

Review Article

A SURVEY ON METHODS OF UNDERGRADUATE PHARMACOLOGY TEACHING

MOHANBABU AMBERKAR, LALIT MOHAN, MEENA KUMARI, BAIRY K.L

For Author affiliations see end of the text

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ABSTRACT

Introduction-Knowledge of pharmacology to choose and prescribe drugs is a major challenge encountered by medical practitioners. A number of initiatives have been carried out to improve the teaching of pharmacology and applied therapeutics. **Material & methods**-A survey was conducted on medical students, pursuing pharmacology at Kasturba Medical College, Manipal, during the month of August 2010, to obtain information regarding students

INTRODUCTION

Pharmacology is a field that encompasses drug composition and properties, mechanism of action, therapeutic effects, interactions, adverse effects and contraindications of drugs. In India it is introduced in third semester to the medical students and is horizontally integrated with other paraclinical subjects like microbiology, pathology and forensic science. The training in Pharmacology takes place by way of didactic lectures, audiovisual aids, problem based learning methods using various clinical problems and practical curriculum includes animal experiments, prescription writing, and solving the clinical problems. Pharmacology curriculum plays an integral role in medical education. Learning pharmacology to choose and prescribe drugs is a major challenge encountered by students.^[1] Traditional pharmacology teaching does not prepare well the students for rational selection of drugs.^[2]

It is generally opined that teaching pharmacology course in medical schools has failed to keep pace with the rapid changes in medical practice.¹ Many attempts have been made to improve the teaching of pharmacology and therapeutics. It is easier to take a lecture on calcium channel blockers than to teach students how to select one for a particular indication / type of patient. Closely linked to this aspect is how prepared are we mentally, logistically, and academically to take up these challenges?^[3]

attitude towards Pharmacology. **Result**-Two hundred and fourteen students participated. The total median score was 56 (maximum score 80). Majority of them suggested to have more problem based learning than didactic lectures and to have integrated teaching with other clinical subjects. Suggestions to improve pharmacology teaching were noted. **Conclusion**-The findings of the study would be of interest to medical educators in modifying undergraduate pharmacology teaching programme .

Key words-pharmacology; problem-solving; student attitude; survey; teaching.

In china the present day pharmacology course consists of a combination of lectures, problem based learning sessions, clinic-correlated lectures and small group discussions.^[4] In Malaysia, pharmacology learning has gradually moved from factual regurgitation to more clinical reasoning, from laboratory based medicine teaching to more patient oriented approach.^[5] At the Mc Master University in Canada the problem based learning curriculum is integrated across organ systems, spanning population and behavior related perspectives, rather than being based on discrete disciplinary areas.^[6]

Animal experiments like bioassay have lost their relevance in undergraduate pharmacology programme, there are better tools and methods like computer assisted learning, which can teach the receptor pharmacology and demonstrate action of drugs on animal tissues.^[7,8]

Curriculum development is a scholarly process.^[9] It integrates the theory and methodology to evaluate its impact. Curriculum evaluation consistently has found to play an important role in modifying the curriculum. The curriculum needs to be assessed for its merit, which is done by evaluation methods based on the goals of the curriculum. The aim is student should develop transferable skills, which would help not only for undergraduate education but to learn throughout the medical career.^[10]

In Kasturba Medical College, Manipal, the lectures are delivered either through powerpoint presentation, slide projector or blackboard. The practical classes are conducted in the departmental laboratory for a duration of two hours. They are conducted in small groups containing 10-12 students. It consists of demonstration of animal experiments, prescription writing for common diseases including emergency medical conditions and problem based learning. The animal experiments are discussed initially by interrogating the students regarding the practical topic, a brief procedure about the experiment is explained to them, followed by the demonstration of the experiment by the moderator. Students are asked to practice in groups of three. They record the experiments in their practical book. The prescriptions are analysed by discussing in detail about the medical condition and giving stress more on the therapeutic aspect of various drugs which can be indicated for the specified condition, their doses, frequency of administration, adverse effects, interactions and contraindications etc. In problem based learning, a clinical problem is presented to the students as a focus of learning or as an example of what has been covered in lectures. Each problem is accompanied with relevant questions to streamline the students thought processes, more with regard to the understanding of the concept. A moderator is present throughout the session not as an instructor but as a facilitator of the learning process.

The assessment of theory and practical is done separately, the student has to get 50% separately in theory and practicals. The theory evaluation is by two papers of three hours duration each, practical assessment is done by one prescription writing and two problem solving exercises each given a duration of five minutes, followed by ten spotters consisting of questions related to it, each of one mark, followed by practical viva on graphs/tables/charts, this is followed by theory viva.

