# Comparison of perception of different innovative teaching and learning methodology among second year medical students

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***Abstract*—***Present study was conducted to compare the different teaching methods i.e. Recitation/ Lecture Method, Questioning/ Socratic Method and Student-Seminar Method in medical students of S.M.S. Medical College, Jaipur. The active students 105 participant were randomly divided into three equal groups viz. Group A, Group B and Group C. Then "pharmacological aspect of anti-cancer drugs'' was taught using three different methods individually, to three sets of students group. In Group A students were taught by Recitation/ Lecture method, in Group B by questioning/ Socratic Method, in Group C by Student-Seminar method. The response of all the students was recorded for these three different teaching methods on a five- point likert. Responses of students were analyzed by Statistical Package for Social Sciences (SPSS version 16.0 trial version) and Excel 2010 by one-way ANOVA. In present study Socratic Method scored the best as compared to Student Seminar Method which in-turn scored better than Recitation Method. In present study, participants also suggested changing the order in which pharmacology topics are taught. The innovative teaching was found to be useful and feasible as adjunct to didactic lectures. Therefore, the present study suggests that there is need to implement pioneer teaching methods for active participation, more attention, and motivation of students.*

***Keywords: Innovative teaching methods, Recitation, Questioning, Student- seminar, Socratic Method.***

## I. INTRODUCTION

Over the past few years, teachers in the medical profession are adopting new training strategies, which are more students friendly and helpful for better understanding. Advances in technology have evolved the teaching methods in pharmacology.[1]Although the pharmacology is rapidly, evolving and expanding branch of medical science but it is still perceived as dry and volatile by medical students. [2] The primary objective of teaching pharmacology at the undergraduate level is to facilitate the medical students to take rational therapeutic decisions in clinical practice but due to surplus content, students often find it hard to memorize and recall the pharmacological terms, concepts and drug names in the subject.[3] For a better understanding of pharmacology, there is need of continuous review and modification in teaching and evaluation methodology in pharmacology.

Innovative active learning modules will promote more interaction among students, encourage their enthusiasm, create significant learning environment and help in remembering the topics.[4] Innovative teaching involves interchange of thoughts between teachers and students. There is a lot of active involvement among the participants leading to learning that is more effective.[5]

In most of the medical colleges, pharmacology is taught by traditional teaching methods like lectures in whole class and practical based on experimental and clinical pharmacy. Traditional lecture method is

teacher centered and students participation is minimal. [6] In lecture method, integration of subject is minimal and as a result, students are not able to apply knowledge of drug information in actual clinical posting.

It is clear from the recent studies that students need to be taught through interactive lectures since it is quite evident that traditional way of imparting lectures are characterized by poor attendance rates.[7] In a number of medical colleges' newer non-traditional method like Patient Oriented Problem Solving (POPS), Problem Based Learning (PBL) and Computer Assisted Learning (CAL) are also used to teach pharmacology.[8, 9] In S.M.S. Medical College, Jaipur, pharmacology is mainly taught by means of didactic lectures, which include tutorials and practical classes, that is mainly teacher-centered which leads to unidirectional learning. To promote student successes and produce graduates with transferable skills, there is an immense need to move from traditional teacher focused, didactic teaching to more student focused methods that actively engage students in the learning process.[10]

Therefore it is very important to develop an innovative way of teaching that can concurrently serve a large number of students while engaging them in the learning process. Many studies have been conducted which compare the different teaching methods like seminar method, student-led seminar method, lecture method, structured interactive lectures and conventional lectures[11, 12] There is strong demand among students from our institute for adopting newer teaching methodologies. Keeping this view, the present study has been designed to implement innovative teaching methods in pharmacology teaching of MBBS Students. This study was aimed to compare the recitation/ lecture method with two innovative teaching methods i.e. Questioning/ Socratic Method and Student- Seminar method.

