

## Three Rs in the research and education system of Pakistan: Perspectives and possibilities

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### Abstract

Concept of 3R in Pakistan is a self-regulated system for individual institutes and research organizations, and animals are used variably for teaching and experiments.

#### 1. Current situation:

- a. Principles of 3R are practiced only when a procedure requires following international protocols.
- b. Legislation mostly covers prevention of cruelty to animals.
- c. Religion provides guidelines about conduct to animals, calling them companions and means of utility.
- d. International collaboration is gradually promoting respect for animal rights.

#### 2. Areas of larger impact in education system:

- a. Veterinary Gross Anatomy
- b. Veterinary Surgery

#### 3. Recommendations:

- a. Legislation for animal experimentation with the aim to reach International Standards in 5 years.
- b. Education and training of researchers for meeting the international standards of 3Rs.
- c. Establishment of 'Ethic Commissions' in research/teaching institutes.
- d. Reduction and replacement of animals in education by introduction of alternatives and residency programmes

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Concept of 3Rs was first introduced by Russel and Burch in 1959 (Flecknell, 2002; Kolar, 2006). Since then, there is widespread adoption of these principles across the scientific communities of the world. As a consequence, new legislation is introduced governing the use of animals in science (Cuthill, 2007; Kolar, 2006). Basic concepts of animal welfare are being introduced as a complete syllabus (De Boo & Knight, 2005), and curricula are gradually being adapted to discourage the use of animals in education (Akbarsha, 2007). At the same time alternatives to traditional teaching methods are also being introduced. (Daviau et al., 1997; Abutarbush et al., 2006; Howe et al., 2005). These include computer simulations, videos, ethically resourced cadavers, preserved specimens, models, surgical simulators and supervised clinical experiences (Knight, 2007). Their use has greatly reduced the number of animals used in science (Hart et al., 2005). Additional benefits of humane teaching methods are reported to be time and cost

effectiveness, increased possibility of repeatability of exercise, increased student confidence, increased compliance with animal use legislation, and inclusion of ethics early in the curriculum (Knight, 2007). Use of alternatives has helped evade indiscriminate use of animals in education which may have multiple outcomes. Students may become insensitive and develop a utilitarian view of animals. When forced to continue against their will, they may lose interest in science (Capaldo, 2004).

Apart from academicians, animal protection groups have also gone a long way to promote humane education at all levels (Jukes, 2004), and have extended their services towards the scientifically less advanced countries also (Jukes, 2005). Among the South Asian countries, India has already covered a few milestones in this regards (Akbarsha, 2007). Unfortunately, Pakistan is still far from any serious, consistent effort being done to introduce the use of alternatives in research and education. This paper

reviews the current status of the concept of 3Rs in Pakistan and future possibilities.

## 1. Current situation

### 1.1. Concept of 3Rs

The concept of 3Rs is still new and relatively less understood in Pakistan. Scientific community is getting exposure to it through increasing international collaborations with foreign research institutes and universities, and publishing of their scientific work in international peer reviewed journals. At government level, the input in the form of legislation is lacking. A few institutes have developed their own guidelines to follow international codes of conduct. These institutes include, but may not be limited to,

Agha Khan University (AKU), Karachi: The Ethics Committee for Research on Animals (ECRA) reviews and monitors ethical issues pertaining to experiments on animals undertaken at Aga Khan University (AKU) for research, teaching and diagnostic purposes for the benefit of humans.

Centre of Biomedical Ethics and Culture (CBEC), Sindh Institute of Urology and Transplantation, Karachi:

It aims to initiate and sustain activities related to bioethics in education, clinical practice, and research. CBEC offers a Post Graduate Diploma in Biomedical Ethics. This diploma mainly covers the subject of biomedical ethics in human medicine. One of its modules is focused on ethical concerns when dealing with genetically modified animals.

### 1.2. Existing legislation

Existing legislation is silent about use of animals in research, but covers certain issues of general well being.

#### 1.2.1. Prevention of cruelty

Laws deal primarily with livestock and draught animals. It neither includes nor excludes laboratory animals. It prohibits to

- a. Subject an animal to unnecessary pain, suffering, starvation and thirst
- b. Kill an animal in an 'unnecessarily' cruel manner

*Prevention of Cruelty to Animals Act 1890*

#### 1.2.2. Wildlife protection and preservation

Laws prohibit killing of the wild animals, ensure their undisturbed breeding, regulate hunting, and use of inhumane methods. There are exemptions that allow their killing or capturing for scientific or public purposes.

