

Impact of Multimodal Learning Interventions on Academic Outcome of Failed Medical Students

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Abstract

Introduction: The MBBS curriculum is one of the most strenuous graduation courses worldwide, leading to constant anxiety and stress regarding good performance in a MBBS students' life. It requires regular, consistent hard-work and dedication to acquire medical knowledge and skills. In this highly competitive studious environment, some students are left behind, affecting their psychosocial wellbeing and growth. Few unsuccessful candidates become hopeless due to lack of guidance and multiple learning issues leading to repeated failures in professional examinations. We aimed to identify problems affecting both the personal and academic domain of these students leading to failure at the 1st MBBS Annual Examination and intervene with multimodal measures to improve their academic performance by teaching, guidance and counselling.

Methodology: The study was conducted on 46 first year MBBS students including 18 multiple attempt students and 28 first attempt supplementary students. The cause of failure was assessed through a questionnaire. Multimodal interventions targeting specific problem areas in individual students were implemented for a period of 1 month after the annual result declaration.

Results: Multiple academic and personal factors were observed among the failed students. The academic performance improved with passing percentage of 66.7 % in multiple attempt students and 92.9% in first attempt supplementary students.

Conclusion: An active teaching-learning multi-modality intervention comprising academic and psychosocial components is essential for the success of failed students in addressing their personal and academic needs.

Keywords: Medical education, Multimodal teaching, MBBS students

Introduction

Every year a fresh and enthusiastic batch of new entrant MBBS students join a Medical College. These students, who are fresh out of school are under constant need and pressure of acquiring knowledge. This continuous process involves both their academic and personal growth as an individual.

In this race of acquiring knowledge most of them succeed and progress, while some lag-behind. In the latter group, the failure might hamper their energy, enthusiasm and positive attitude towards the learning process as well as life.

The psychological wellbeing of the student declared failed by the University in summative evaluations has been identified by many studies to manifest as depression, anxiety, stress and suicidal intent. There are very few studies on the cause of failure which has been documented among medical, dental and allied

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courses students by medical educationists globally, elucidating social, personal, economic and environmental agents (Azari *et al.*, 2015; Hassan *et al.*, 2018; Mahdion *et al.*, 2016; Taheri *et al.*, 2014).

A Medical College admits students from a diverse spectrum of social, economic, cultural and ethnic backgrounds with different sensitivities and sensibilities. They are exposed to a common learning atmosphere and teaching modalities in the medical college. The students are mostly top rankers, who have worked tirelessly for admission in the institute and have been excellent in academics while at school level. They join the college with zeal and hope to excel in the medical institution as well. A significant percentage of students gradually become unable to continue their zeal, energy and efforts leading to failure in the annual examination and thus have to reappear in supplementary examinations. Most of them pass the supplementary examination and are promoted to the next semester. Many of them who do not pass supplementary examinations need to repeat the entire year of study.

Despite the uniform learning environment and learning process, stratified final outcomes are observed. Each student is also variable in terms of learning and grasping abilities and require varying teaching learning techniques. The conventional teaching learning modules, methods and assessment techniques in the MBBS course are the standard procedures and have not been modified according to the evolving and varied qualities of a learner (Adlakha *et al.*, 2018; Gupta *et al.*, 2018; Amaranathan *et al.*, 2018). This perhaps, is the causative factor for a vast gap in the perception, application, evaluation and ultimately the final outcome of a student at the end of the learning process.

Though much global evidence for the prevailing trends in medical education exist, there are few targeting this group of students with fruitful solutions and results. This study aims to identify the problem areas of the personal and academic domains of the repeater students through multimodal targeted interventions. The improvement of academic performance was

addressed through individual problem solving, encouraging them to attend classes, building a positive attitude, motivating and facilitating effective learning through structured lectures and demonstration classes in small batches.

