

Comparative study of effectiveness of computer based knowledge in teaching versus conventional teaching perception in pharmacology among second year MBBS undergraduate medical students at Maharajah's Institute of Medical Sciences, Andhra Pradesh, India

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ABSTRACT

Background: Medical education has been asserted as one of the most challenging, demanding, and stressful fields of study, as medical students are expected to acquire diverse competencies such as academic, clinical, and interpersonal skills. Pharmacology is rapidly evolving and expanding conquering many diseases in its stride. The survey-based study we aim to grasp the MBBS students' opinion regarding the teaching practices in pharmacology. Aim was to Study and compare the Effectiveness of Computer Based Teaching Versus Conventional Teaching Perception About Pharmacology Among Second Year MBBS Undergraduate Medical Students.

Methods: A comparative study was conducted at Department of Pharmacology, Maharajah's Institute of Medical Sciences, Nellimarla, Vizianagaram, Andhrapradesh. Two hundred second year MBBS medical students (n = 200) were divided into two groups.

Results: In this study results shows P value and statistical significance the two-tailed P value is less than 0.0001 by conventional criteria, this difference is considered to be extremely statistically significant. Confidence interval the mean of Pre-test score minus Post test score equals -3.1900 and 95% confidence interval of this difference from -3.4503 to -2.9297.

Conclusions: The importance of pharmacology in clinical decision making is well understood by the majority of students and they aim to act in that behest. Also, we find that computer based learning is a new and important tool coming up in the arsenal of the pharmacology teacher.

Keywords: Feedback, Medical students, Pharmacology, Teaching

INTRODUCTION

Medical education has been asserted as one of the most challenging, demanding, and stressful fields of study, as medical students are expected to acquire diverse competencies such as academic, clinical, and interpersonal skills.¹ Pharmacology is rapidly evolving and expanding conquering many diseases in its stride. Though a backbone

of modern medicine, it is perceived as dry and boring subject by many undergraduates.² Some of the reasons for this perception could be the vast nature of the subject and having to memorize some of the details of the drug.³ Traditional Pharmacology teaching includes didactic lectures with audiovisual aids, tutorials and seminars.⁴ Also animal experiments, prescription writing, and clinical problems solving included additionally.⁵ It is difficult to

mend student perception with traditional methods of teaching, though some modification in teaching-learning methodology could be tried. Such attempts have been made all over India to make the teaching of pharmacology more interesting and relevant.⁶

However use of animals for teaching and learning of pharmacology has shown a downward trend over the last decade due to ethical concerns, practical problems associated with the animal experiments such as availability of animals, cost of purchasing animals and maintaining animal houses.⁷ Due to serious ethical concerns related to use of animals for experiments, the University Grant Commission (UGC) has decided to stop the animal experimentation for undergraduate students.⁸

The field of pharmacology and therapeutics go hand in glove and therefore are better presented to the medical student as pharmacotherapeutics.⁹ The teaching of pharmacology in medical college of India has evolved from mere didactic lectures to audio-visual aid based lectures and computer based learning.¹⁰ Evolution of teaching methods is an on-going process and a docent needs proper feedback from the pupils regarding their opinion on what is satisfactory and what needs improvement.¹¹

The importance of including students input in education is accepted as a key component of processes used to monitor the quality of academic programs.¹² Effective evaluation provides valuable information, which contributes to both student and course success. Medical education system is capable of teaching students the required proficiency in their respective fields.¹³ The routine assessment of the efficacy of dental education is important to improve faculties, departments, and institutions. The efficacy of education can be determined by observing the extent to which the provided instruction fulfils its intended purposes and objectives.¹⁴

Problem based teaching gives the clinical application of knowledge acquired and makes the student write a rational prescription for a particular case and helps solving problems in real therapeutic situations. Disadvantages are until proper basic knowledge about drug's uses and adverse effects are understood, application cannot be done.¹⁵

Research supports the viewpoint that a learner's experiences are invaluable for assessment of teaching methodology. Thus, by way of this survey-based study we aim to grasp the MBBS students opinion regarding the teaching practices in pharmacology.

