



ISSN (E): 2277- 7695

ISSN (P): 2349-8242

NAAS Rating: 5.03

TPI 2018; 7(9): 162-166

© 2018 TPI

www.thepharmajournal.com

Received: 22-07-2018

Accepted: 24-08-2018

Rahul Choudhary

Assistant Professor, Department of Veterinary and Animal Husbandry Extension Education Mahatma Jyotiba Fule College of Veterinary and Animal Science, Chomu, Jaipur, Rajasthan, India

Gautam

Associate Professor, Department of Veterinary and Animal Husbandry Extension Education, College of Veterinary Science, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar, Haryana, India

SS Sangwan

Professor & Head of Department, Department of Veterinary and Animal Husbandry Extension Education, College of Veterinary Science, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar, Haryana, India

Rakesh Ahuja

Ph.D. Scholar, Department of Veterinary and Animal Husbandry Extension Education, College of Veterinary Science, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar, Haryana, India

Correspondence

Rakesh Ahuja

Ph.D. Scholar, Department of Veterinary and Animal Husbandry Extension Education, College of Veterinary Science, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar, Haryana, India

Animal scientists and students perception toward xenotransplantation

Rahul Choudhary, Gautam, SS Sangwan and Rakesh Ahuja

Abstract

Xenotransplantation is a burgeoning technology that could provide a solution to the shortage of organs and tissue for transplantation. It does, however, raise many moral and ethical dilemmas. The aim of this study was to evaluate the perception of veterinary students' and scientists at Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar to determine factors that affect their acceptance. The sample constituted randomly chosen scientists and students. The perception was conceptualized as positive or negative inclination towards acceptance of xenotransplantation and was assessed using a questionnaire. Mean perception about xenotransplantation score of respondents was 61.27 and the differences in mean score of scientists and students was negligible. Further, a majority of respondents were having moderate acceptance of xenotransplantation. Almost one third were having a strongly favourable perception. Educational qualification was significantly having an impact on the perception about xenotransplantation.

Keywords: Xenotransplantation, perception, veterinary education

Introduction

Xenotransplantation is the transplantation of living cells, tissues or organs from one species to another (Kress and J.M. 1998) [1]. However, modifying or manipulating animal genomes, is considered akin to breaking usual boundaries among biological species (For example, Verhoog, 1992) [2]. Also, transplant process is regarded as unacceptable because the contradictory outcomes occur for both humans and animals (Kaiser, M. 2004) [3]. The technology is fundamentally dependent on the use of animals, animal welfare and harm (Pearce *et al.* 2006) [4] conducted a study to evaluate undergraduate university students' opinions on the xenotransplantation and concluded that the medical need for organs was highlighted as the most important argument in favour, and the risk of infection was revealed to be the most important argument against xenotransplantation. The students would significantly prefer a human to non-human animal organ, and did not believe the genetic modification of animals for transplantation was ethically acceptable. On the other hand, the acceptance and use of the xenotransplantation requires construction of an adequate explanation to overcome such dilemmas. Yet, how the individual respond to the idea depends largely on their perception. Perception is closely related to opinions, attitudes and behaviours (Tevelde *et al.* 2002) [5]. Schacter and Daniel (2011) [6] define perception as the organization, identification, and interpretation of sensory information in order to represent and understand the environment. It depends on complex functions of the nervous system, but subjectively seems mostly effortless because this processing happens outside conscious awareness (Goldstein 2009) [7]. Perceptions develop through interaction between what people see and hear and their past experience, knowledge, beliefs and expectations. These are often expressed through words and may be associated with images, including metaphors (George, 2010) [8].

The purpose of this study was to determine the perception, and factors affecting these perceptions, of veterinary student as well as scientists concerning xenotransplantation.

Materials and Methods

The study was conducted at Lala Lajpat Rai University of Veterinary and Animal Sciences (LUVAS), Hisar. All the animal scientists at LUVAS, Hisar were taken as universe for the sample. A sample of 50 members was drawn randomly by simple lottery method. Similarly, a sample of 120 students (100 undergraduates and 20 postgraduate) was drawn. The list of undergraduate students in each class was obtained and 20 students were randomly chosen using simple lottery method. Similarly, a list of all Post-graduate students was prepared. Then 20 students were randomly selected for the study.

Thus, the total numbers of respondents were 170. The antecedent variables likely to affect students' and scientists' perception about xenotransplantation were selected after thorough review of available literature and consultation with the faculty members. These were age, gender, educational

qualification and history of pets, belief in animal mind, religiousness, extraversion, conscientiousness, agreeableness, neuroticism and openness. They were operationalized as presented in Table 1.

Table 1: Operationalisation of independent variables

Variables	Operationalisation
Gender	Dichotomous
Age	Chronological age of respondents
Experience of pet animals	Schedule was developed
Belief in animal mind	Scale developed by Hills (1995) ^[9]
Religiousness	Scale developed by Hernandez (2011) ^[10]
Level of education	Schedule was developed
Extraversion	Scale developed by John and Srivastava (1999) ^[11]
Conscientiousness	Scale developed by John and Srivastava (1999) ^[11]
Agreeableness	Scale developed by John and Srivastava (1999) ^[11]
Neuroticism	Scale developed by John and Srivastava (1999) ^[11]
Openness	Scale developed by John and Srivastava (1999) ^[11]

The perception in this study was conceptualized as positive or negative inclination towards acceptance of xenotransplantation. A schedule was developed to assess the perception of respondents towards xenotransplantation. The following procedure was adopted to develop the schedule. A list of 81 statements reflecting opinion about xenotransplantation was prepared initially. These statements were obtained from different sources like popular literature, scientific works, general discussion, etc. In the next stage, the statements which were ambiguous, irrelevant and not conforming to the criteria as suggested by (Edwards *et al.* 1948)^[12] were deleted and a list of 52 statements was obtained. These statements were listed randomly and sent to 20 judges with well-defined instructions to carefully and critically evaluate the statements. They were requested to give their responses as to whether the particular statement is favourable, unfavourable or ambiguous. They were requested to add/delete or modify any statement which they deemed fit for inclusion or deletion. The performa was returned by 11 judges. In the next step, the statements with more than 70 percent agreement scores of judges were retained. In this way 29 statements were retained.