Methodology

Study Design

The present interventional study, was conducted on first year MBBS students who had been declared failed in Anatomy at the Annual Examination by the University. The study comprised of two groups of failed students (Test/study group and Control group) from consecutive batches. The control group comprised of failed students appearing at exams a year prior to the test / study group.

Test / Study Group

The Test group comprised of 46 first year MBBS students failing in Anatomy, of which 28 students appeared for the first time in the Supplementary examination and 18 students were repeat failures with multiple attempts in the examination.

Control Group

Control group comprised of 67 first year failed MBBS students in Anatomy, out of which 53 were first attempters and 14 were repeat multiple attempt students appearing in exam a year preceding the test / study group.

Study Instrument

A questionnaire addressing problem areas in their personal life and academic domains was administered to the test/ study group. The questionnaire contained both closed (yes/ no) and open-ended questions on personal and academic factors.

Personal Factors

Language barrier (English/ Hindi/ NA), MBBS course enrolled by choice, attendance deficit, presence of peer group/friends, feeling inferior, Hosteller/day scholar, medical illness (if any).

Academic factors

Study duration hours/day, time spent on mobile/ internet usage, specify academic deficiencies that led to failure.

The response to the questionnaire, on the first day of the scheduled remedial classes was assessed by the core curriculum committee of the Institution. A teaching schedule tailored to the academic and capacity building domains was drawn up and implemented from the next day for a period of one month.

Multimodality interventions

Academic Domain: The cognitive and psychomotor domains were the areas of focus. Small group teaching in the form of lecture-demonstrations and interactive sessions was used for theory sessions. Vivas and OSPE sessions were administered for mock practical practice.

Psychosocial Domain: The identified problems of the students were managed by addressing the affective domain. They were encouraged to attend classes, develop a positive attitude and intrinsic motivation.

Evaluation: All 46 students of our study group appeared for the Supplementary examination and their results were compared with the results of the previous batch as the control group. The comparison was done statistically through the Chi-square test and Fisher's exact test.

Results

The extensive data obtained through the questionnaire provided to study group was observed and assessed. The academic and personal problem areas were identified.

Identification of problems

Psycho-social Domain: The major problem among both the repeat multiple attempters and first attempters was the inferiority complex, reported by 44% and 28.8% respectively. The language barrier (English) was observed to be the second major issue, affecting 22% of the repeater students but only 3.6% of first attempt students. The other most common factor identified in both the groups was absence of a support group and friends. (16.5%: repeater batch and 7.2%: detained / supplementary). Other factors identified were attendance deficit, parental pressure to select MBBS the course and medical illness (Fig. 1 & 2).