*Balochistan Wildlife Protection Act 1974*  
*Punjab Wildlife Protection, Preservation, Conservation and Management Act 1974*  
*Sindh Wildlife Protection Ordinance 1972*  
*Northern Areas Wildlife Preservation Act 1975*  
*Wild Birds and Animals Protection Act 1912*  
*Islamabad Wildlife (Protection, Preservation,*

*Conservation and Management) Ordinance 1979*

#### 1.2.3. General Health

There are laws to protect animal health from indiscriminate use of agricultural pesticides.

*Agricultural Pesticides Ordinance Order 1995*

#### 1.2.4. Animal Slaughter

Law prohibits slaughter of useful animals and regulates that of other animals.

*West Pakistan Animal Slaughter Act 1953*

### 1.3. Religious Standpoint

#### 1.3.1. Basic Animal Rights

##### 1.3.1.1. Animals Are Members of Communities

They are like communities in their own right and not in relation to human species or its values.

*"There is not an animal on the Earth or a being that flies on its wings, but (forms part of) communities like you" (6:38)*

This simply raises the animals to a level which prohibits us to imprison them, or to treat them as objects.

##### 1.3.1.2. Animals and Humans Must Share Natural Resources

It is repeatedly emphasized that humans must share food and other resources of nature equitably with other creatures.

*"And We send down pure water from the clouds, that We may give life thereby, by watering the parched earth, and slake the thirst of those We have created - both the animals and the human beings in multitude" (25-48,49)*

#### 1.3.2. Ethical Handling

##### 1.3.2.1. Branding

It is forbidden to strike, disfigure or brand the animals. Disfiguring includes ear slitting, cropping and tail docking.

*'Do not clip the forelock of a horse, for a decency is attached to its forelock; nor its mane, for it protects it; nor its tail, for it is its fly-flap'*

##### 1.3.2.2. Housing/Slaughter of Animals Used for Food

While Islam permits to eat meat, it gives instructions to ensure humane slaughter. If animals have been subjected to cruelties in their breeding, transport, slaughter, or in their general welfare, meat from them is considered impure and unlawful to eat.

The Muslim World League in its joint meeting with the World Health Organization (WHO) made the following recommendation about pre-slaughter stunning (No 3:1. WHO-EM/FOS/1-E, p. 8):

"Pre-slaughter stunning by electric shock, if proven to lessen the animal's suffering, is lawful, provided that it is carried out with the weakest electric current that directly renders the animal unconscious, and that it neither leads to the animal's death nor renders its meat harmful to the consumer"

### 1.3.3. Experimentation on Animals

#### 1.3.3.1. The Theology of Vivisection

The Quranic theology mandates the use of animals that is as gentle, respectful, and humane as possible.

*"Humans are trustees responsible to God for the care of their fellow creatures" (6:165)*

Vivisection, factory farming, and animal experimentation did not exist 14 centuries ago and therefore, no specific laws were passed at that time. Islamic Jurisprudence has left it to Muslim Jurists to use their judgment by inference and analogy for such issues, based on the sources of Islamic law. Consequently, Islamic Law would oppose use of animals in military research in general and in the so-called wound laboratories in particular.

#### 1.4. International Collaboration

The more important international organizations which are currently working towards increasing the awareness for ethical animals handling in everyday life and scientific environment include

- a. International association against painful experiments on animals (IAAPEA)  
IAAPEA has helped introduce the concept of alternatives to painful experiments on animals. A seminar and demonstration of alternatives to use of cats was first of its kind to be held in 2005 in University of Veterinary and Animals Sciences, Lahore, Pakistan.
- b. The Brooke Hospital for Animals, Pakistan  
This organization has a network of hospitals operating throughout Pakistan. Their specialty is in treatment and prevention of cruelty to equine species.

## 2. Areas of larger impact

### 2.1. Education System

Veterinary education is being imparted at 8 Colleges/Universities in the country. Like other countries of the world, anatomy and surgery are among the main areas of impact (Knight, 2007).

