



Review Article

www.ijrap.net

(ISSN Online:2229-3566, ISSN Print:2277-4343)



NEED, SCOPE AND LIMITATIONS OF ANIMAL STUDY IN PERSPECTIVE OF AYURVEDA: A REVIEW

Sucheta S Chavan ^{1*}, Kiran Tawalare ², Snehvibha Mishra ³

¹ PG Scholar, Department of Kriya Sharir, Shri Ayurved Mahavidyalaya, Nagpur, Maharashtra, India

² Assistant Professor, Department of Kriya Sharir, Shri Ayurved Mahavidyalaya, Nagpur, Maharashtra, India

³ Associate Professor and HOD of Kriya Sharir, Shri Ayurved Mahavidyalaya, Nagpur, Maharashtra, India

Received on: 06/06/22 Accepted on: 15/07/22

*Corresponding author

E-mail: drsucheta84@gmail.com

DOI: 10.7897/2277-4343.1305134

ABSTRACT

Ayurveda is a goldmine for researchers. Unfortunately, very few researches are planned with a comprehensive approach. Animals have been used repeatedly throughout the history of biomedical research analysis. The utilization of non-human animals in biomedical research has made an essential contribution from precedent days. These animal experiments advance understanding of anatomy, physiology, pathology, pharmacology, and various medical fields. However, natural laboratory-based new research is still awaited. Our objective was to compile the most recent data on animal study's needs, scope and limitations. Also, we tend to overlook how we conduct a department-wise animal study, the ethics of the animal study, and the similarities between animals and man and their unique mechanisms. We conduct a narrative review. There is a need and scope for animal study in medical bioscience because a cure for a disease proves the safety and efficacy of new treatments attained through animal testing. There are also some limitations in animal studies, like loss of biological variability or predictivity from the utilization of inbred strains, young animals, restriction to single sexes, and inadequate cluster sizes. Also, there are so many department-wise uses and limitations of animal study. Conclusion: Animal study proves beneficial for the future because animals are often used in medical research to investigate the progression of the disease, test new drugs, surgeries, etc. But before that, we must always study the ethics of animal research to avoid unskilled, pseudoscientific and needlessly repetitive studies that bring on reserve damage to laboratory animals.

Keywords: Animal research, need, scope, limitations, animal ethics

INTRODUCTION

Animal experiments have always played a central role in biomedical research. Animal experiments have also been the subject of heated public and philosophical debate. There are so many historical reviews of animal research, but there is a lack of much more review articles on animal research. Throughout history, *Vedic acharya* scientists have been solving medical problems, developing new techniques and treatments, and curing diseases using animals in biomedical research^{1,2}. New antibiotics are continuously being discovered and then tested in animals to treat every minor infection to severe illness to ensure that they don't cause side effects. Since the dawn of medicine, humans have used other species of vertebrates as models for their anatomy and physiology. Because of the taboos regarding the dissection of humans, physicians in ancient times dissected animals for anatomical studies³. Pre-clinical experiments were increased due to clinical problems and helped develop new therapeutic approaches⁴.

Modern medical science is at best in the 21st century. Non-communicable diseases kill 41 million people yearly, equivalent to 71% of all deaths globally. Infectious diseases kill over 17 million people annually: WHO wants global crises⁵. The animal study is therefore necessary.

Research in the *Ayurvedic* academic sector needs to be focused on fundamental principles such as genome-wide study (*Prakriti*), the chronology of life science (daily and seasonal regimen) and its therapeutic implications, *Ayurvedic* epidemiology, and demography, materialistic and non-materialistic ancient science

of *Ayurveda* namely *Padartha Vijnana*, *Rasayana*, and basic principles of pharmaceutical sciences are intervened less frequently and have therefore remained underdeveloped and underutilized⁶. Research in *Ayurveda* needs to focus on drug research for which the world looks to this ancient health science. The researchers often fall behind due to scarce economic and other resources and thus remain under-explored. The scholar students are multifaceted or poorly equipped with the less rigorous protocol or the protocol completion⁷.

Animal models also have limitations, such as animals are not humans, so results must be extrapolated. Altered susceptibility to the progression of diseases may occur. In the 1950s, thalidomide was considered the sleeping pill, and the drug was tested on animals; it still causes several deformities in thousands of babies born due to the loss of biological variability or productivity resulting from inbred strains, juvenile animals, single-sex confinement, and inadequate group sizes. It causes physiological or immunological distortions resulting from stressful environments and procedures. It comes with a vast amount of money. An animal study has many expenses necessary to provide proper care, food, and shelter for the animals subject to tests⁸. Also, some procedure takes several months to complete; in that case, more expenses would be accumulated. Sometimes animal studies may involve necessary tests, and at that time, animals just suffer or even die because of harmful tests⁹. Despite some limitations, animals are used in biomedical research because they are biologically similar to humans. Mice share 98% of their DNA with humans¹⁰. The Animals Act of 1986 ensures that any research using animals must be fully assessed regarding any harm to the animals¹¹. The use of animals in research is never

undertaken lightly. Currently, animal testing is a compulsory legal part of drug testing. It is also essential to find out how to perform scientific research in the future. Animal research has contributed to 70 percent of Nobel Prizes for physiology or medicine. The animal study helps ensure the effectiveness and safety of new treatments^{12,13}. Animal experiments are always used in apace with other types of research, namely tissue cultures, computer simulation, and human experiments. All drugs must be tested on animals before they can be used in humans¹⁴.