## II. METHODOLOGY

This comrative type of study conducted on 105 MBBS students under Department of Pharmacology, SMS Medical College, Jaipur (Rajasthan) India in year 2018

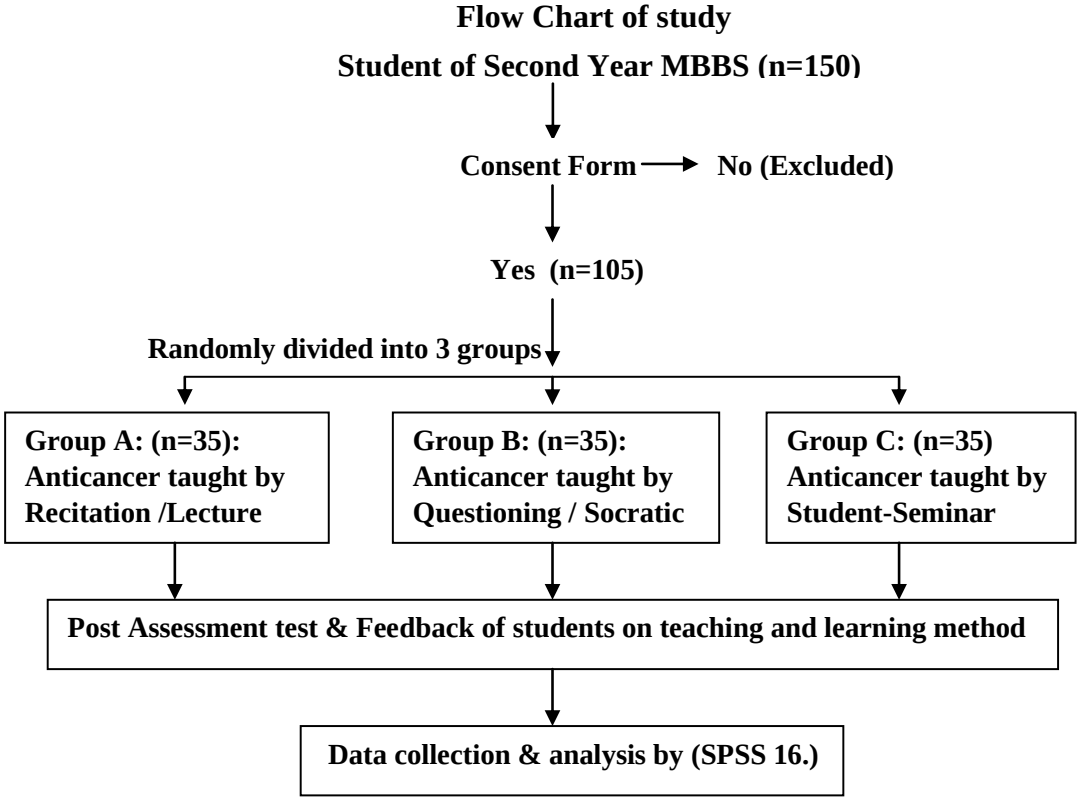
For the present study initially 150 MBBS students of 2nd year batch attended at the department of Pharmacology, S.M.S. Medical College, Jaipur. Institutional Ethics Committee, approval was taken to conduct the study. The procedure of study was described to each student. A written informed consent was taken from each active participant and excludes those who have not adhered to the procedure of the study. The active participant were 105 students who were randomly divided into three equal groups viz. Group A, Group B and Group C, which consisted of 35 students each.

**Study design**: The topic taken for observational analysis in present study was "pharmacological aspect of anti-cancer drugs" which was taught using three different methods individually, to three sets of groups.

- In Group A, students were taught pharmacology aspect of anti-cancer drugs by recitation/lecture method in which lecture was delivered by power point presentation.
- In Group B students were taught by Questioning/Socratic Method in which lecture handouts containing Question/Answers of anticancer drugs were distributed in the classroom. After obtaining the response, a tutorial session was initiated to clear the doubts.
- In Group C students were taught by student-seminar method. In this method, students were randomly given topics regarding anticancer drugs and asked them to prepare a seminar on these

topics and present it in the class. The presentation session was combined by a live interactive discussion which mainly focused on the presenting and concept grasping skills.

In order to analyze the performance of the above mentioned methods, a post–test was conducted in the form of multiple choice questions, consisting of 30 questions. The response of the students for three different teaching methods was analyzed by predesigned and pre-validated self-administered Questionnaire[3,14] with minor modifications in which all the students were asked to rank the given questions on a five- point likert scale i.e. 1 (strongly disagree), 2 (disagree), 3 (neutral) 4 (agree) and 5 (strongly agree). The grading on each statement was used to calculate the final score.