This study was designed to know

- 1) The student attitude towards teaching and learning pharmacology at Kasturba Medical College, Manipal.
- 2) Student feedback on the assessment process of pharmacology.
- 3) Suggestions to improve the teaching and learning of pharmacology
- 4) Basic information about the student respondents and to note any association of the student attitude with demographic and other variables

MATERIALS AND METHODS

The study was carried out among the fifth semester medical students at Kasturba Medical College, Manipal, during the month of August 2010, after the approval from university ethics committee. The students were asked to complete a questionnaire, which consists of two parts. The first part consisted of demographic and other relevant information about the student respondents. The sex and nationality of the respondents was noted. The medium of instruction at school was recorded. In South Asia because of the British colonial rule and other factors, there are two media of instruction at school. English medium schools teach the various subjects in English while the vernacular medium schools teach them in local languages. In vernacular medium schools, English is taught as a second or third language. Information whether the respondent was a self-financing or a government-selected student was collected. His or her attitude towards mathematics and chemistry in school was also recorded. The second part of the questionnaire consisted of 16 statements regarding students attitude towards department of pharmacology—a questionnaire based study. The students were asked to score each individual statement using the following key: 1- strongly disagrees with the statement, 2- disagree, 3- neutral, 4- agree and 5- strongly agree with the statement. The students were instructed to use whole numbers only. Participation in the study was voluntary. The questionnaire used in the study was framed after reviewing related literature, incorporating ideas from a study done by earlier author^[5], and on discussion with the faculty members of department of pharmacology. The students were asked to give reasons for attempting questions like multiple choice questions should form 50% of the examination questions and whether there should be more emphasis on problem solving exercises rather than on didactic lectures. They were also asked to give two suggestions to improve pharmacology teaching. The questionnaire is shown in the Appendix.

The data was analysed using SPSS 11.5 version. The median total score and interquartile range were calculated. The median scores as well as interquartile range of individual statements were also calculated. The reasons and suggestions were grouped together and noted.

RESULTS

Two hundred and fourteen students participated in this questionnaire study. The males were 57.9% compared to 42.1% of females. The median total score was 56 compared to total score of 80. Table 1 shows the median scores and

interquartile range of individual statements. Majority of the participants were of Indian origin constituting around 87.9%, followed by Malaysians (5.6%) and the rest were from Sri Lanka, USA, New Zealand and Mauritius. Majority had English as the medium of instruction. Maths was one of the subjects in school for 60.7% of participants. It was liked by 68.2% of students, similar results were seen with chemistry. Among the participants 25.2% were admitted through government selection whereas the rest were self financed.

The students showed neutral response on the statement pharmacology as the favourite subject in basic sciences. They agreed that studying pharmacology in second year MBBS will help them in rationale selection of drugs for their future practice. They also preferred to have horizontal integration of pharmacology with other paraclinical subjects. They strongly agreed to have the subject also to be integrated with the clinical cases in the hospital, and to use them for problem solving exercises. They were happy about the transparent assessment in Pharmacology and that it concentrates on ability to acquire facts. They also emphasized to have more problem solving exercises. The response was not good to consider pharmacology as one of the subjects for postgraduation. Table 2 shows the common comments made by the students.

DISCUSSION

From our study it is seen that students do not prefer pharmacology to be the favourite subject in the basic sciences. It could be due to the apathy the students face in knowing about the vast majority of drugs, some of them to which they are unexposed until they complete their internship. However it is equally important for them to know it, for rational choice of drugs for future practice, as supported by Theo^[11], that undergraduate training should lay the foundation for choosing and prescribing drugs rationally. The irrational prescribing can be prevented at some extent by incorporating the WHO Action Programme on Essential Drugs, a manual for undergraduate medical students on the principles of rational prescribing, intended for use in developed & developing countries.^[12] Though there is still lacunae as there is too much emphasis placed on transferring knowledge to students with little attempt to train them in its application. It looks that our students did not possess about adequate knowledge about simulation experiments, as they were only briefed about it and have not done any hands on experiment on it in comparison to an

earlier study which states that students were comfortable with computer assisted studies especially on autonomic pharmacology. Studies have shown simulation experiments better than animal. Students were positive to have horizontal integration of pharmacology with other paraclinical subjects. They also strongly agreed that pharmacology teaching should be related to clinical cases in hospital. A survey of Italian doctors had considered the pharmacology teaching they received to be mainly theoretical and they were of the opinion that more time and attention should be devoted to issues more closely related to clinical practice.^[13] The statement whether multiple choice questions should form 50 percent of examination questions remains unanswered, since some students feel it helps them to prepare for postgraduate exams others were of opinion it helps them in reasoning out rather than memorizing long paragraphs, whereas others commented they can express better an answer in essay type. They felt that our assessment concentrates on the ability to acquire facts rather than development of problem solving exercise. Their preference for pharmacology as a subject in post graduation was less probably because of inadequate knowledge of the booming career in clinical research in pharmaceutical industries.^[14] Regarding the improvement of pharmacology teaching the students suggested to increase more problem solving exercise and reduce the class hour. We can also imbibe the techniques as said by Graham^[15] like active review during the lecture, involving students in structured discussions, using questionnaires and asking them to summarise the three most important things. They have suggested not to teach banned drugs also.