NEED OF STUDY

However, after carefully consulting the various sources of mainstream medical literature to list these prominent contributions, scope, and limitations of an animal study in *Ayurveda* literature, one does not come across any assistance credited to *Ayurveda* literature. For instance, searching a topic like the discovery of animal study for contribution in *Ayurveda* on search engines like PubMed, Google Scholar, etc., does not provide any satisfactory result for attributing *Ayurveda* literature for its contribution. This communication aims to analyse some of *Ayurveda's* essential contributions to understanding related to animal research in various branches of *Ayurveda*.

This paper aims to critically review animal studies concerning the Ayurvedic aspect and assess animal studies' needs, scope, and limitations.

Classical texts of *Ayurveda* viz. *Sushruta Samhita*, *Dalhan* commentary, and *Chakrapani* commentary as research references for animal study. Literature available regarding the modern animal study was collected through various search browsers such as pub med, med live, and Google scholar. These references from both streams of knowledge were compared and analysed critically.

DISCUSSION

The use of animals in studies began in ancient times. Modern drug development will never accept a drug without any animal study since there are reports that *Ayurvedic* drug contains metals above the permissible limit. Many administrations are pushing hard on the safety data of *ayurvedic* drugs¹⁵. Before the start of the clinical phase, I trial, i.e. before entry of the drug into human beings, it is important to recognise possible target organs in animals and the number of side effects that can be observed.

In vitro studies failed to gain the faith of regulatory agencies to date. *In vivo* studies is the only option where the condition can be simulated to a human being, and a biological response can be obtained¹⁶.

Some claims say that *Ayurvedic* drugs in human beings are safe, and the dosage is based on the *prakriti* of that person. *Ayurvedic* medicinal research must be treated as a new drug discovery. Here we only know the therapeutic application of the drug from the classical literature but are unaware of other essential data about it¹⁷. According to World Health Organisation, about 70-80% of the population rely mainly on herbal sources, i.e., nonconventional medicines, for their health care¹⁸.

The well-being of animals, the calibre of research data, the effectiveness of teaching or testing programmes using animals, and the staff's health and safety depend on the proper housing and management of animal facilities. In *Ayurveda*, there are few animal houses because the rules of the animal ethics committee for sanctioning and maintaining an animal house are a little complicated. Also, the laws of the Government regarding the

animal house are strict. Making animals available for research is not easy. There are many animal houses at pharmacy colleges but not at *Ayurveda* colleges. So it is important to develop at least one animal house for any *Ayurveda* college where a bunch of other *Ayurveda* colleges are available. The other *Ayurvedic* colleges from that area are connected to that college through MOU. In *Ayurveda* for PG, Ph. D., and research purposes, the CPCSEA-approved animal house provides a wide range of animal models and facilities.

The CPCSEA Guidelines are strictly followed in the execution of all experiments. There are different facilities at CPCSEA like rats, mice, rabbit, and guinea pig experiments, models accessible Plethysmograph, Convulsimeter, Model of a burn wound, Histamine room, table for dissection with a warm room, cages for metabolism etc. There are behavioural and neuropharmacology studies on immunomodulation on acute, subacute, and chronic toxicity and safety. Different animal models for *Ayurveda* are being developed here.

Modern medicine fails to cure deep-rooted diseases such as cancer, diabetes, arthritis, and asthma, but *Ayurveda* can treat such chronic diseases. Unfortunately, In the traditional system of *Ayurveda*, there is no scientific validation for treating such chronic diseases because the valuable contribution of our forefathers is trailing. Hence, evidence-based research is urgently needed for global recognition and acceptance of *Ayurveda* which requires further advances in the research methodology. There is also a need for research in the *Ayurveda* field, drug pharmacology, pharmacokinetics, and pharmacovigilance¹⁹.

Moreover, *Ayurveda* is scientifically hardly acceptable due to the deficiency in the overall grasping of fundamental ideologies. The modern medicinal system has its ideologies, validated basic research, and advanced techniques, making it almost at the forefront. There is crucial for advanced research methodology to validate basic principles and medicinal products used in the *Ayurveda* system of medicine. Therefore, further development of the ongoing research methodology is urgently needed to advance *Ayurveda*²⁰.