**Statistical analysis**: Collected Data was analyzed using following software tools namely SPSS for Windows, version 16.0 Chicago, SPSS Inc. (Trial Version) and Excel 2010 by one way ANOVA. The mean scores, standard deviation and P-value were calculated for each group. Chi-square test was used for demographic data. The P- value less than 0.05 ($P<0.05$) was considered to be statistically significant.

## III. RESULTS

In present study, total 105 professional students of 2nd year MBBS were included in this study. Of the total participants, 58% were males and 42% were females. The mean ± standard deviation age of the participants was 19.6±2.0 years. Students were in the age group of 21-24 years.

Responses of the students were analyzed in terms of percentages and Mean±SD as tabulated in Tables and Figures mentioned below.

**Response of Medical students**: The response of the students to the questions related to innovative teaching methods is given in Table 1. It was found that in most of parameter studied it was significant ($p<0.05$) difference as per type of teaching method except in 'Constructive and interactive lecture'. In most of parameters questioning method was best except 'Useful and clarified doubts', 'Delivery of

lectures was interesting' and ' The content of lectures was well organized' where seminar method was best among three teaching method. Otherwise in all studied parameters like ' Increased understanding of the topic', 'Gained more knowledge and stimulated', 'Promoted autonomy and self-directed learning', 'The lectures were interesting and stimulating', 'Felt encouraged to Discuss' and 'Created a positive learning environment' Questioning/Socratic Method was best following seminar and Lecture method. (Table 1)

**Table 1**
**Medical students' opinion of the lectures using different teaching aids (n=105) (Mean score on five-point Likert scale).**

| Questionnaire Statement | Group A (n=35) | Group B (n=35) | Group C (n=35) | P value |
|---|---|---|---|---|
| 1. Increased understanding of the topic. | **2.5(±1.3)** | **3.4(±1.3)** | **3.1(±1.6)** | **P=0.028** |
| 2. Gained more knowledge and stimulated thinking. | **3.0(±1.5)** | **3.9(±1.2)** | **3.3(±1.3)** | **P=0.019** |
| 3. Promoted autonomy and self-directed learning. | **2.9(±1.5)** | **3.8(±1.3)** | **3.6(±1.4)** | **P=0.022** |
| 4. Constructive and interactive lecture. | **2.7(±1.5)** | **3.3(±1.5)** | **2.9(±1.4)** | P=0.224 |
| 5. The lectures were interesting and stimulating. | **3.2(±1.6)** | **4.0(±1.0)** | **3.7(±1.4)** | **P=0.049** |
| 6. Felt encouraged to Discuss. | **2.7(±1.4)** | **4.1(±0.9)** | **3.7(±1.3)** | **P<0.001** |
| 7. Created a positive learning environment. | **2.5(±1.3)** | **3.4(±1.6)** | **3.1(±1.4)** | **P=0.032** |
| 8. Useful and clarified doubts. | **2.9(±1.5)** | **2.1(±1.3)** | **3.5(±1.3)** | **P<0.001** |
| 9. Delivery of lectures was interesting. | **2.8(±1.5)** | **3.6(±1.3)** | **3.8(±1.4)** | **P=0.021** |
| 10. The content of lectures was well organized. | **3.1(±1.4)** | **3.4(±1.3)** | **4 (±1.0)** | **P=0.011** |

The answers of students were recorded on Likert scale. Total scores and assessment of knowledge and retention were shown in figure 2 & 3 respectively, where Questioning/Socratic Method shows highest scoring.

**Figure 2**
**The total response scores by three different educational interventions**

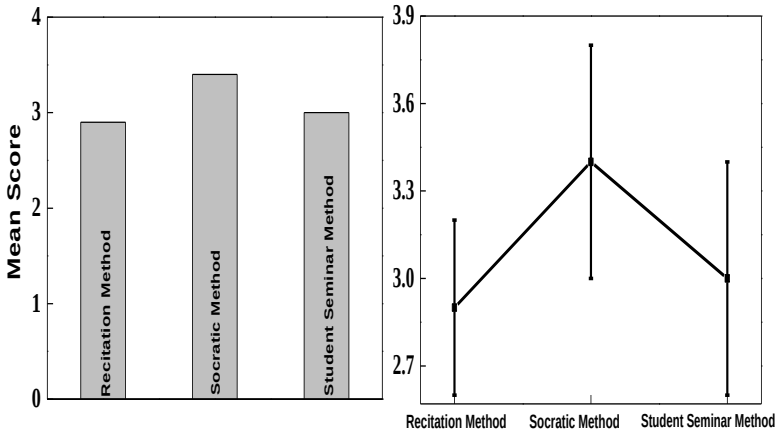
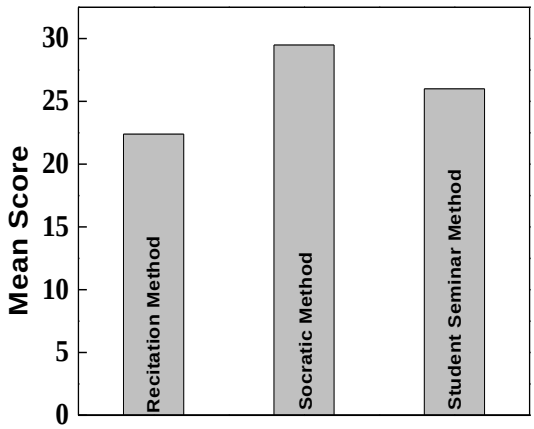