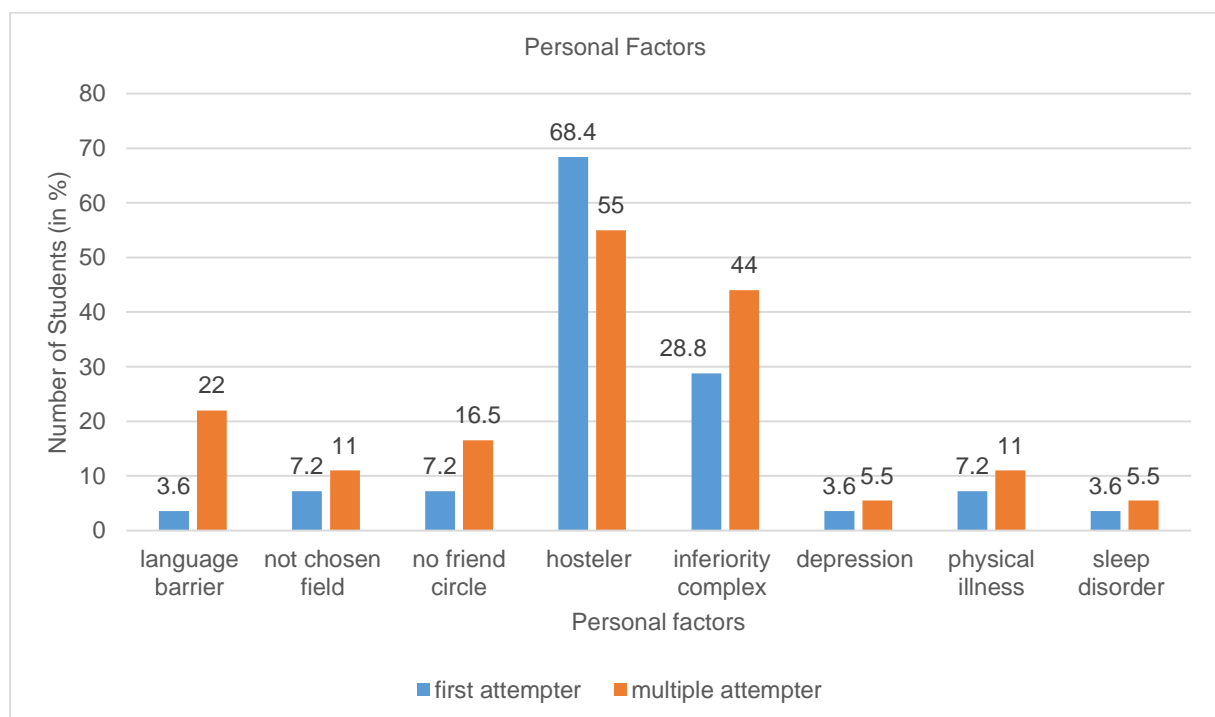


Figure 1: Personal Factors

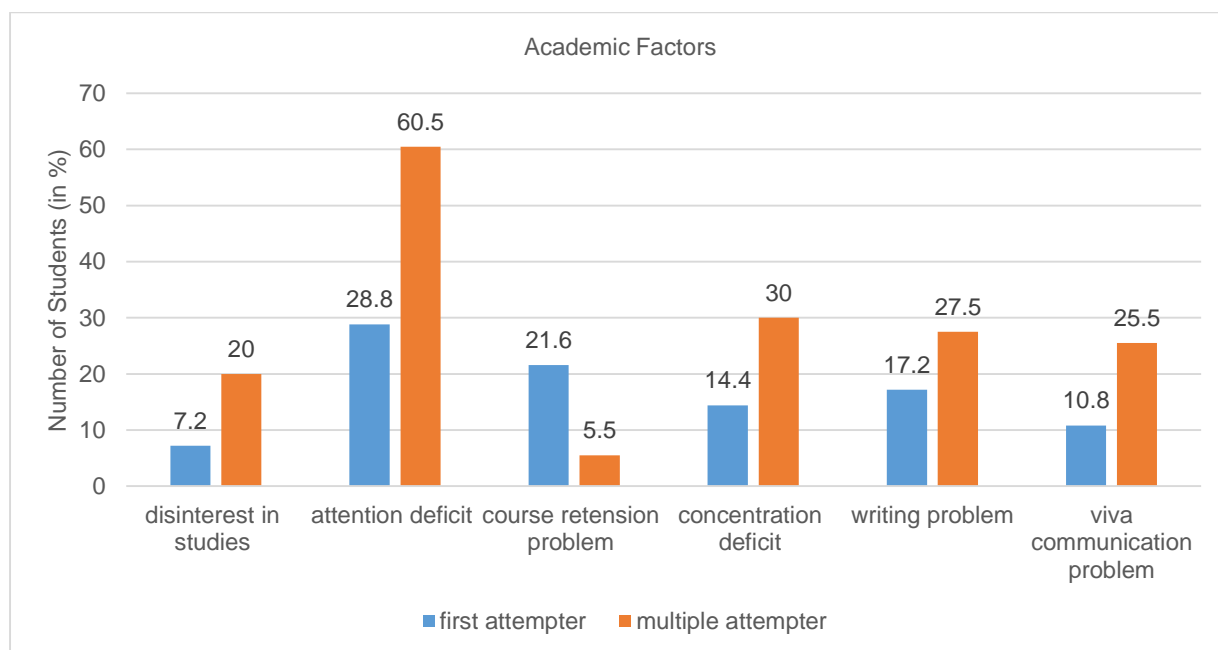


Figure 2: Academic Factors

Majority of students (55% multiple attempters and 68.4% of first attempter students) were observed to be hostellers (Fig. 1). The average time spent on daily studies was 4-6 hours in major proportions of students in both the groups (Fig. 3). It was observed that in both the groups the major time was spent on internet / mobile

