THE PERCEPTIONS OF FIRST-YEAR MEDICAL STUDENTS ON ANIMAL AND HUMAN EXPERIMENTS IN PHYSIOLOGY

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Abstract: This study was conducted to ascertain the attitudes of first year medical students to human and animal experimentation, while undergoing a course in Muscle and Nerve experimental Physiology. At the time of administration of the questionnaire, students had been exposed to both human as well as animal experiments. Approximately 81% of the students preferred human experiments ($P < 0.05$). This preference, however, was related more to the issue of enjoyability rather than the extent to which the experiment contributed to overall understanding and learning. 55% of students identified ethical issues related to laboratory experimentation. Gender and academic performance were not determinants of student's attitude to animal and human experimentation, although ethical insight was. The results suggest that while students recognize the importance and value of animal experiments, they would prefer the introduction of a larger number of human experiments.

Key words: students medical teaching human education experimentation animal ethics

INTRODUCTION

While human experiments in Physiology reduce the dehumanization of preclinical course (1), the actual information from such experiments may be limited because of the need to use simple, inexpensive and largely non-invasion procedures. In contrast, the use of animal experimentation in teaching Physiology has been widespread and time tested, although there has been an increasing move to substitute non animal alternatives in laboratories or delete animal experiments altogether (2). In recent years, studies in the west have shown adverse learner attitudes towards animal experimentation (3, 4, 5).

In India, too, there has been considerable introspection into the role of laboratory exercise in teaching Physiology (6). While educators have recognized the value of human experiments, there has been little data in India on students perceptions with regard to these issues.

The aim of the present study, therefore, was to examine the attitudes of first year...
medical students towards animal and human experiments and to further determine whether gender or academic performance was a determinant of these attitudes.

METHODS

This study was carried out on the basis of a questionnaire administered to 56 out of 60 first year MBBS students, consisting of 26 males and 30 females, at the Department of Physiology, St. John's Medical College, Bangalore. At the time of administration of the questionnaire the students had performed 4 animal experiments and 3 human experiments all of which were related to muscle and nerve physiology. The questionnaire consisted of, in part, statements for which the students responded using a five point Likert type scale (Table I). There were in addition several open-ended questions which addressed ethical issues in experimentation and asked students to list advantages and disadvantages of animal and human experiments.

All the numerical data are expressed as Mean ± SD. For those parameters where students were required to make a choice, e.g. preference for human or animal experiments, data was analyzed using the 'Z' test. The contribution of gender and academic performance was analyzed using an independent 't' test. Students were divided into two groups based on the academic performance using the 50th percentile at the internal assessment examinations. For 'within' subject comparisons of perceptions of animal and human experiments a paired 't' test was used. The null hypothesis was rejected at P<0.05.

TABLE I : Overall perspectives of first year medical students on the human and animal experiments in Physiology.

<table>
<thead>
<tr>
<th>Animal Experiments</th>
<th>Not at all</th>
<th>Very much</th>
<th>Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How enjoyable</td>
<td>1 2 3</td>
<td>4 5</td>
<td>3.5 ± 0.95</td>
</tr>
<tr>
<td>2. How informative</td>
<td>1 2 3</td>
<td>4 5</td>
<td>4.0 ± 0.72</td>
</tr>
<tr>
<td>3. How much did it contribute to your understanding</td>
<td>1 2 3</td>
<td>4 5</td>
<td>3.9 ± 0.67</td>
</tr>
<tr>
<td>Extremely difficult</td>
<td></td>
<td>Very easy</td>
<td></td>
</tr>
<tr>
<td>4. How easy were the experiments to perform.</td>
<td>1 2 3</td>
<td>4 5</td>
<td>3.1 ± 0.78</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Human Experiments</th>
<th>Not at all</th>
<th>Very much</th>
<th>Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How enjoyable</td>
<td>1 2 3</td>
<td>4 5</td>
<td>4.3 ± 0.58*</td>
</tr>
<tr>
<td>2. How informative</td>
<td>1 2 3</td>
<td>4 5</td>
<td>4.0 ± 0.82</td>
</tr>
<tr>
<td>3. How much did it contribute to your understanding</td>
<td>1 2 3</td>
<td>4 5</td>
<td>3.9 ± 0.73</td>
</tr>
<tr>
<td>Extremely difficult</td>
<td></td>
<td>Very easy</td>
<td></td>
</tr>
<tr>
<td>4. How easy were the experiments to perform</td>
<td>1 2 3</td>
<td>4 5</td>
<td>4.0 ± 0.88*</td>
</tr>
</tbody>
</table>

Numbers in bold indicate the most frequently report score (mode).

*P<0.05, animal versus human, paired 't' test.
RESULTS

All the 56 students answered the Likert type scale questions, while only 48 of them answered the open ended questions.

Table I summarizes the data of the fixed-alternatives (Likert) statements. While the students found human experiments more enjoyable and more easy to perform, they felt that animal experiments were equally informative and contributive to overall understanding of the subject. There was no significant difference in opinion between male and female students and between high and low academic performers.

Data from the open-ended questions showed that students felt that animal experiments helped in improving their dissection skills (11%) and helped them to interpret the theory they learn from the lecture classes (46%). Some students found the experiments were complicated (50%) and time consuming (17%). In the case of human experiments 57% of students felt these were applicable to the course and 25% found them interesting and simple to perform.

A total of 31 students (55%) identified ethical issues related to laboratory experimentation. In those who indicated that animal experimentation was unethical (n=21), the cumulative score for animal experiments was significantly lower than that for human experiments (P<0.05). On the other hand, there was no difference in the cumulative score for animal and human experiments in those who identified ethical issues in relation to human experiments (n=10).

DISCUSSION

While there is a global trend towards a reduction in animal experimentation during the teaching of Physiology, and the incorporation of alternative teaching methods (7), some educators believe that hands-on animal experimentation is a critical learning experience (5, 8).

The results of this study suggest that while a majority of students find animal experiments less enjoyable, they still identify them as being integral to the learning process. This study suggests that while key animal experiments need to be retained within the curriculum there is also a need to shift towards meaningful and easy to perform human experiments. The initiatives of International Union of Physiological Sciences are a step towards this direction (9).

A substantial number of students raised ethical issues with regard to both animal and human experiments and this in part appeared to be a determinant of their preference for animal or human experiments. This may suggest that while...
medical students are introspective about ethical issues related to experimentation, it does not impinge on their ability to enjoy the practical or derive useful information from them. It is conceivable that students at this stage of the medical course, have not formed firm opinions about the specific ethical issues involved with experimentation and that they are susceptible to changes in moral reasoning (10). Data from abroad suggests that students arrive at medical school with moderately well established ethical perspectives (11), although gender differences in the perception of ethical issues may exist (12). Our inability to demonstrate gender differences in our study may be related to the fact that age of the students in our study was approximately 6-8 yrs younger than those of the studies conducted abroad.

The data suggests a need to review practical exercises in Physiology, with the introduction of a larger number of easy to perform human experiments. The students are likely to find these more enjoyable and this may contribute substantially towards preventing the dehumanization of the preclinical course.

REFERENCES


