

Students' perception and practice in learning basic pharmacology through a 'Project Based Learning' programme

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ABSTRACT

Introduction: Pharmacology cannot be learnt exclusively in the confine of a classroom. Students need to work extensively on analysing the basic principles of pharmacology in terms of their application in management of real life patients during their second year of medical curriculum.

Aim: A novel teaching learning model in undergraduate pharmacology was tried and the impact on second year medical students in a medical college of West Bengal was analysed.

Methods: Students were taught basic principles of pharmacology for two months in the scheduled lecture classes. Then these topics were assigned for project work in groups. They tried to correlate these concepts with the management of individual patients encountered during clinical postings with the help of a teacher acting as a facilitator. After two months of self-reading, hospital learning and interaction in groups, they expressed their knowledge on the assigned topics by means of charts or models in their own innovative manner.

Results: The mean score with regard to interest in the subject increased from 4.07 to 7.05 after the project. There were similar increases in the scores related to various other domains of learning. The project made them discuss the subject with friends and search related information 50% more than previously.

Conclusion: This novel project based learning helped the students in understanding the concepts of pharmacology better. They were able to remember and liked subject more after the project. Fruitful time spent before the computer and with friends discussing the subject increased following the project.

Keywords: undergraduate pharmacology, project based learning, didactic lecture

INTRODUCTION

Medical students often complain of monotonous pattern of academic activities which fails to build their interest in learning. Mere memorizing fact is pointless. One needs an in-depth understanding of various issues as well as the ability to analyze the topic and build arguments.¹ Pharmacology is a subject which has to be learnt thoroughly in order to treat the patients. It serves as a foundation stone for clinical practice.² This discipline is covered in Phase II of graduate medical education curriculum of the Medical Council of India (MCI). Unfortunately, this conventional lecture based curriculum provides less scope for an extensive study and in depth understanding of the basic concepts of pharmacology and their practical implications. This leads to confusion when students are later exposed to real life patients.

Project Based Learning (PBL) involves projects that incorporate 'complex tasks, based on challenging questions or problems that involve students in design, problem-solving, decision-making, or investigative activities; give students the opportunity to work relatively autonomously over

extended periods of time; and culminate in realistic products or presentations'.³ Research shows that active participation in project-based education results in students being more intrinsically motivated, more likely to show conceptual understanding, and more well adjusted than students in traditional education modes.⁴ However, there is lack of research in PBL in the field of medical education.

Studies have also stressed the need for interactive learning of medical science. Clinical teaching and learning must be an intellectually challenging experience whereby students, through extensive interactive teaching, are able to gain thorough conceptual understanding.⁵ Students working on a particular project in groups have scope for spontaneous and focused interaction. Research on students' self-perceptions of their academic ability reveals that self-perception can impact school performance and motivation for doing academic and career orientated tasks.⁶ Therefore, the present study intends to evaluate the impact of a PBL approach following conventional didactic lectures on the perception and practices of students regarding learning Pharmacology.

MATERIALS AND METHODS

The study was a one-group, before-after study performed on 2nd year MBBS students in August 2011 in the College of Medicine and JNM hospital, Kalyani, West Bengal. Prior ethical clearance from the Institutional Ethics committee and informed consent from the students were obtained. Seventy students participated in the study.

A questionnaire pretested on 10 volunteer students and again validated by the Principal of the college was used. It included 2 sets of parameters: questions probing their perception on learning pharmacology (rated out of total 10 marks); and questions on few learning practices (rated as average number of hours in a day spent on a particular practice).

After 2 months of usual didactic lectures on the basic concepts in pharmacology, the participants were assessed using the questionnaire. Then the already discussed topics were divided among them in groups of 2 or 3 to work upon as project. In an initial session for their sensitization, the teacher explained the central theme i.e., 'clinical applications of basic pharmacology- the foundation of pharmacotherapy in human ailments' using few case presentations. In the next 2 months, they were required to analyse the pharmacological concepts in their respective topics in relation to individual patients encountered during their scheduled clinical postings. They were also advised to regularly discuss the topic and share their experiences in respective groups in the evening. One hour on all week days (except holidays) was allotted when the students were free to meet the teacher to discuss their experiences and clarify doubts. The teacher performed the role of a facilitator encouraging and guiding them.