usage per day. While only minute proportions of them (5.5 % of repeaters and 3.6% of first attempter students) reported using it minimally for upto 1 hour a day. There were an alarming number of hours accounting to more than 6 hours a day on mobile / internet usage in 12% of repeater students (Fig. 4).

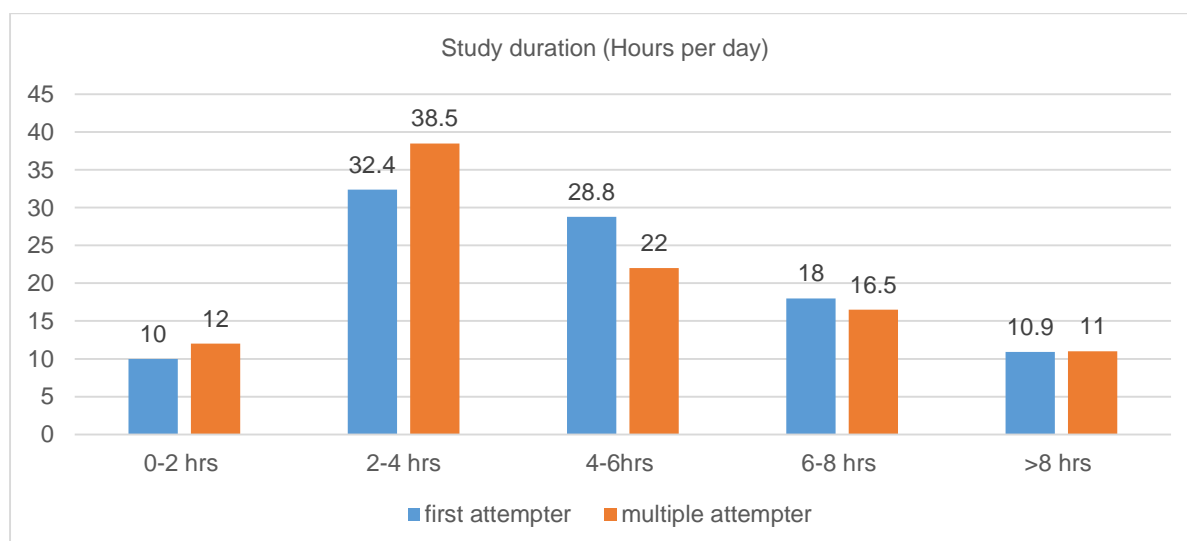


Figure 3: Study Duration (Hours per day)

Irregularity in attending classes was again a major concern in both the groups affecting 89% of repeaters and 78.4% of first attempter supplementary students.

Academic Domain: Academic problem areas identified were difficulty in retaining and memorizing the content, concentration deficit, difficulty in keeping pace with the lectures, poor writing skills and inability to speak confidently in viva-voce (Fig. 2).

