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The Role of Animal Experiments in Pharmacology Curriculum: A Teacher Student Perspective.

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ABSTRACT

With various problems in animal experiments today pertaining to ethics, animal sacrifice and alternate simulation tests, it is important to know the view of postgraduate students and teachers about the same. To find out medical personnel's views on utility and importance of animal experimentation in Pharmacology. To assess both teachers' and postgraduate students' opinion and knowledge regarding animal experiments as a part of practical training in Pharmacology. This questionnaire based study was carried out in various medical colleges in Maharashtra amongst postgraduate students and teachers in Pharmacology. 70 postgraduate students and 30 teachers participated in the study. 60% students and 83.3% teachers agreed with use of animal experiments in current pharmacology curriculum, especially procedures like Bioassay. 74.2% students and 76.6% teachers thought animal experiments help to clear basic concepts and aid in teaching as well as understanding the subject better. 54.2% students and 70% teachers opined that animal experiments have role in clinical subjects. However, 82.8% students and 93.3% teacher suggested alternatives like computer simulation tests. Among students, 68.6% and 54.2 % knew about CPCSEA and GLP guidelines respectively, while all teachers knew about both. 60% teachers were not in favour of animal experiments for undergraduates. The study put forth views of teachers and postgraduate students alike, who agree with alternatives to animal use in pharmacology curriculum except certain experiments like bioassay. More studies over the country are necessary to form a consensus and national guidelines regarding the same.
Keywords: Animal experiments, Pharmacology curriculum, Alternatives to animal experiments

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INTRODUCTION

Animal experiments, since long, due to its benefits in better understanding of the molecular methods of drug actions, have been an integral part of the pharmacology education in all medical colleges of India [1].

In current scenario, the animal rights and strict animal handling guidelines, has not only cropped up various ethical issues regarding use of animals in experimentation, but the cost effectiveness of such experiments is also been questioned [3]. Government Rules like The prevention of cruelty to animals (PCA) Act 1960 (amended in 1982) and "Breeding of and experiments on animals (Control and Supervision) Rules, 1998 (amended in 2001 and 2006) provide regulatory framework for control of any experimentation on animals in India. The CPCSEA (Committee for the purpose of control and supervision of experiments on animals) also provides the guidelines for performing experiments on animals and maintenance of animal house.

In the recent years, lots of discussions and debates on the topic of animal use in Pharmacology curriculum is garnering interest. Moreover, alternatives like internet and computer assisted learning are being widely accepted by students and teachers. These modes of instruction are been documented to be better accepted and advantageous over conventional methods of teaching and learning [4].

Certain scientific, and legislative authorities and animal activist organisations in India have been demanding the abolition of the animal experiments in the laboratory [5]. In line with these demands, Medical Regulatory bodies of India are planning to ban the animal experimentation altogether in pharmacology curriculum.

Discovery of new lead compounds for novel therapeutic targets is a multi-step process involving drug design, synthesis and its pharmacological screening and animals play an indispensable role in this process even today [2]. Therefore the knowledge of these experiments is paramount for postgraduates in pharmacology planning a career in this field. Majority of academicians strongly believe that Animal experiments are still very important as far as subject of Pharmacology is concerned and should not be banned.

The faculty and postgraduate students of pharmacology, who are involved in teaching the subject, have most hands on experience with such experiments. Any such decision by government therefore is going to impact this section of medical fraternity the most. Therefore, it is important to know about the opinion of medical teachers and postgraduate students of Pharmacology on this issue. We planned a questionnaire based survey to gather their views regarding the importance of the animal experimentation in Pharmacology curriculum.

MATERIALS AND METHODS

A survey was conducted among the two group of medical professionals associated with animal experimentation in pharmacology, namely the Faculty and the Postgraduate students of Pharmacology, to evaluate their current attitude and opinions regarding the relevance of animal use in Pharmacology curriculum for practical training of undergraduates and postgraduates. The survey was a performed using a semi-structured questionnaire designed by experienced faculty of Pharmacology. It included 15 questions pertaining to the responders' attitude towards use of animals in pharmacology curriculum (UG and PG), need for alternatives and the ethical & regulatory considerations of such use. The study material was approved by the Institutional ethics committee. The questionnaire was distributed among faculty and postgraduate students of all government medical colleges of Maharashtra either by hand or by post along with a self—addressed envelope for dispatch. The responders were allowed to maintain anonymity.