At the end of 2 months, the students in respective groups submitted a project report on their assigned topics in the form of a chart, model etc. Innovative way of presentation was encouraged. After the completion of PBL program, the students were re-evaluated using the same questionnaire.

Statistics: Mean and standard deviation of the

scores was calculated. Paired- sample 't' test was applied to find out the difference in mean scores of the students before and after the project. Independent 't' test was used to see the significant difference between the scores and hours devoted to pharmacology of male and female students. Two-tailed significance test with 'p' value of 0.05 or less was considered to be statistically significant. SPSS 16.0 version was used for analyses.

RESULTS

Out of 70 students evaluated, 42 (60%) were boys. The mean scores of students in the various aspects related to the perception of learning pharmacology before the project was low. These scores increased significantly after the project work (table 1). Female students were more interested in the subject and were able to remember the topics more than male students (mean scores 4.29 vs 3.93, and 3.21 vs 3.17 respectively). Male students were marginally better in understanding the concepts of pharmacology (mean score 3.95 vs. 3.94). The difference in scores between males and females were not significant though.

Students were using computer/internet on an average for 1.07 hour daily before the project. It increased significantly to 1.35 hours after the project. A quarter of time spent before computer was utilized to learn pharmacology. It increased considerably to 60% after the project. The project made the students interact more with themselves (mean hours spent with friends increased from 2.79 hours to 3.81 hours). Time spent with friends on discussing pharmacology was increased from 27% to 76% during the project work (table 2). Male students were using computers more than females (mean hour per day spent before computer was 1.19 vs .89). But females were devoting more time to the subject before the computer relative to males. Females were spending more time with their friends than males before the project. But it gets reversed after the project. Time spent before computer or with friends was not significantly different amongst males and females.

Table 1.: Perception of students regarding learning Pharmacology before and after the project

Item	Mean (SD) score before the project	Mean (SD) score after the project	t statistics	P value
Interest in the subject (Pharmacology)	4.07 (2.01)	7.05 (1.49)	13.59	.000
Understanding of concepts in Pharmacology	3.95 (1.70)	6.86 (1.43)	13.30	.000
Ability to remember information related to different topics in Pharmacology	3.19 (1.63)	5.54 (1.60)	11.30	.000

Table 2. Practices of students with regard to learning Pharmacology

Item	Mean (SD) hour before the project	Mean (SD) hour after the project	t statistics	p value
Time spent before computer and/ or internet per day	1.07 (1.35)	1.35 (1.49)	4.01	.000
Time spent before computer and/ or internet learning Pharmacology per day	0.27 (0.68)	0.81 (1.10)	4.75	.000
Time spent in the company of friends per day	2.79 (2.23)	3.81 (2.18)	5.13	.000
Time spent in the company of friends discussing Pharmacology per day	7.57 (1.11)	2.90 (1.41)	11.92	.000

DISCUSSION

Pharmacology is an essential subject for medical students from 2nd year onwards. The basic principles of pharmacology in terms of pharmacokinetics and pharmacodynamics are relevant in every case of patient management. Therefore, this section of medical teaching-learning goes a long way in shaping the student's future. The didactic lecture method has been immensely criticised by various researchers in the past and there have been innovations in teaching pharmacology at different medical schools.⁷ We devised a new model to make the subject interesting to the students. There was almost 50% increase in each aspect of perception and practice related to learning pharmacology after the project. Though the time spent before the computer/internet and with friends increased marginally after the project, proportion of time spent exclusively for the subject increased substantially. This may be due to the pressure of presenting their knowledge on the stipulated date.

A study done in a medical college of Nepal has identified that 80% of students liked a judicious mixture of the didactic lecture and PBL in the subject Physiology during their first year of medical school.⁸ The present study is a step further as it tries to evolve a modified medical teaching learning approach incorporating lecture classes

supplemented by interactive and hospital based learning under specific objectives set by project topics. There are significant increases in scores related to understanding and likeness of the subject after the project work.

There are some limitations of the study as we did not directly compare the traditional lecture classes with the PBL initiative. But the scores before the project work may be taken as the score after the lecture classes and there were significant increase in all the scores proving that PBL helped students in learning the concepts of pharmacology better. However, the increase in time devoted to pharmacology after the project work cannot be attributed wholly to the project work as other routine classes also continued during this period. The work is important in showing how the innovative models of teaching can make a subject more interesting and appealing to medical students.

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