Poor performance by the undergraduate medical students in the paraclinical subjects like Pharmacology is because of the lack of clinical experience, inadequate guidance and other factors. Re-teaching and repeat examination of the difficult chapters can be the way to overcome such a situation faced by the students. Materials and Methods: The study was planned to re-teach chapters of Pharmacology to the underperforming undergraduate medical students (i.e. Students who scored <50% marks in the third semester examination in aggregate) by traditional method of teaching over a duration of four months, and a repeat examination was taken at the end of the re-teaching program. After submitting the informed consent form, some of the students attended the classes of re-teaching and appeared in repeat examination which was arranged at the end of the re-teaching program. They were classified as group I, while the other students who did not attend the re-teaching class but appear in the repeat examination were designated as group II. Repeat examination comprised of both written and viva components as per the structure of third semester examination for proper evaluation. The percent score secured by each of the students in repeat examination were calculated. Result: The mean of the percent score secured by the both of the groups were compared by Student's unpaired t test (Group I: 56.39 ± 5.09 VS Group II: 43.17 ± 4.66) which shows that there is statistically significant improvement in performance in repeat examination by the students who attended the classes of re-teaching than who did not (P value <0.001). It can be concluded that these re-teaching classes are helpful in the enhancement of the performances of the students who perform poorly in their initial examination.

1. Introduction

According to Medical Council of India, subjects taught in the first year (first and second semester) of undergraduate medical education are Anatomy, Physiology, Biochemistry. After completion of the second semester examination, they have to appear first Professional MBBS Examination. Those who pass the examination are promoted to third semester. Pharmacology along with other paraclinical subjects are taught in the third, fourth and fifth semester of the undergraduate medical curriculum. It is often seen that students in their third semester fail to grasp the principles of paraclinical subject like pharmacology because of their lack of clinical experience and other contributing factors**[1, 2]**. Due to failure in the First Professional examination, students are not allowed to attend the classes of third semester till they clear the supplementary first Professional MBBS examination. Thereby they could not attend the initial classes where chapters of "General Pharmacology", "Drugs used in Autonomic Nervous System" are taught. There is often difficulties for the students to identify the must learn areas of these chapters by reading books only. As a result there is underperformance by some students in third semester examination and also in the second professional MBBS examination. Cleland *et al.* have explored previously that weak students often continue with little guidance, less feedback from their side, and have ongoing difficulties**[3,4]**. Early support may stop students experiencing a cycle of failure**[3- 5]**. As a teacher, one should try to improve the performances of the weak students to minimize the failure rate in the second professional examination of the undergraduate medical education. One of the

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ways to improve the performances of the student is re-teaching the chapters, which are difficult to grasp and by taking repeat examinations (both theory & oral)[5,6]. However there are some constraints in conducting these classes. Some identified obstacles include time constraints, planning and making the schedule of the classes and student participation. There are limited studies undertaken to analyze the effect of re-teaching on underperforming students. Therefore we arranged a re-teaching program after third semester examination of the undergraduate medical curriculum. The objective of this study was to assess the effect on performances of the underperforming undergraduate medical students in the examination by taking repeat classes in traditional method.

2. Materials and methods

After obtaining clearance from the Institutional Ethics Committee the study was conducted in the Department of Pharmacology of a tertiary Medical College in Kolkata. Poor performers were identified as those secured marks less than 50% in aggregate in the third semester examination. The participation of the students in the study depended on their free will. They were also free to attend the classes of re-teaching and to appear in the examination held at the end of the re-teaching program. After obtaining an informed consent from the students, a series of classes by traditional method[7] were taken on the topics of third Semester which included the chapters of "General Pharmacology", "Drugs used in Autonomic nervous system", "Autacoids and related pharmacology", and "Drugs for Central nervous system" over a period of four months. Traditional method consisted of lectures given by the teacher, and class activities involving the topics discussed during the class[7]. Confidentiality of the students was maintained. The marks obtained in the third semester examination were recorded and expressed in percentage. After the series of classes on the topics of third semester, repeat examination was conducted. The repeat examination had both the theory and viva-voce components simulating the structure of third semester examination of undergraduate medical education. The students who did not attend the classes of re-teaching were also allowed to appear in the repeat examination, if they were interested and submitted the informed consent form. Thus the students were categorized in two groups i.e. Group I: Students who attended the re-teaching classes and appeared the repeat examination and Group II: Students who did not attend the re-teaching classes but appeared in the repeat examination.

Marks scored by both the groups of students in the repeat examination were calculated and expressed as percentage. The mean percentages of marks scored in repeat examination by both the groups were subjected to statistical analysis. Statistical analysis was done using the software IBM SPSS statistics 20. Unpaired Student's t test was applied to compare the mean of the percentage of the marks scored by each of the groups in the repeat examination conducted at the end of re-teaching classes.

3. Results

A total numbers of 76 students out of 159 failed to secure 50% in the 3rd semester examination. These 76 students were approached to be included in the study. 2 students did not want to participate in the study. Of the rest 74 students 33 students attended the re-teaching program and 41 students did not. All these 74 students appeared in the repeat examination held at the end of the re-teaching program (Fig 1). Baseline characteristic of the students of both the group is comparable (p value 0.141). Applying Student's unpaired t test it is found that statistically significant difference exist between the mean of the percent of score by both the group in repeat examination (Group I: 56.39 ± 5.09 VS Group II: 43.17 ± 4.66, p value: <0.001), shown in table 1.