Limitations of study

This study was conducted two and half month before the university exams, so there may be chance of bias. The questions were formulated by the staff members. Many did not fill the suggestion and reasons for certain questions. Few students might have been uncomfortable about frankly expressing their opinions and criticizing the teachers and may have not completed the questionnaire.

CONCLUSION

This study has helped us in knowing the student preferences regarding pharmacology teaching and its outcomes would be helpful in modifying undergraduate pharmacology teaching pattern.

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Table 1. Median Score of responses by the students

Statement Number	Median Score
1. Pharmacology is my favorite subject in the basic sciences.	3(3-4)
2. Studying pharmacology in second year of MBBS will help me in choosing drugs rationally in my future practice	4(4-5)
3. I find the Pharmacology lectures interesting and stimulating.	3(2-3)
4. I consider simulation experiments (computer based) better than animal experiments	3(2-3)
5. I would like horizontal integration of pharmacology with other paraclinical subjects	4(4-5)
6. I would like Pharmacology to be more closely integrated with the clinical sciences and would like real cases from the hospital to be used during problem solving exercises	5(4-5)
7. The subject has helped me to develop my problem-solving and logical reasoning skills.	4(3-4)
8. I would like the subject to focus more strongly on the health problems of India.	3(3-4)
9. I would welcome modules on Pharmacology and therapeutics during the clinical years of my training.	4(3-4)
10. The assessment system in Pharmacology is transparent.	4(3-4)
11. MCQs should form 50 percent of the examination questions	3(2-5)
12. The assessment concentrates on ability to acquire facts rather than on the development of problem-solving skills.	4(3-4)
13. Our practical assessment is better than other paraclinical subjects	3(3-4)
14. There should be more emphasis on problem solving exercises rather than on didactic lectures	4(3-5)
15. The Pharmacology teachers have inculcated in me a capacity for self- directed learning	3(3-4)
16. I will consider Pharmacology as one of my subjects for post graduation	2(1-3)

Table 2

Statements suggested for improving pharmacology teaching.
1.They wanted more clinical oriented teaching
2.To spread the pharmacology teaching throughout four years.
3.To have regular assessment in the form of quiz or month end tests.
4.To allow interested students to take part in clinical trials
5.Teaching in small groups
6.More attention to various diseases and its drug of choice
7.To provide memory cards for easier remembrance of drug names.
8.To have clinical case discussion
9.To teach the commonly used drugs in the hospital with dosage and brand names
10.To have more problem solving exercises
11.Not to teach banned drugs
12.To shorten the duration of class to 45 mins.
13.Lectures to be interactive ,with less matter and more discussion

APPENDIX

Teaching Pharmacology at a South Indian Medical College-The student overview

This questionnaire is designed to help us understand the student attitude towards pharmacology department at KMC, Manipal. Participation depends on your willingness. No personal information should be written on the paper (name, registration number). Please answer legibly and write the appropriate number in boxes wherever required.

Questionnaire based study

Sex:M/F

Nationality:

Medium of instruction at school: English/ Vernacular

Was mathematics one of your subjects at school (10+2 level)? Yes/ No

Your attitude towards mathematics at school: Liked it/Neutral/Hated it

Your attitude towards chemistry at school: Liked it/Neutral/Hated it

Govt. selected /self-financing

For the following statements score using the following key:
1- strongly disagrees , 2- disagree, 3-neutral, 4-agree, 5- strongly agree

1. Pharmacology is my favorite subject in the basic sciences.

2. Studying pharmacology in second year of MBBS will help me in choosing drugs rationally in my future practice.

3. I find the Pharmacology lectures interesting and stimulating. Give reasons -----

4. I consider simulation experiments (computer based) better than animal experiments
5. I would like horizontal integration of pharmacology with other paraclinical subjects.
6. I would like Pharmacology to be more closely integrated with the clinical sciences and would like real cases from the hospital to be used during problem solving exercises.
7. The subject has helped me to develop my problem-solving and logical reasoning skills.
8. I would like the subject to focus more strongly on the health problems of India.
9. I would welcome modules on Pharmacology and therapeutics during the clinical years of my training.
10. The assessment system in Pharmacology is transparent.
11. MCQs should form 50 percent of the examination questions
12. The assessment concentrates on ability to acquire facts rather than on the development of problem-solving skills.
13. Our practical assessment is better than other paraclinical subjects.
14. There should be more emphasis on problem solving exercises rather than on didactic lectures. Give reasons -----

15. The Pharmacology teachers have inculcated in me a capacity for self- directed learning.
16. I will consider Pharmacology as one of my subjects for post graduation.
17. Give two suggestions to improve pharmacology teaching.

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AUTHORS AFFILIATION AND ADDRESS FOR CORRESPONDENCE

Dr Lalit Mohan, Associate Professor,

Dept. of Pharmacology, Kasturba Medical College, Manipal-576104, E mail-drlalitjee@rediffmail.com

JPRHC