Of the total 320 questionnaires distributed, we received 83 and 48 responses from the postgraduates and faculty members respectively. Of these, 13 and 18 forms were incomplete / or the designation could not be determined and hence were discarded. A total of 70 complete responses from postgraduate students and 30 completed responses from faculty of Pharmacology were considered.

The data was entered in Microsoft excel for record and calculations. All the results are presented as proportion of total responses.

RESULTS

60% of Postgraduate students and 83.3% of Pharmacology teachers agreed to continuation of animal use for experimentation in educational curriculum.
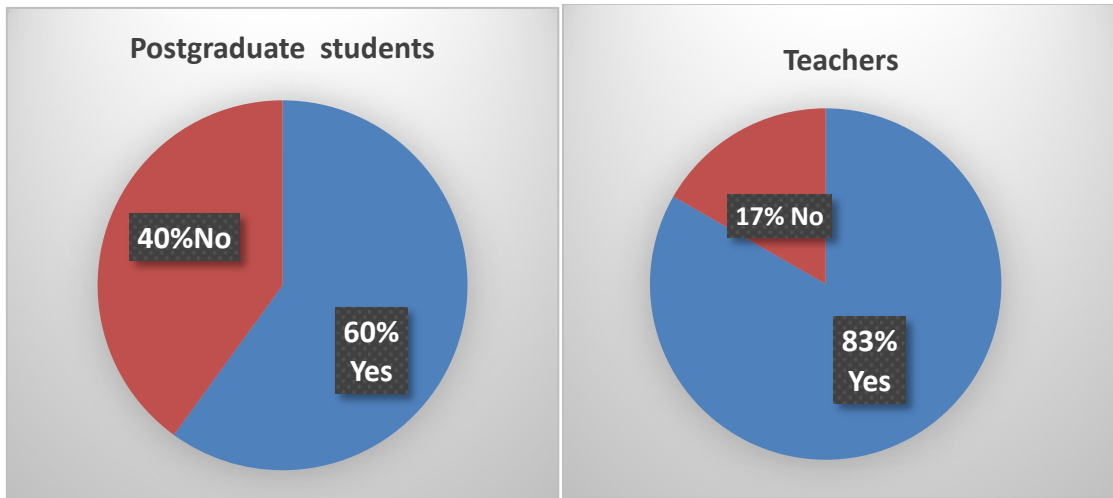
Figure 1: proportions of responders according to the agreement upon use of animal experiments in Pharmacology
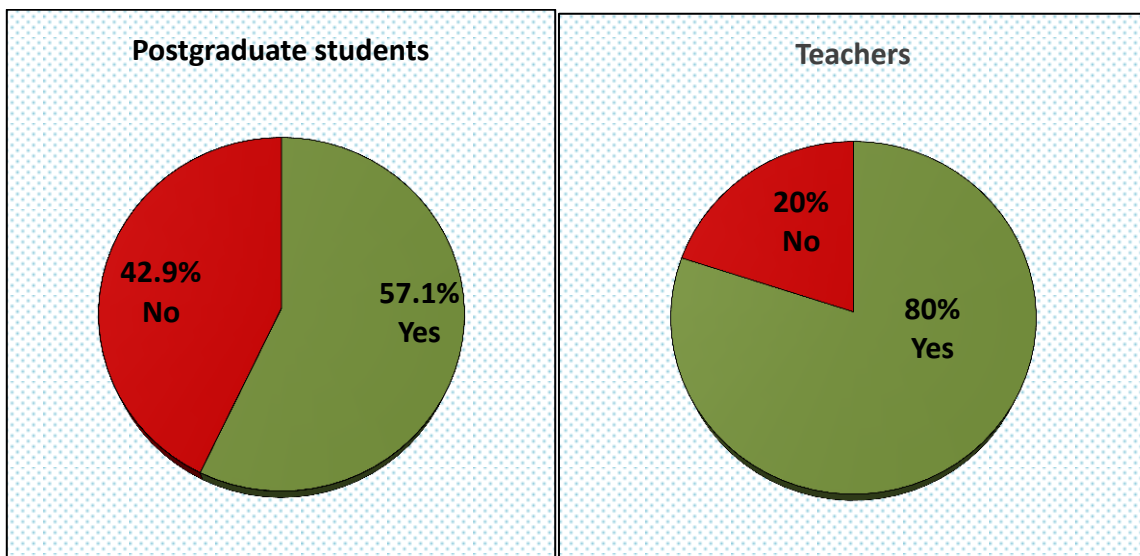
74.2% of students and 76.6% of Pharmacology teachers said there is definite role of animal experiments in Pharmacology curriculum and are very capable to clear the basic concepts in Pharmacology.

