ORIGINAL ARTICLE

ANNALS OF PUNJAB MEDICAL COLLEGE

Effectiveness of Innovative Pedagogical Methods versus Passive Teaching

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Submitted for Publication: 03-03-2023
Accepted for Publication 30-08-2023

How to Cite: Shahid Z, Ali SS, Arshad A, Yousaf M, Sajid AH. Effectiveness of Innovative Pedagogical Methods versus Passive Teaching. APMC 2023;17(3):281-284. **DOI: 10.29054/APMC/2023.1478**

ABSTRACT

Background: Over the past several years there have been growing interest in the active teaching methods by the introduction of innovative instructional strategies as they fulfil the need of developing interests of students in participation and motivation towards learning and retaining knowledge. **Objective:** To evaluate the effectiveness of active and passive teaching methods for improvement in learning and retaining knowledge & to assess the comparison of improvement by diverse teaching methods in Pharmacology. **Study Design:** Academic Interventional Study. **Settings:** Jinnah Medical & Dental College, Karachi Pakistan. **Duration:** 31st August and 1st November 2022. **Methods:** Target population being 100 students of third year MBBS students of Jinnah Medical and Dental College, Karachi divided into 3 groups. Each group was taught the same topic but with a different teaching method. Group 1-conventional/passive method, Group 2-Flowcharts and Group 3-Flipped classrooms. Descriptive was calculated for various variables. Paired t test was used for pre and post testing data of students and Independent t test used for comparison in between quantitative variables. **Results:** Demographic results were significant for students with A levels, day scholars, and self researchers. The noteworthy finding was that the males (n=44) showed most remarkable p value of <0.001 for knowledge and retention. Lecture method and Flipped classrooms with significant p value <0.002 and <0.043 as compared to Flow charts <0.222. Finally, the most notable feature being 62.6% improvement in knowledge of students by active and passive teaching methods. **Conclusion:** Lecture, no doubt is still the most promising teaching method. Flipped classroom also showed worthy improvement & males showing the most significant results for knowledge and retention after intervention of active and passive teaching methods.

Keywords: *Active teaching, Flipped classrooms, Flowcharts, Lectures, Passive teaching.*

INTRODUCTION

Recently, a lot of emphasis had been laid on active teaching methods as compared to the conventional/passive methods. It is seen in literature that although even passive methods can produce knowledge but, it is the active method that gives the chance of understanding.[1] Active methods are student centered and more effective as student approach the ill-defined problems with minimal instructional guidance. It employs high order thinking skills and reflect on their learning with deeper understanding especially in higher education where it is considered as a challenge. The flipped classroom reverses the technique of lectures. Students have to watch online videos before coming to the class and do the class work with the coach or teacher in the class. Many students get frustrated, confused, and fail to adjust to the boring online videos of the unfamiliar topics. However, they get adjusted and more motivated to attend the flipped classroom. Mean teaching scores were found to be higher than typical class lecture.

On the other hand, conventional or passive approach may not promote the cognitive skills because the content is already well organized and presented to the students in an organized manner. It may not promote more than the knowledge and comprehension and the principal difficulty was to pay attention in the class especially the

long lengthy ones.[2,3] Flipped classrooms reported positive change. Students liked the flipped classrooms methods resulting in promoting teaching approaches in terms of motivation, tasks value and engagement. When flipped class rooms were compared with lectures, it was seen that the students that were trained by flipped classroom approach showed better results as compared to lecture based passive approach.[4] Flow meaning sequence. The flow charts are useful tools for schematic representation of steps in boxes are asserted to various operations in a logical manner connecting them with arrows. [5] The rationale of this study is that Intervention of diverse teaching methods to enhance learning experience in all medical subjects. The objective of this study is the effectiveness of active and passive teaching methods for improving learning and retaining knowledge and to assess the comparison of improvement by diverse teaching methods in Pharmacology.

METHODS

Interventional study was carried out on the target audience of undergraduate medical students of MBBS 3rd year students of Jinnah Medical and Dental College because their availability. The students have been divided into 3 groups.

We have taken whole class of 3rd year MBBS so, no need of sample size calculation. We have used non-probability convenient sampling technique. This study was conducted at Jinnah Medical & Dental College (JMDC) Karachi from 31st August to 1st November, 2022.

In this study data collection tool was Questionnaire. The validity of Questionnaire was check by using the Pilot Testing method of face validity.