METHODS

A comparative study was conducted at Department of Pharmacology, Maharajah's Institute of Medical Sciences, Nellimarla, Vizianagaram, Andhrapradesh. Two hundred members of second year MBBS medical students (n = 200)

were divided into two groups. Group A included students with odd roll numbers and group B with all even roll numbers.

The questionnaire was derived and inspired from previous studies done in this field and was modified according to the current relevance. The survey was conducted after pharmacology lectures and practical's in the department itself and was deemed optional for the participating students. The data was collected and tabulated in an anonymous fashion to avoid any conflicts and bias. Pre-tested objective type questionnaire consisting of 6 questions each having one mark was given for evaluation in both pre and post-test.

There after two didactic lecture classes were taken for the students on treatment of diabetes mellitus, before teaching of therapeutic problem. While assessing on problem based learning ,all students were dealt together and all faculty members helped as facilitators. A similar pre and post test was conducted for evaluation by giving 7 similar questions to all students. At the end, the students were given one separate question for giving their choice on different modules by grading them in 6 categories and result analysed. suggestions were asked about the qualities of good pharmacology teacher, modifications in pharmacology teaching methodology and scope of pharmacology. During the session, there was discussion between the students and the teacher on the topic and how to write the answers to the questions. Difficulties of students were also solved during the session. Along with thorough discussion on the topic and difficulty solving, answers to question in question bank were also discussed. The feedback was taken on clarity of objectives, interesting or not, explanation of procedure, research orientation, retaining capacity and correlation with theory knowledge, each on Likert's scale.

Statistical analysis

Descriptive statistics were employed for evaluation of the data. Frequency of data was expressed as percentage wherever applicable. SPSS 17 and Graph pad prism 4version were utilized in the statistical analysis of the data.

RESULTS

Opinion about Pharmacology being interesting before the study was 40% and after 60%. Order of preferences as most interesting teaching methods are Tutorials, Lectures, Demonstrations, Experiments, Case study and Seminars.

Figure 1 shows related about When asked about their viewpoint of the importance of pharmacology in clinical decision making, a majority of the students (58%) voted it to be of paramount importance. Only 6% of the repliers considered pharmacology to be of not much significance in clinical decision-making strategy. When investigated on their preferences for experimental pharmacology, 49% of

the students wanted animal experiments and 36% favored computer-based learning.

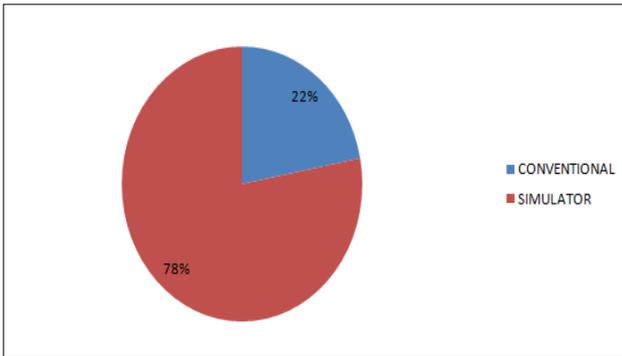


Figure 1: Students preference of teaching method in feed back.

Table 1 shows the P value and statistical significance, the two-tailed P value is less than 0.0001 by conventional criteria, this difference is considered to be extremely statistically significant. Confidence interval, the mean of Pre-test score minus Post test score equals -3.1900 and 95% confidence interval of this difference: From -3.4503 to -2.9297. Intermediate values used in calculations: $t = 24.1632$, $df = 198$ and standard error of difference = 0.132.

Table 1: Comparison and assessment of pre and post test scores of therapeutic problem (practical based learning) in the chalk and board group.

	N (sample size)	M (Mean)	SD (Standard deviation)	P value
Pretest score	100	0.61	0.23	<0.0001
Posttest score	100	3.8	1.3	

Table 2: Comparison and assessment of pre and post test scores of therapeutic problem (Practical based learning) in PPT group.