30% teachers 46.8% students are in opinion that there is no role of animal experiments in clinical subjects.

51.4% of students have not performed animal experiments during their current may be because in some colleges animal experiment facility is not available. Among teachers, all have performed animal experiments in their postgraduate period.

71.5% of students said they are not comfortable while performing animal experiments.

57.1% of students and 80% of teachers said they feel bad due to sacrifice of animals for the purpose of Pharmacology teaching.

Figure 2: Percentage of participants who feel bad due to sacrifice of animals.

82.8% of students and 93.3% of teachers suggested that alternatives to animal experiments should be introduces in Pharmacology.

When asked about which animal experiments are useful to clear the basic concept in Pharmacology, students opinions were as follows. Most of the postgraduate and the teachers agreed that bioassay should be continued in Postgraduate curriculum as it is useful to clear the basic concepts in Pharmacology. Other important experiment as suggested by students and teachers include Evaluation of SMR, Local anaesthetics, Mydriatics and miotics, Dog blood pressure and toxicology studies.

When we asked about animal experiments as a practical training in Pharmacology, 80% teachers agreed for postgraduate curriculum and 40% for undergraduate curriculum.

82.8% students and 93.3% teachers suggested that there should be alternative to the animal experiments while both teachers and students are agreed for computer simulation will be the best alternative for animal experiments.

When asked about regulatory guidelines on animal experiments i.e. CPCSEA (Committee For The Purpose Of Control and Supervision of Experiments on Animals) guidelines, 31.4% Postgraduate students were unaware about this guideline whereas all the teachers were aware. Similarly when asked about GLP (Good laboratory practices guidelines), 54.2% postgraduate students were unaware about these guidelines whereas all the teachers were aware.
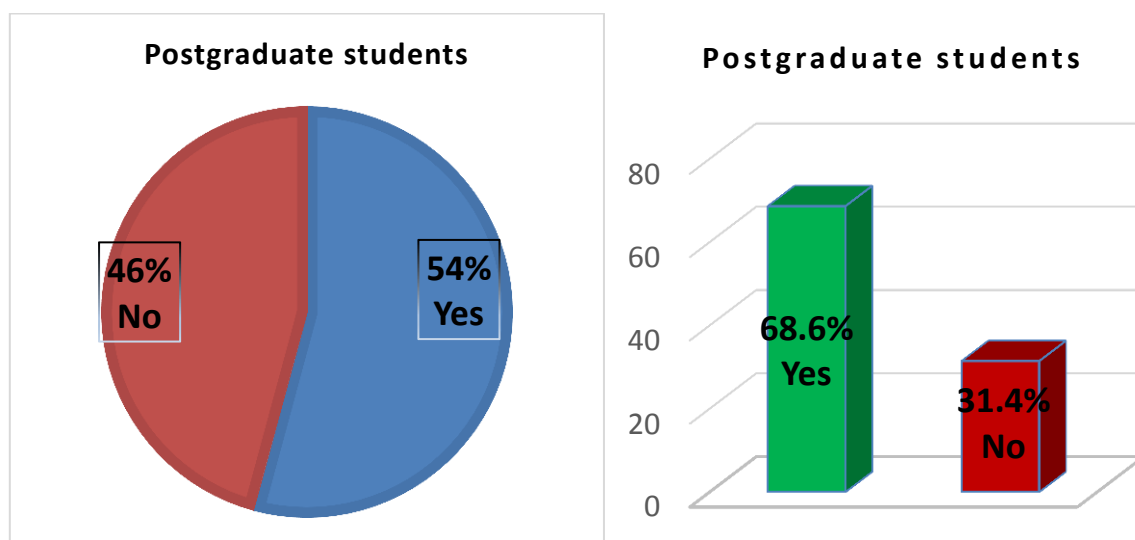