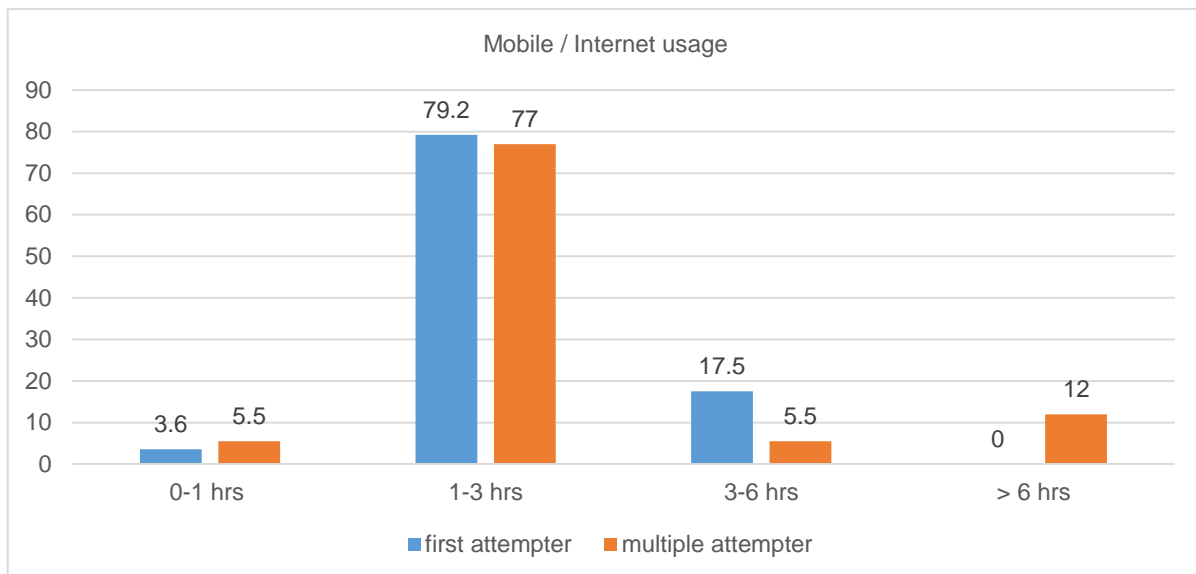


Figure 4: Mobile / Internet usage

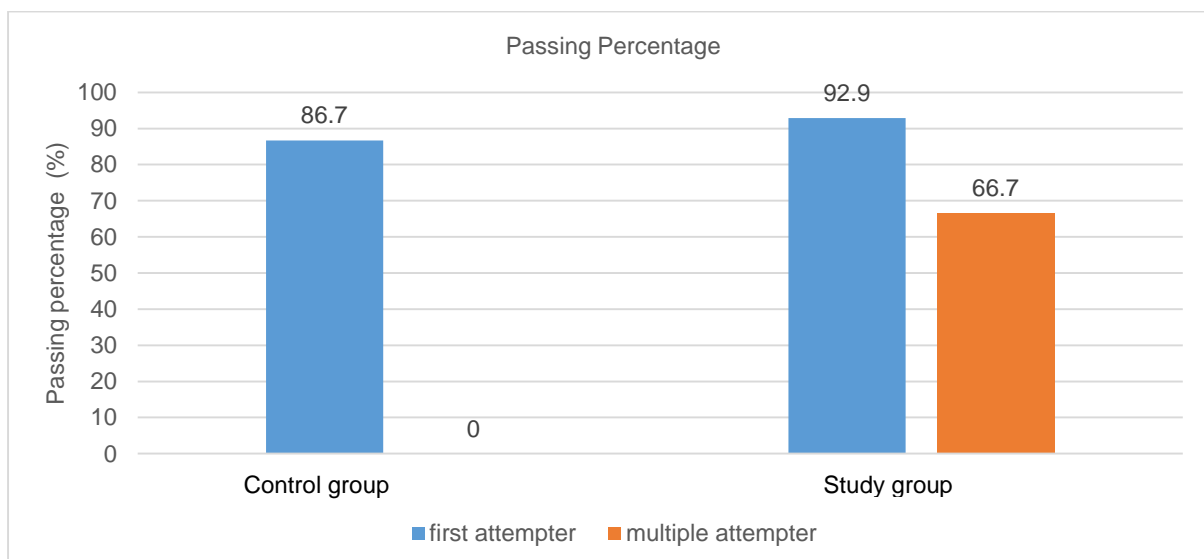


Figure 5: Passing Percentage

Individual problem-solving and multimodality interventions: students were encouraged to attend remedial classes. They were motivated to actively participate in the capacity-building exercises aimed at boosting their zeal to study with concentration. They were counseled to develop a positive attitude and were taught time and stress management skills through role play and interactions with senior faculty members. Students with a language barrier (English) were given practice writing for theory exams. All students were guided and prepared for theory examination by practicing writing answers and later discussing

it with the faculty. They were prepared individually for appearing in Viva voce for practical examination as well.