#### 2.1.1. Gross Veterinary Anatomy

Gross Anatomy is covered in the first two semesters. Currently, the course outline allows the use of goat/sheep/dog as a model animal in the first semester. In the second semester, a comparative study is offered using horses, cattle, dogs and poultry as specimens. All the students are provided hands on experience through dissection. For this purpose, a fairly large number of animals have to be embalmed every semester. Important factors in this regard are

- a. Structural and technical facilities are inadequate to preserve such a large number of specimens for future use.
- b. Experimental animals are available at low prices.
- c. Alternative techniques like plastination are currently unavailable.

- d. Institutional funds are not always adequate to equip the laboratories with suitable alternatives without compromising on the quality of education imparted.

#### 2.1.2. Veterinary Surgery

Surgery courses are offered during the later clinical years. Practical classes are carried out on dogs and donkeys. Students perform surgeries in small groups under the expert supervision of the course instructor. Within a group, each student alternatively works as surgeon, assistant surgeon, and anesthetist during the course of the semester. Students are evaluated based on their surgical skills as well as for the post-operative care and survival of the animal.

#### 2.2. Research Institutes

Besides educational purposes, laboratory animals are used in research institutes, both in medical and veterinary sciences. These include, but are not limited to, provincial veterinary and poultry research institutes, federal veterinary laboratories and medical research/vaccine production units etc.

## 3. Recommendations

### 3.1. Legislation for Animal Experimentation

Legislation is required to govern the use of animals in science. The areas that need to be addressed are

- a. Definition of rights of animals.
- b. Definition of the violation of these rights.
- c. Definition of 'necessity' and therefore 'justification' of use of an animal in experiment.
- d. Definition of 'acceptable' procedures.
- e. Prohibition of certain procedures, if any.
- f. Penalties for violation of laws.

### 3.2. Training of Academicians and Researchers

Animal experimentation, when absolutely necessary to carry out, should be accompanied by education and training of researchers (Hendriksen, 2006). It can be accomplished gradually through

- a. Carrying out a series of introductory seminars and workshops in research and educational institutes so that maximum number of scientists/students could be addressed.
- b. Exposing scientists to international research environment by developing collaboration with internationally acclaimed laboratories. It should include hands on experience through short trainings in the international partner institutes.
- c. Provision of alternatives to traditional methods.
- d. Scheduled subsequent monitoring of the procedures adopted by the institutes.

Initial 1-2 years target should be to come at par with the guidelines followed by neighboring South Asian countries. The next 3-4 year target should be to reach the standards maintained by the more advanced countries.

### 3.3. Ethic Commissions

Ethic Commissions must be established in all the research institutes. The members should be competent and experienced enough to evaluate a scientific proposal and come up with a solution for conflict situations.

### 3.4. Change of Curricula

Surgery on live animals should be discontinued in under-graduate courses. This would include a major change in the curriculum, with a resultant introduction of compulsory internships at public/private clinics during the degree program. Such internships are also needed because of reduced learning opportunities at certain teaching hospitals due to Municipal Laws concerning prohibition of keeping farm animals in municipal boundaries.

### 3.5. Effective Replacement and Reduction

To discourage embalming of numerous fresh specimens every year for Gross Anatomy students, one or more of the following options can be adopted

- a. Initially to reduce the number of animals embalmed every year for dissection, infrastructure for storage of adequate number of specimens should be developed. Additionally, use of ethically resourced cadavers should be encouraged.
- b. Techniques like plastination should be introduced. It should include training of the personnel as well as establishment of plastination laboratories for long-term benefits. It may not reduce the use of experimental animals in the beginning, but will eventually replace them with synthetic models. Not only the plastinated models are durable (Herndl et al., 2004), and invaluable didactic tool (Latorre et al., 2007, Probst et al., 2006), but are also a safe (Latorre & Rodriguez, 2007) alternative to formalin preserved specimens which have proven health hazards (Silva et al., 2007; Akbar-Khanzadeh et al., 1994; Mizuki & Tsuda, 2001; Ryan et al., 2003; Mathur & Rastogi, 2007)
- c. Providing the teaching departments with educational material in the form of interactive software.

Bringing the countries like Pakistan in the mainstream will inevitably require the scientifically advanced countries and non-profit organizations to extend their technical and financial support. The main target of this support, specially the financial support, should be the training of qualified manpower, and strengthening of the institutes. It should be realized that public opinion is still not the driving force in developing countries. A result-oriented approach, therefore, would be to change the research/educational environment as a first priority; while at the same time educating the masses also in the background.

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