Figure 3: Percentage of postgraduate students aware about CPCSEA and GLP guidelines.

DISCUSSION

Animals have been used globally for teaching medical subjects especially pharmacology, physiology and surgery. 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.

The primary finding of the study was that both the teachers and postgraduate students were agreed upon inclusion of animal experiments in a Pharmacology curriculum as they thought that it clears the basic concepts and aids in teaching. They also thought that there is strong role of these experiments in clinical practice. Majority of responders thought that experiments bioassay is of utmost important to understand receptor Pharmacology well. Even though majority were agreed on animal use to have basic understanding of the subject, at the same time they also suggested introducing alternatives to these experiments whenever possible.

When we evaluated knowledge regarding national regulatory guidelines of animal experiments like CPCSEA guideline and GLP guidelines, surprisingly many postgraduate students were not aware of these guidelines. Hence there is need to have special training regarding these guidelines at the start of postgraduate Pharmacology course so that to conduct the proper and ethical experimentation on animals.

Most of teachers were in opinion of animal experiments only for the postgraduate training and not for undergraduate curriculum as there is no need for such a detailed study of the subject at their undergraduate level.

Among various alternatives suggested, most common was computer simulation while others include in vitro tests, tissue culture, cell culture, model demo, chemical chromatographic methods. The study done by Lexin Wang et.al shows that computer-simulated pharmacology experiments are effective alternative to live animal experiments since it assists Undergraduate students in achieving their learning objectives [6].

The alternatives suggested by participants should be considered. Some medical schools both in India and abroad have supplemented laboratory animal exercises with alternatives. Need expertise, availability, standardisation, cost factor. 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 think that it is helpful to learn the objectives but not for the knowledge, confidence about the subject, and recollecting the subject.

Various similar questionnaire based studies have been conducted in past few years. In one such study A survey involving three medical institutes of Delhi has reported that 32% students and 45.7% medical teachers favor the continuation of animal experiments [7]. while in other study done by S.V. Tembhurne et.al assessed and taken views of 120 students about use of live animal in teaching pharmacology and physiology for undergraduate curriculum and the results of this study indicate that there is a need to modify the curriculum taking into account the development and availability of the new technology [8].

Jasvant RAi stated in study that demonstration and experimentation is time saving but many experiments can be demonstrated in a short time, experiments can be observed repeatedly without loss of animals [9].

However, we 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.

Disadvantages of computer simulation tests include these cannot completely replace actual animal experiments and required more advanced and complex simulation and cannot create the actual scenario. This doesn't allow learning skills and techniques and changes in conditions during animal experiments.

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. So there is need for a change in Pharmacology curriculum also. E.g. Inclusion of computer simulations etc. Some responders have given novel ideas as alternatives like using chicken ileum from slaughter houses in which we can use already sacrificed chicken tissues to perform bioassay.

The study from Tamilnadu shows students prefers both the live animal experiment and the virtual experiment but the data for recollection of subject revealed students has preference for real experiment [9].

CONCLUSION

Most of the PG students & teachers are in a strong view of introducing alternatives to animal experiments whenever possible in Pharmacology curriculum. Animal experiments should be reserved for research purposes and preferably not for teaching. Computer simulation came out to be most suitable

alternative. There should be special training for PG students on CPCSEA and GLP. More studies across country are necessary to for a common consensus to form national guidelines regarding the animal experiments.

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