The self-motivated and enthused students were then taught the course in an organized time schedule for a period of one month covering all the theoretical and practical aspects of course and content of Anatomy as a subject through lecture demonstrations and practical classes.

Evaluation: The passing percentage in both the study group with multimodality interventions and control group with no interventions were

compared in repeaters and first attempters in the Supplementary Examination.

Among the repeat attempters, the percentage of students who passed was 66.7 % in the study group as compared to the control group with 0 % passed students. Hence there was a significant difference between the study group

and the control group among the repeat multiple-attempt students based on the Chi-Square test (Table 1). Though the percentage of first attempt students who passed was higher in the study group than the control group, there was no significant difference between the two groups based on the Fisher's exact test (Table 2).

Table 1: Statistical analysis of the Pass rate among repeat multiple attempt students in the Supplementary Examination.

	Pass	Fail	Total
Study group	12 (66.7%)	6 (33.3%)	18 (100.0%)
Control group	0 (0.0%)	14 (100.0%)	14 (100.0%)
Total	12 (37.5%)	20 (62.5%)	32 (100.0%)

Pearson chi2 (1) = 14.9333; Pr = 0.000; Fisher's exact = 0.000

Table 2: Statistical analysis of the Pass rate among first attempt students in the Supplementary Examination.

	Pass	Fail	Total
Study group	26 (92.9%)	2 (7.1%)	28 (100.0%)
Control group	46 (86.8%)	7 (13.2%)	53 (100.0%)
Total	72 (88.9%)	9 (11.1%)	81 (100.0%)

Pearson chi2 (1) = 0.6823; Pr = 0.409; Fisher's exact = 0.487

Discussion

In the present study, we attempted to elucidate the psychosocial causes for the failure of students in the first year MBBS Examination and simultaneously provide remedial measures for both academic and personal problems to improve their performance through multimodality interventions.

The learning experience and academic performance of a student is dependent on a variety of factors including socio- economic conditions, personal traits, medical illnesses, stress and depression in the same learning environment (Azari et al., 2015; Hassan et al., 2018; Mahdion et al., 2016; Taheri et al., 2014).

In our study, we analysed both the personal and academic problems of each student. The major personal issues among the failed students was

observed to be the inferiority complex affecting 44% multiple attempters and 28.8% first attempter students. There was lack of self-worth in these students which was quite alarming as it led to disappointment and low confidence.

On further assessing the cause of failure, we identified that the second major concern was the language barrier (English) affecting 22% of the repeater batch students while it was of somewhat less concern in first attempters with only 3.6% of students being affected. This disparity of the language barrier as a cause of failure in the two groups shows that the fluency in English language has a marked and prolonged effect, leading to repeated failures among the students. Several other studies have also documented proportionate relationship between examination results and English language proficiency (Wijewardana et al.,

2018). It was also observed in our study that students with inadequate English skills found it difficult to explain their answers in both theoretical and communicative viva format during the examination which further led to lower confidence, self-esteem and psychosomatic manifestations among them.

The other most common personal factor identified in both the groups was absence of any peer group support. This is the least researched factor accounting for failure. Mentorship plays a vital role in aligning the social structure and academic output. Our study found this factor significant as absence of a well-wisher friend led to disappointment and disinterest in studies.

