ANIMAL EXPERIMENTS IN MEDICAL UNDERGRADUATE CURRICULUM: A TEACHER STUDENT PERSPECTIVE

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SUMMARY

Objectives: This study was conducted to assess the teachers' and the students' opinions regarding animal experiments as part of practical training in the discipline of pharmacology.

Methods: Students of fourth and final year and teachers in pharmacology were included in a survey using a semi-structured questionnaire. Questions pertaining to the objectives of these animal experiments and their utility thereof were included in the survey. They were also asked to suggest alternatives for these experiments if they so desired.

Results: Majority of students and teachers cited that these experiments were conducted for a better understanding of the subject of Pharmacology as the main objective. However, most felt that this is not achieved and too much time is spent on them. Majority of teachers and students felt that an understanding of pharmacology could have been achieved without the existing set of animal experiment exercises. Passing second MBBS exams was a major reason cited for the conduct of these experiments. Alternative suggestions included demonstrations of experiments, video films, computer simulations followed by discussions, patient bedside teaching and human volunteer experiments.

Conclusion: There seems to be an urgent need for reconsidering changes in the M.B.B.S pharmacology curriculum, especially with regards to the experimental pharmacology exercises, to make it more relevant. Newer alternative teaching methods need to be incorporated. An all out effort has to be made by all the teaching faculty to make animal experiments relevant and interesting for the students.

KEYWORDS Pharmacology, medical, undergraduate, practicals, animal, experiments

INTRODUCTION

Many hours in undergraduate practical training in the discipline of Pharmacology presently are spent in animal experiments most of which are repetitive and showing action of drugs not used clinically. These experiments also stress on development of skills that have no bearing on the students becoming a basic doctor. However, the evaluation system is such that the students have to acquire expertise in these experiments.

Most of the experiments conducted during undergraduate pharmacology teaching today were planned over three decades ago. No changes have been brought in their content or format since. Despite rapid advances in medical fields and specifically in pharmacology, no attempts have been made to assess either their relevance or usefulness in the training of a basic medical doctor. In addition, the rise in animal rights activities leading to new regulations, enhanced security measures and rise in prices for procurement of animals have all led to an increase in the cost of animal experimentation. An American study puts the cost of this to about 17.3 million U.S dollars annually.  

The teachers who follow a curriculum set decades ago and the students who are the end beneficiaries of such training programs, have seldom been asked their opinion in this regard. Keeping the above in mind we thought it would be important to seek the opinion of both the trainers and the medical students on various aspects of animal experiments as conducted in the present format, for teaching pharmacology.
MATERIALS AND METHODS

A survey was conducted amongst the fourth and final year students in Maulana Azad Medical College, New Delhi. The pharmacology teachers of three medical colleges affiliated to the Delhi University, Maulana Azad, Lady Hardinge and University College of Medical Sciences were also included in the survey.

The study was conducted using a semi-structured questionnaire. Opinion was sought on the following aspects: knowledge regarding objectives of using animals as experimental models; the utility of these experiments; the duration of time spent in animal experiments and suggestions for alternatives to the existing animal experiments.

The questionnaire was designed by teachers from the department of Pharmacology. The participants were given the option of indicating more than one alternative to the question asked. The questionnaire was filled in anonymously.

RESULTS

A total of 35 teachers and 258 students participated in the survey and returned the questionnaire. Of the 258 students, 147 were in fourth year, who answered the questionnaire just prior to their second university examination, 111 were in final year studying clinical subjects. The figures in percentage indicate the number of times a given response was made from the total number of responses.

Eighty percent of teachers and 74.7% students answered in the affirmative regarding their awareness of the objectives of these experiments in teaching of Pharmacology to undergraduates. However, only 65% of the teachers actually wrote the objectives. Majority (80.3%) of the students and teachers (65.7%) were of the opinion that these help them to understand and see drug effects i.e. they reinforce the lecture material (Table 1). Amongst the reasons for conducting animal experiment exercises, although more than half the students (59.6%) felt these experiments increased their understanding of drug action, however, the rest of the students felt that these exercises only helped them pass their examinations and was a waste of their time. The teachers seem to agree with the students in this regard (Table 1).

The time assigned for these experiments was felt to be in excess by 38% of the students and 45% of the teachers. A majority of students (60.8%) and teachers (51.4%) felt that the same understanding of pharmacology could have been achieved without the use of animal experimentation and said they should be discontinued (Figure 1). As alternatives to animal experiments many suggestions were given, which included: video films followed by discussion (45.5 %students, 59.9 % teachers), demonstration of the experiment in batches (31.5% students, 42.9% teachers), patient bedside clinical pharmacology teaching (20.9% students, 31.4% teachers), human volunteer experiments (2.9% versus 11.4% teachers) and computer simulations.