	N (sample size)	M (Mean)	SD (Standard deviation)	P value
Pre-test score	100	0.48	0.21	<0.0001
Post test score	100	4.2	0.9	

Table 2 shows the P value and statistical significance, the two-tailed P value is less than 0.0001 by conventional criteria, this difference is considered to be extremely statistically significant. Confidence interval, the mean of Pretest score minus Post test score equals -3.7200 and 95% confidence interval of this difference: From -3.9022 to -

3.5378. Intermediate values used in calculations: $t = 40.2521$, $df = 198$ and standard error of difference = 0.092.

Table 3 shows the P value and statistical significance the two-tailed P value is less than 0.0001 by conventional criteria, this difference is considered to be extremely statistically significant. Confidence interval, the mean of Pre-test score minus Post test score equals 4.0600 and 95% confidence interval of this difference: From 3.8068 to 4.3132. Intermediate values used in calculations: $t = 31.6166$, $df = 198$ and standard error of difference = 0.128.

Table 3: Comparison and assessment of post-test PPT score and pre-test of therapeutic problem (Practical based learning) score.

	N (sample size)	M (Mean)	SD (Standard deviation)	P value
Post test score of PPT	100	4.6	1.27	<0.0001
Pre-test score of Therapeutic problem	100	0.54	0.19	

Figure 2 shows Sixty two per cent of the students found lectures as the most communicative method of teaching in pharmacology. Tutorials (6%) and experimental pharmacology exercises (7%) were considered the least effective teaching module by the students.

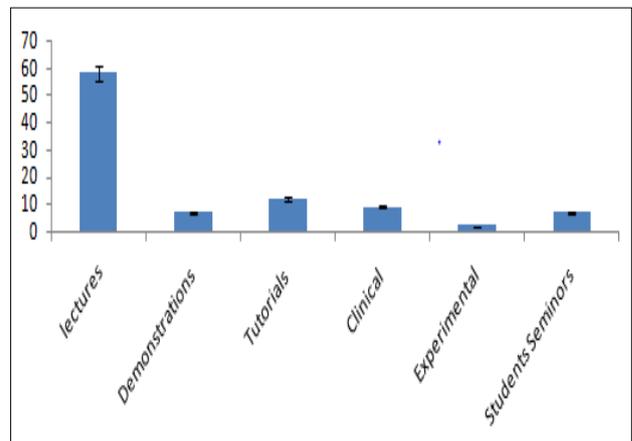


Figure 2: Teaching aid maximally communicative.

DISCUSSION

Although lecturing is one of the most widely used teaching methods in undergraduate teaching of pharmacology and seems to be appropriate method for providing information, it does not promote thinking and deep learning Banning M. et al.¹⁶ The didactic lecture method has been immensely criticized by various researchers in the past and has prompted many innovations in teaching pharmacology at

different medical schools. In the present study, all the students from the class got opportunity to attend the lectures of clinical conditions included in the study. After the lecture, they were exposed to other methods in small groups. Study correlated Draper SW et al, shows that to gain knowledge, interactive lectures i.e. tutorial and group discussions were more useful. Students accepted and preferred interactivelectures.¹⁷

The students overwhelmingly preferred Essentials of Medical Pharmacology by KD Tripathi et al, as their text book of choice and had an inclination towards the hard copy version of books compared to electronic versions (e-books).¹⁸ This indicates that although students have access to newer reading methods, the age-old trusted method of hard copy text book reading still holds true in the majority of the cases. A combination of lectures and notes was the preferred method of study and thus again underlines the importance that lectures hold in the teaching methodology of pharmacology. From our study we also find that a majority of the students regularly studied the subject which highlights the students' awareness regarding the importance of the subject as well the interest it manages to garner from them. Problem based learning (Therapeutic problem) there is no evidence available to evaluate the impact of problem based learning process. In this study all the three types of teaching shows significant improvement in the similar extent. Shulman LS et al.¹⁹ Power point presentation there is significant improvement in post test scores compared to pretest scores with PPT aiding the lecture which correlates with Henkel CK et al.²⁰

CONCLUSION

The importance of pharmacology in clinical decision making is well understood by the majority of students and they aim to act in that behest. Also, we find that computer based learning is a new and important tool coming up in the arsenal of the pharmacology teacher. The study recommends use of computer assisted method for teaching. Study also points out need of computer training for the faculty and students as well as availability of more advanced simulators for demonstration and practical for undergraduate students. Though Tutorials ensured understanding as reflected in the test scores, students perceived case scenarios as the most interesting learning mode.

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