Living in campus has been shown to impart negative effect on academic performance of medical students (Azari *et al.*, 2015). A study on nursing students also documented adverse effect of being a hosteller on academic performance (Mahdion *et al.*, 2016). Similar results were observed in our study as well where majority of failed students (55% repeaters and 68.4% first attempters) were observed to be hostellers. Staying in hostel accommodation was associated with feelings of home sickness and emotional insecurities in these students.

Several other personal factors identified were parental pressure to select the MBBS course (7.2 % in first attempters and 11 % in repeaters), medical illness (7.2 % in first attempters and 11 % in repeaters), depression (3.6% in first attempters and 5.5 % in repeaters) and sleep disorders (3.6 % in first attempters and 5.5 % in repeaters).

We found a negative correlation between academic performance and internet usage in all the failed students, especially affecting the chronic multiple attempter students. Similar associations of increased mobile and internet usage with anxiety and stress has been documented in both medical and non - medical students in earlier research as well (Gupta *et al.*, 2018; Javaeed *et al.*, 2019). The regularity in class attendance was found to be crucial for academic performance in the present study.

Similar direct relation of attendance and exam result was reported by Subramaniam *et al* (2013) who observed that after the attendance mandate for the medical course in Melaka Manipal Medical College, Manipal, India was increased from 75% to 90%, it led to improvement in students' performance.

We found that multiple personal and academic factors were predominant in our study group which accounted for the failure of these students. Though the problem areas in both groups were similar, the percentage of students affected with the same issues were more profound in multiple attempters. This data projects that if the problem areas are not dealt with on a timely manner, it may have chronic effects leading to the student being repeated for the entire session.

We observed that the most common factor of the feeling of inferiority complex was an amalgamation of various other limitations that the students were facing. Absence of a peer and mentor group and lack of communication of multiple attempter students with the current batch was also observed.

In the present study, while analysing and teaching the students we learnt that clubbing the two groups (multiple attempters and first attempters) together and creating a positive, communicative environment among the learners and between the teacher to the learner acted in breaking the barrier and building trust among each other. Through multiple guiding sessions the students who were hesitant and had an inferiority complex came out of their inhibition, recognised their limitations and displayed active interest in strengthening their learning process. The students became more confident and receptive towards bringing out a positive change among themselves. This eased our effort as a teacher, as the self-driven and self-enthused students dedicated themselves towards the learning process.

Some students required additional effort to overcome their limitations such as language barrier, poor writing skills in theory, and communication problems while attempting viva voce. Hence in the present study after

compiling all the academic and personal issues affecting the failed students, we tried to rectify individual problems of every single student through counselling and academic demonstrations. The students were encouraged to attend classes and actively participate in the deliberations. They were trained to prepare for both theory writing skills and practical *viva voce*. The entire course was revised through a structured schedule of lecture- demonstrations for a period of one month prior to the supplementary examination.

All the 46 students appeared in the first year MBBS Supplementary examination. The result was compiled and compared with the control group with no multimodality learning intervention. We found improvement in the performance of students in both the first attempters and repeat multiple attempt students of our study group. There was a slight improvement of 6.2% in the first attempters after our interventions. The magnitude of improvement was remarkable among repeat multiple attempters with passing percentage of 66.7 % (12 out of 18) as compared to the previous batch which had 100% failure rate.

The present study is the first study of its kind as a similar intervention has not been reported in the literature to date, where we were able to analyze the problem areas accounting to failure but also were able to improve the performance of the failed students.

Hence, we strongly recommend that in medical education we must try to observe and analyze the probable causes of failure as early as possible after the student joins the medical college. The root cause of failure if timely detected can not only improve the performance but also aid in building a positive attitude and limit the cases of stress, depression and suicidal intent among failed students. The present study also highlights the importance of the role of a teacher being not limited to academics but as a compassionate mentor.

Conclusion

An effective multi-modality teaching intervention targeting academic and

psychosocial domains can remarkably improve academic performance in failed students with multiple attempts. Hence an active search for cause of failure and prompt remedial measures can significantly reduce the number of repeated failure students in Medical colleges.

Acknowledgment

None

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