29 students scored ≥ 50% in the repeat examination in group I while only 6 students scored ≥ 50% in group II, which is statistically significant. (Chi square test shows p value: <0.001, Fig 2). Therefore it can be concluded from the result that there is definite improvement by the students in repeat examination conducted after re-teaching.

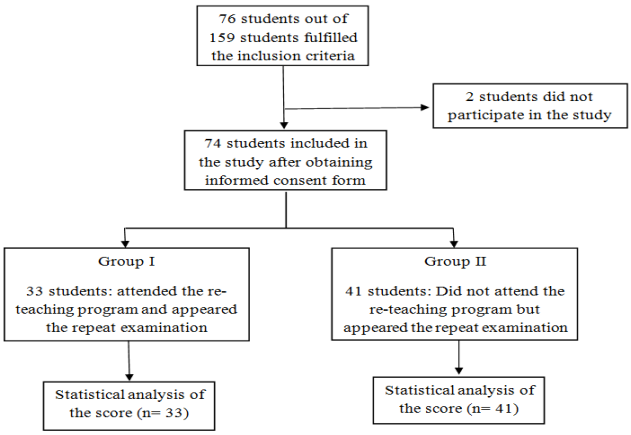

Figure 1: Flow diagram of the student's participation in the study

Table 1: comparison of mean percent of marks among the two groups of students before and after re-teaching

Time of examination	Mean percent of Marks obtained		
	Group I (MEAN ± SD)	Group II (MEAN ± SD)	P Value
Before re-teaching (Baseline Characteristics)	38.85 ± 5.4	34.04 ± 4.97	0.141
After re-teaching	56.39 ± 5.09	43.I7 ± 4.66	<0.001

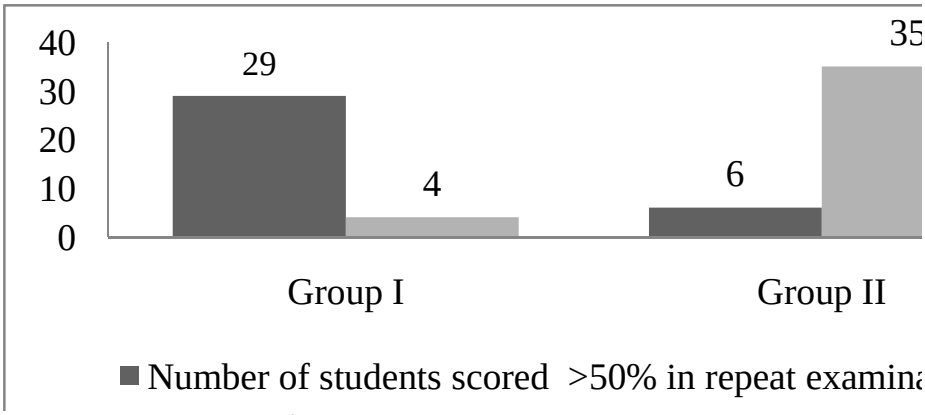

Figure 2: Bar diagram comparing the number of students scored ≥ 50% in aggregate in the repeat examination by both the group

Group I: Students who attended the re-teaching classes and appeared the repeat examination and Group II: Students who did not attend the re-teaching classes but appeared in the repeat examination. P value obtained by using Student's unpaired t test

Group I: Students who attended the re-teaching classes and appeared the repeat examination and Group II: Students who did not attend the re-teaching classes but appeared in the repeat examination. P value < 0.001, obtained by using Chi-square test.

4. Discussion

It has been noticed that a number of students repeatedly fail to obtain pass marks in semester examinations. Previous studies showed that remedial interventions can improve poor performances in students[3,5]. The chapters like "General Pharmacology" and "Drugs used in Autonomic nervous system" which are included in third semester of pharmacology syllabus, form the basic or foundation to understand the Systemic Pharmacology. Weaker concepts in these areas are often associated with poor performance in final examinations of Pharmacology. Our study showed that these re-teaching classes significantly improve the performance of the undergraduate students in the examination by the improvement of conception over the basic chapters of Pharmacology.

Some of the common problems that are linked to poor performance in undergraduate medical education include unfamiliarity with new terms and drug names, lack of concentration and socio-cultural disparities[8]. Medium of instruction of undergraduate medical education in India is English. In India a large number of medical students are well conversed to study in their vernacular languages before the commencement of medical education. For these students understanding as well as expressing themselves verbally and in writing in English is difficult[8,9]. A failure in the first professional examination creates a vicious cycle that the students find difficult to come out of it. As the number of students in the re-teaching classes was small, there was increased possibility of teacher-student interaction, which helped to overcome different barriers of underperformances.

5. Conclusion

It can be concluded that if these re-teaching classes can be arranged by adjusting time with routine class schedule, it will be helpful for students who perform poorly in their initial examinations. These re-teaching classes can overcome the failure rate, improve the knowledge of underperforming students and enable them to understand the clinical subjects better in subsequent semesters. Although the study was performed in the subject of Pharmacology, we are hopeful that if these re-teaching classes can be arranged for other paraclinical subjects of third to fifth semesters, like Pathology, Microbiology, Forensic Medicine, then the performance of the students in Second Professional MBBS examination can be improved. The study has some limitations as the classes were taken only chapters of Pharmacology included in third semester and did not cover the whole syllabus. Moreover the underperforming students were identified on the basis of their performance in the third semester examination but not from the internal assessment of the total Pharmacology curriculum. Another study can be conducted in future which will include the whole Pharmacology syllabus to overcome these limitations.

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