**Figure 3**
**Assessment of knowledge and retention (Post test result).**



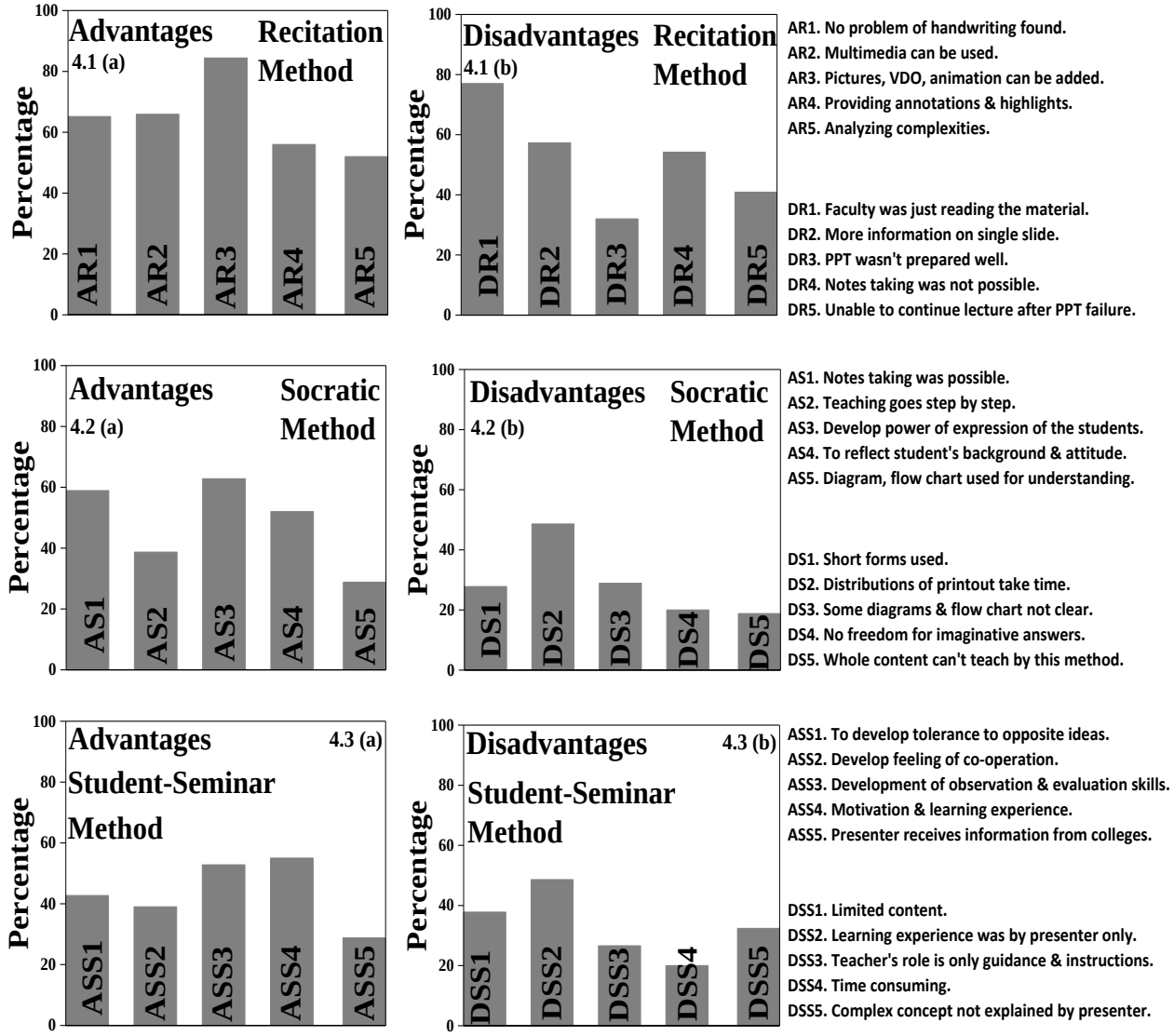
A feedback was taken from the students in form of suggestions where majority suggest that there is need to change the traditional method. (Table 2)