A topic was selected, and each group was taught the same topic but with a different teaching method. To evaluate the effectiveness exams was be conducted; one at the end of the class (Baseline) and the other 20 days later. The exam consists of theory paper in the form of MCQs. At the end of the evaluation, we will determine by the scores as to which teaching method turned out to be the most effective one for pharmacology. Randomization was done, and verbal/written consent was obtained via the questionnaire. Among 3 groups there were 33 students in each group:

Group 1-conventional/passive method, Group 2-Flowcharts and Group 3-Flipped classrooms. The questionnaire consisted of demographic variables, such as gender, high school education, mode of study and residence. ERC approval # 000212122 was taken from the ethical review committee of Jinnah Medical and Dental College, Sohail University. Data was compiled and analysed using statistical analysis using statistical package for social sciences (SPSS) Version 26. Descriptive was calculated for various variables, and we have used Paired t test because there was pre and post testing data of students. Independent t test used for comparison in between quantitative variables.

After taking informed consent the data was collected. Only the investigators have access to confidential data.

RESULTS

Demographic results were significant for students with A levels, day scholars, and self researchers. (Fig.1)

Figure 1: Distribution of Demographic variables

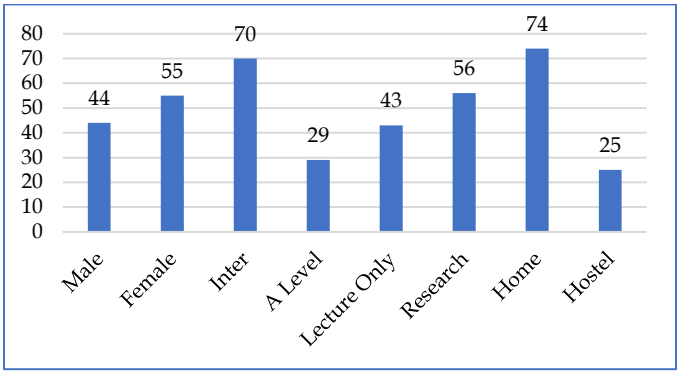


Table 1: Frequency of different variables of study participants

Characteristics		Frequency (%)	Mean (SD)
Age			21.65 (0.951)
Attendance			80.6263 (13.7)
Gender	**Male**	44	
	Female	55	
Board of Intermediate	**Sindh board**	70	
	A level	30	
Mode of study	**Lectures only**	43	
	Self study	56	

This table shows that mean age of the study participants was 21.65 ± 0.951 and mean attendance 80.6263 ± 13.7. there were 55 students, 70 studied from inter board and 56 of them preferred self study for the module exams.

Table 2: Comparison of different Teaching methods on the basis of their Module Exam Scores

Method	Baseline (Mean)	Post Intervention (Mean)	Mean Difference in Scores	P value
Flipped	11.27	12.64	1.37	0.043
Lecture	10.33	12.12	1.79	0.002
Flowchart	11.76	12.36	0.6	0.222

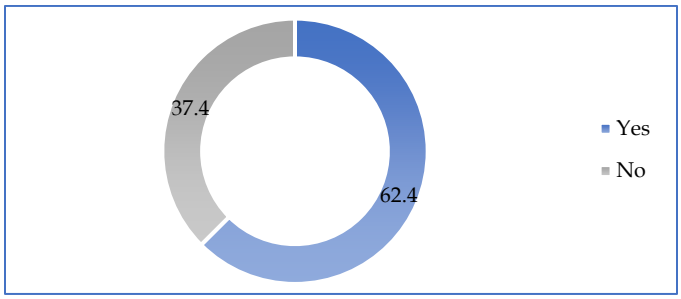
Table 2 shows that the students who were taught through lecture showed statistically significant difference in the mean scores (mean difference =1.79) in the intervention exam with p=0.002. Flipped classroom also showed improvement (mean difference= 1.37) with p=0.043. Flow chart group mean scores didn't show any statistically significant difference between pre-post intervention exam.

Table 3: Difference in scores of Pre and Post intervention among study participants according to different socio-demographic Variables after intervention

		Flipped class room		Lectures		Flow Chart	
		Mean difference	P value	Mean difference	P value	Mean Difference	P value
Gender	Male	2.0	0.05	2.64	0.003	1.467	0.02
	Female	0.833	0.33	1.158	0.111	0.111	0.88
High school	Inter	1.00	0.223	1.455	0.53	0.480	0.402
	A level	2.200	0.07	2.455	0.011	1.00	0.359
Mode of study	Lecture only	2.889	0.001	1.286	0.136	0.364	0.700
	Self-Research	0.469	0.655	2.158	0.008	0.72	0.225

This table shows that Males showed significant improvement in the mean scores in all three-teaching methods p value for flipped classroom was 0.05, lecture p = 0.003 and flow chart p = 0.02. A level showed significant improvement in lecture p = 0.011. students who were only dependent upon materials provided to them for exam showed significant improvement in flipped classroom group with p= 0.001.