In *Ayurveda*, for critical research on animal study, only a few institutions have a well-established research infrastructure. While conducting advanced and high-quality research in the field of *Ayurveda* requires experienced researchers with knowledge of western technologies. The traditional system of *Ayurveda* is based on investigative research tools, which is the glorious part of the research methodology. The research tools include the *Pratyaksha* (direct observation), *pramaan* (evidence), *anumana* (inference), and *aptopadesha* (the authoritative testimonies or literature. The effectiveness of modern research also depends on these three essential tools, which have been complemented by the use of scientific and technological devices. The interdisciplinary research concept has also prevailed recently, especially in integrative medicine²¹.

Clinical skills and theoretical knowledge are two equally important parts of medical education. For the use of animals, simulation is important. In the past, its main purpose was to train medical professionals to reduce errors during surgery, prescription, crisis inventions, and general practise²².

Day by day, the approach of amalgamating herbal and modern is growing enormously in western countries. The clinical effectiveness of many traditional medicines for various diseases is comparatively better than modern medicine²³. There are a lot of complications from conventional prescribed drugs as the traditional medicine system helps reduce stress. The ancient

system of *Ayurveda* has proven effective against various diseases in which pathogens have developed resistance to antibiotics. Therefore, research in the traditional *Ayurveda* system is urgently needed to combat most chronic diseases²⁴. It is important to give thorough attention before researching *Ayurvedic* drugs. The choice of an appropriate animal model is essential to exploring the drug's efficacy.

Further consideration comes to the dose of the drug. The dose given in *Ayurveda* literature can be validated based on efficacy and toxicity studies²⁵. Although if, if the exact dosage value is not available for all drugs so it can be judged based on available shreds of evidence. To obtain data on the effectiveness of *anupana*, the *Ayurveda* literature must be studied thoroughly. There is an insufficiency of sample size calculations, sufficient sample sizes, randomized treatment allocation, blinded outcome assessment, and the problem of interest statements. There is differing absorption, tissue distribution, metabolism, and excretion of pharmaceutical agents and toxins. Loss of biological variability or productivity resulting from an inbred strain, restriction to single sexes, and inadequate group sizes. When common laboratory animal species are handled, blood is drawn, and gavages, they experience significant stress, anxiety, and possible distress²⁶. It is important to check the safety, efficacy and other potential adverse side effects of new chemicals, and for that, we conduct animal studies; while conducting animal studies, pain management for laboratory animals was addressed, and for that, OECD guidelines have been developed. In OECD guidelines, 3R principles such as replacement, reduction and refinement²⁷.

Nowadays, the process of discovery of drugs has become extremely expensive, risky, and inefficient as the drug industry faces serious challenges. The main concerns of big pharmaceutical companies are post-marketing failure of blockbuster drugs and a severe innovation deficit²⁸. Proper quality control is still a serious issue in *Ayurveda* since most drugs are polyherbal formulations²⁹.

CONCLUSION

In day-to-day life, people's ability to afford health coverage is affected as health care costs continue to rise. The drug-based medicines have a lot of side effects. In *Ayurveda*, animal study has poor research methodology, and also, in many cases, there is a lack of scientific evidence. Because of that, *Ayurveda* is still lagging behind the other sciences. So there is a need for animal study in *Ayurveda*. To overcome all these difficulties in *Ayurveda*, it is important to research in the field of animal study. Compared to western medicine, the *Ayurvedic* research process in an animal study is tedious, but it is the only way to overcome the difficulties in *Ayurveda* worldwide. The well-organized and coordinated work free from bias continuously improves the quality of *Ayurveda*. For the development and promotion of *Ayurveda*, *Ayurvedic* research methodology needs more advancement.