DISCUSSION

Animals have been used globally for teaching medical subjects especially pharmacology, physiology and surgery\(^\text{2,3}\). However, with the increasing cost of animal experiments, students concerns against use of animals for routine experiments, protests by animal rights organizations and security concerns, it is evident that this subject needs to be discussed in greater detail\(^\text{4}\).
The present survey examined medical students and teachers' opinion regarding use of animal experiments as they are conducted presently for teaching pharmacology to M.B.B.S students in Delhi University. It is encouraging that majority of students were aware of the objectives of conducting animal experiments in pharmacology as explained to them in the introductory lecture. However, it is disheartening that only half of the students felt these objectives are fulfilled by these experiments. A large number of students and teachers felt that these experiments only helped in passing university examinations and were a waste of time. We would like to specify here that, “objectives” refer to statements corresponding to aims, purpose or goal, while “reason” refers to motive, cause or justification. These feelings need to be considered in view of the fact that we spend many hours, manpower and money on conducting these experiments.

Today practical exercises for the teaching of pharmacology in Medical Colleges affiliated to Delhi University devote nearly 50 out of the 85 hours allotted to practicals in animal experimentation. These include four sets of experiments for testing of known drugs and identification of unknown drugs using *in vitro* tissue models of smooth muscle, skeletal muscle and cardiac tissue and one *in vivo* experiment using the rabbit eye as a model. Some of the drugs tested include drugs without any clinical relevance for example barium chloride on the intestine. To acquire adequate skills in the experimental technique, which involves dissection of the animals and setting up of apparatus, a lot of time has to be spent. Since the students are evaluated on skills in putting up the experiment, it is considered imperative that they be given enough time to acquire expertise in doing these experiments. As a result, each set of experiments involving sometimes as few as three to four drugs, may take 8-14 hrs of practical time. It is thus obvious why a considerable percentage of students (38%) and teachers (45%) feel that too much time has been allocated to experimental pharmacology...
and that same understanding of pharmacology could be achieved without these experiments (60% students and 51% teachers). Hence, evidently 54% of teachers and 67% of students felt that these experiments can be discontinued. In an earlier study conducted in Delhi, Tekur et al (1994) had observed similar sentiments expressed by students who felt that these experiments served no useful purpose.

The authors, however, do not advocate a total discontinuation of these experiments. We feel that these may be modified and taught in lesser time, as the students do not require the skills of dissection and setting up of experiments in their later years of medical practice.

The alternatives suggested by the students should be considered. Some medical schools both in India and abroad have supplemented laboratory animal exercises with alternatives. Bernard et al (1988) in their survey of physiology, pharmacology and surgery departments at some U.S medical schools, reported that only 25% of the current pharmacology courses, 53% of physiology courses and 19% of surgical courses involved the use of live animals as part of their regular curriculum. The alternatives were generally perceived to be efficient and popular amongst students. However, in the context of our country where resources are scarce, the costs of such alternative models need to be worked out. To start with, some of the alternatives suggested such as demonstrations in small batches, followed by discussion, patient bedside clinical pharmacology teaching would only require minor adjustments in the teaching schedule and should be looked into.

We also suggest that the time may be utilized in teaching students skills in dosage calculation, a skill totally neglected and of which students are quite ignorant, administration of drugs to humans, skills required in selection of drugs rationally, developing communication skills and evaluation of drug information.

We live in a rapidly changing world and like in other fields, medical education and the various components that constitute it also require to be changed keeping in mind the changing scenario both in terms of aspirations, requirements of a medical student as also the availability of resource material. The basic objective of teaching pharmacology to undergraduates is to ensure that a sound foundation is laid in drug therapeutics both in terms of knowledge and skills so as to make the undergraduate a basic medical doctor. The Medical Council of India in the revised curriculum has spelt clearly the practical skills that need to be acquired by the students during their Pharmacology teaching.

Keeping the results of the survey, MCI guidelines and our own objectives of teaching pharmacology to undergraduates in mind, we must urgently evolve a consensus and work towards making the practical acquiring of skills in pharmacology more relevant for students in the three Delhi medical colleges. We feel the first task of defining specific educational objectives in pharmacology for undergraduates, is of utmost importance. As only then can relevant curriculum be framed, teaching - learning programmes developed and objective evaluation methods exercised.

REFERENCES