Figure 2: Frequency of improvement by all three interventions



DISCUSSION

The study of the teaching method is known as pedagogy. The present study appraised and addressed the current literature on innovative pedagogical strategies in MBBS Curriculum.[6] The preferences of the students should be considered before to improve conditions to meet learning needs of students.[7] The intervention of both Active and Passive teaching methods show improvement of 62.6% in our study Fig. 2. The noteworthy finding was that the males (n=44) compared to females (n=55) showed most remarkable p value of <0.001 for knowledge and retention by active and passive teaching methods Table 2. Gender, the most effective group of at interventional level. (Table 3). This contrasts with the finding in another research in which both females and males showed high level of satisfaction for active learning. The female graduate students preferred active learning over didactic lectures more than the male students.[8] Similarly in another study gender wise, females showed much learning improvement with flipped classrooms as compared to males.[9] The result of this study is congruent with the result shown in another study in which females preferred flow charts for learning by active and passive teaching methods.[10] Fig.1.

According to a research done in 2009, a normal student retains just 42% of what was taught immediately after the lecture and 20% of the learning a week later.[11] This is very much in contrast with our study finding in which there is 8.94% improvement by intervention with the post intervention scores immediately after lecture being 10.33 ± 2.50 (Mean %) and after 2 weeks later is 12.12 ± 2.83 (Mean %) by lecture. Table 2

The lectures are still a common approach in most of the medical curriculum to impart knowledge in medical students based on the available evidence. Traditional Lectures primarily involve a one-way style of communication that is based on passive learning rather than active student interaction method.[12] Interestingly, these findings contrast with our research findings in which lectures were found to be the most significant teaching method with p value 0.002 among the other active teaching methods for knowledge and retention. Students have been found to retain little information in lecture-based science courses.

Flipped classroom comprises of two parts that is, direct computer-based individual instruction taking place outside the classroom and interactive group learning activities within the classroom. The class session is then dedicated to more active learning processes with application of knowledge through problem solving or case-based scenarios. The rationale behind this approach is that teachers can spend their face-to-face time supporting students in deeper learning processes.[13] In this study it was seen that the knowledge and retention of the students increased significantly (P < 0.002) following the implementation of flipped classrooms and

the mean score with significant increase in the pre-and post-intervention scores (mean, SD) of 3.14±0.72 and 3.57±0.69.[14] This is very much similar to our finding in which by the implementation of flipped classroom, the p-value is found significant (P <0.043) with mean score Pre-intervention 11.27 ± 2.16 (Mean %) and Post-intervention12.64 ± 3.60 (Mean %).(Tab. 2)

There are number of researchers that show that the educators are still not clear by the transformation of flipped classrooms as it needs readjustments. Two major concerns are development of the teaching materials and retention of knowledge. There is paucity of evidence regarding flipped classroom for the long-term knowledge retention for learners as compared to lectures.[15] There are numbers of studies that show higher satisfaction with knowledge acquisition of flipped classrooms while on the other hand there are studies that show no significant difference for knowledge retention between lectures and flipped classrooms.[16] Table 3 shows mean difference percentage improvement in knowledge and retention due to intervention in lecture, flipped classroom and flow charts showing 8.93% improvement by lectures as compared to 6.81% in flipped classroom and 3.03% by flowcharts. (Fig. 2) Flow charts are skeletal outline of key concepts. They increased the knowledge of 2nd year undergraduate medical students for role of drugs in cardiovascular diseases.[17] Similarly, another study conducted in which Flow chart is a unique and appropriate for using as mind map giving directions to the students step by step for learning improvement.[18] This study finding is in contrast to our results in which knowledge retention was not found significant with flow charts (p value< 0.222) shown in Table 2.

CONCLUSION

Lecture, no doubt is still the most promising teaching method. Flipped classroom also showed worthy improvement & males showing the most significant results for knowledge and retention after intervention of active and passive teaching methods.

LIMITATIONS

Data Collection done from only one medical college and only 3rd year MBBS class.

SUGGESTIONS / RECOMMENDATIONS

Both active and passive teaching methods should be inculcated in medical subjects to enhance the retention of knowledge

CONFLICT OF INTEREST / DISCLOSURE

There is no conflict of interest.

ACKNOWLEDGEMENTS

We are thankful to the third-year students of Jinnah Medical and Dental College, Karachi forb their cooperation and support.

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