REFERENCES

1. Washington (DC) Science, medicine and animals 1991 by the National academy of sciences.
2. Loew, F.M. "Animals as Beneficiaries of Biomedical Research Originally Intended for Humans." *ILAR News*, Vol. 3 (Fall 1988), p. 13-15.
3. Von Staden H. *Herophilus: The art of Medicine in Early Alexandria*. Cambridge University Press; Cambridge, UK: 1989.
4. Pioreschi P. *A History of Medicine, Volume 3: Roman Medicine*. Horatius Press; Omaha, NE, USA: 1998.
5. Semwal DK, Mishra SP, Chauhan A, Semwal RB. Adverse health effects of tobacco and role of Ayurveda in their reduction. *J Med Sci*. 2015; 15:139-46.
6. The use of non-human animals in research: a guide for scientists. UK: The Royal Society, UK; 2004: 1.
7. Goswami A, Barooch PK, Sandhu JS. Prospect of herbal drugs in the age of globalization-Indian scenario. *J Sci Ind Res*. 2002; 61:423-43.
8. J. Bailey, M. Thew, M. Balls. An analysis of the use of animal models in predicting human toxicology and drug safety. *Altern Lab Anim*, 2014;42:189-199.
9. P. Perel, I. Roberts, E. Sena, et al. Comparison of treatment effects between animal experiments and clinical trials systemic review. *British medical journal*. 2007;334:197-203.
10. Van der Worp HB, Howells DW, Sena ES, et al. Can animal models of disease reliably inform human studies? *PLoS Med*. 2010;7(3): e1000245.
11. Ioannidis JP. Evolution and translation of research findings: from bench to where? *PLoS Clin 2006 Trials 1*: e36. DOI:10.1371/journal.pctr.0010036
12. Hackam DG. Translating animal research into clinical benefit. *British medical journal*. 2007; 334:163-164.
13. Hackam DG, Redelmeirer DA. Translation of research evidence from animals to humans. *Journal of the American Medical Association*. 2006;296:1731-1732.
14. Levin LA, Danesh-Myer HV. Lost in translation: bumps in the road between bench and bedside. *Journal of the American Medical Association*. 2010;303:1533-1534.
15. Hooijmans CR, Rovers M, de Vries RB, Leenaars M, Ritskes-Hoitinga M. An initiative to facilitate well-informed decision making in laboratory animal research: report of the First International Symposium on Systematic Reviews in Laboratory Animal Science. *Lab Anim*. 2012;46:356-357.
16. Cassarett and Doull's *Essential of toxicology*, McGraw hill publication, USA 2003.
17. Sharma MP, *Drugs of animal origin in Unani medicine: The need for scientific evaluation*, in *Ethnobiology in Human Welfare*, edited by Jain S. K. (Deep Publications, New Delhi), 1996
18. Basisht G. Exploring progression of Ayurveda. *Ayu*. 2011; 32:445-7.
19. Baghel MS. Need of new research methodology for Ayurveda. *Ayu*. 2011; 32:3-4.
20. Patwardhan B. The quest for evidence-based Ayurveda: Lessons learned. *Curr Sci*. 2012; 102:1406-17.
21. Hankey A. The scientific value of Ayurveda. *J. Altern Complement Med*. 2005; 11:221-5.
22. Kiran Tawalare, Chavan Sucheta, Kalpana Tawalare, Meshram Sumedh Ancient concept of simulation in perspective of Ayurveda 2021 P. 103.
23. Sharma PV, editor. *Charaka Samhita of Agnivesha, Sutra Sthana, Ch. 11, Ver. 2*. Varanasi: Chaukhamba Orientalia; 1995. P. 114.
24. Mishra SP, Semwal DK, Chauhan A, Scenario of Ayurveda education in India: Some recommendations for development. *University News – Association of Indian Universities*. 2015; 53:3-8.
25. Morandi A, Sartori G, Tosto C. Ayurveda-LaMedicina tradizionale Indiana. In: Giarrelli G, di Sarsina PR, Bilvestrini B, editors. *Le medicine Non Convenzionali in Italia – Storia, Problemi e Prospettive di Integrazione*. Milan (Italy): Franco Angeli; 2007. P. 291-309.
26. Shekelle PG, Hardy M, Morton SC, Coulter I, Venturupalli S, Favreau J, et al. Are Ayurvedic herbs for diabetes effective? *J Fam Pract*. 2005; 54:876-86.
27. Russell, W.M.S. & Burch, R.L. *The principles of Humane experimental technique*. Methuen, London. 1959. P 330-334.

28. Datta HS, Mitra SK, Patwardhan B. Wound healing activity of topical application forms based on Ayurveda. *Evid Based Complement Alternat Med* 2011. 2011:134378.
29. Singh RH. Exploring issues in the development of Ayurvedic research methodology. *J Ayurveda Integr Med.* 2010; 1:91-5. Chatterjee B, Pancholi J. Prakriti-based medicine: A paradigm shift. *Indian J Pharm Sci.* 2015; 77:135-41.

Cite this article as:

Sucheta S Chavan *et al.* Need, scope and limitations of animal study in perspective of Ayurveda: A Review. *Int. J. Res. Ayurveda Pharm.* 2022;13(5):100-103
<http://dx.doi.org/10.7897/2277-4343.1305134>

Source of support: Nil, Conflict of interest: None Declared

Disclaimer: IJRAP is solely owned by Moksha Publishing House - A non-profit publishing house, dedicated to publishing quality research, while every effort has been taken to verify the accuracy of the content published in our Journal. IJRAP cannot accept any responsibility or liability for the site content and articles published. The views expressed in articles by our contributing authors are not necessarily those of IJRAP editor or editorial board members.