**Table 2**
**Suggestions and Feedback given by students**

| |
|---|
| 1. Microteaching in groups of 6-7 should be included to teach pharmacology. **42.0%** |
| 2. Computer or projector teaching learning method should be more. **34.5%** |
| 3. Problem based learning should be increased. **53.2%** |
| 4. Museum study for pharmacology should be included. **28.9%** |
| 5. Theory & Practical examination papers should be discussed during class. **52.4%** |
| 6. Need to change the order of pharmacology topics taught. **60.8%** |
| 7. Pharmacology should be taught by correlating with clinical cases. **61.3%** |
| 8. Socratic Method should be included. **58.2%** |

The advantages & disadvantages were also considered for each method for evaluating the results as shown in Figure 4

**Figure 4**
**Advantages and Disadvantages of Different Teaching Methods**



## IV. DISCUSSION

It is essential to evaluate the teaching methods in order to stride advances in imparting education and cope with up with the challenges faced by the students. It is prerequisite of medical teachers to apply innovative teaching methodologies that facilitate deep and meaningful learning. The present study is an effort to improve the quality of medical education with the use of innovative teaching methods. During this study, advance-teaching methodologies were discovered, which could be included in conventional pharmacology teaching to make the subject more interesting and comprehensible. Suggestions given by the students were also included in the study. Majority of the participants (60.8%) suggested need of some modifications in which pharmacology topics are taught. The suggestions and feedback given by students are an essential part of learning. It is generally known that active learning allows teachers to obtain feedback from students and these suggestions and feedback serves as an efficient tool in developing teaching methodology. In addition feedback and suggestions throw a vital light on the students perception, on the strategies used and give an insight to their learning needs.[15,16]

In present study three teaching methods i.e. Socratic Method, Recitation Method and Student Seminar Method were compared. Each method has its pros and cons which has also been deliberated on in this study.

Starting with Recitation Method, major advantage of this method is that the study material is rich in content having x-ray, pictures, videos and animations, which makes learning easy. Roopa B. et al (2015) [17] had reported similar advantages of lecture method. But major disadvantage of this method is that while delivering lecture faculty seems to be reading the material rather than explaining it. Shaffer K (2004)[18] stated the similar findings during his study.

For Socratic Method students think that it is helpful for developing power of expression, while on the other hand majority of students' opined that it is time consuming method. In Student Seminar Method, participants observed that it develops power of observation and evaluation but learning experience is limited to presenter only.

The Present study highlights the inclination of medical students in descending preference order as: Socratic Method > Student Seminar Method> Recitation Method that could be compared by observing the mean value as shown in Figure 2.On comparing the responses to the Questionnaire it could be concluded that majority of students prefer Socratic Method as shown in Table 1. Mean Likert scores for questions 1, 2 and 3 as shown in Table 1, expresses statistically significant score for Socratic Method as compared to other two methods. Highest score of Socratic Method indicates that it is a useful teaching aid to understand the concepts of anticancer drugs. Most of the students were motivated and encouraged to discuss the topic among themselves and with the teachers in case of Socratic Method. The results of the current study provide an objective measurement of the strengths of Socratic Method because Socratic Method satisfies student's perceived needs in their education. The present study suggests that there is need to implement pioneer teaching methods.

## V. CONCLUSION

This present study concluded that the students prefer innovative teaching method as compared to the didactic lecture. Because innovative teaching methods like Socratic Method, Student Seminar Method motivates the students to participate in the class and helps to retain the concepts of pharmacology. So

different methods of innovative teaching should be planned in a large group to break the monotony of conventional lecture practices.

## CONFLICT OF INTEREST

None declared till now.

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