The respondent were requested to give responses on three-point continuum scale, i.e. agree, neutral and disagree and the scores 3, 2 and 1 and 1, 2 and 3 were assigned for positive and

negative statements, respectively. Thus, the minimum and maximum possible obtainable overall scores were 29 and 87, respectively. The total score of each respondent was worked out by adding the scores of individual statements. The respondents were categorized in three groups of equal range based on their scores (i.e. less favourable (29-48), favourable (49-67) and strongly favourable (68-87).

Result and Discussion

Background profile of the respondents: The observed age of the total respondents were 18-58 years indicating that respondents of all age groups were represented in the study (Table 2). A majority of the respondents were male with nearly one third being females. This is perhaps because of the fact that the veterinary profession is perceived in the society as masculine. Further, a large percentage of the respondents were having experience of keeping pets. They were having varying degrees of extraversion, conscientiousness, agreeableness, neuroticism, and openness. Further, the respondents were having moderate belief in animal mind (BAM). This BAM is the term used for how we attribute to animals mental capacities such as intellect, the ability to reason, and feelings of emotion (Hills, 1995)^[9]. Similarly, the respondents were having varying degree of religiousness.

Table 2: Background profile of respondents

Variable	Possible Range	Scientists		Students		Overall	
		Observed Range	Mean± SD	Observed Range	Mean± SD	Observed Range	Mean± SD
Age (years)	-	26-58	40.10±10.62	18-34	22.06±2.32	18-58	27.36±10.22
Gender	0-1	0-1	0.32±0.47	0-1	0.40±0.49	0-1	0.38±0.49
Educational qualification	1-7	6-7	6.80±0.40	1-6	3.50±1.71	1-7	4.76±2.45
History of pets	1-4	1-4	1.72±0.88	1-4	2.34±1.29	1-4	2.16±1.22
Belief in animal mind	4-28	15-28	22.80±3.58	15-28	21.36±3.58	15-28	21.78±3.63
Religiousness	0-111	0-85	52.18±19.26	0-86	47.78±20.92	0-86	49.07±20.49
Extraversion	8-40	19-38	27.38±4.38	19-39	26.84±3.89	19-39	27.00±4.03
Agreeableness	9-45	29-44	35.64±3.72	20-44	32.49±4.47	20-44	33.42±4.49
Conscientiousness	9-45	24-42	34.46±4.45	21-43	31.12±4.21	21-43	32.10±4.53
Neuroticism	8-40	13-33	22.16±4.91	11-38	22.11±4.83	11-38	22.12±4.84
Openness	10-50	28-43	36.12±3.75	27-45	35.27±3.81	27-45	35.52±3.80
Xenotransplantation	29-87	31-77	60.32±12.92	33-79	61.27±9.59	31-79	61.27±10.66

Perception of respondents about xenotransplantation

A schedule was developed for assessment of perception about xenotransplantation. There were 29 statements in the schedule and scoring was done on a three point continuum. The minimum and maximum possible scores were 29 and 87 respectively. The minimum score obtained by the respondents

was 31 while the maximum was 79. The frequency distribution is depicted in the (Figure 1). The average score of all the respondents was 61.27±10.66 (mean ±SD). The respondents were divided into three categories i.e. less favourable (29-48), favourable (49-67) and strongly favourable (68-87) for appropriate analysis.

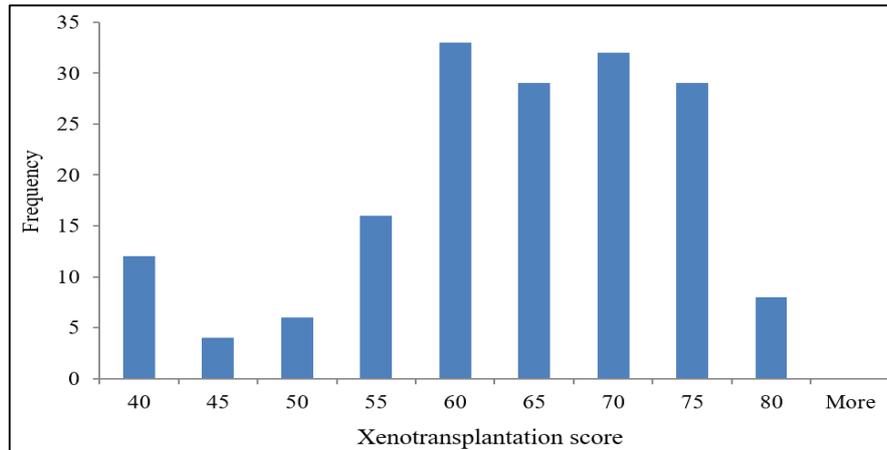


Fig 1: Histogram depicting frequency distribution of xenotransplantation score of respondents

Table 3: Classification of respondents on the basis of perception about xenotransplantation

S. No.	Xenotransplantation score	Students(n=120)		Scientists (n=50)		Total (n=170)	
		Frequency (%)	Mean Score	Frequency (%)	Mean Score	Frequency (%)	Mean Score
1	Less favourable (29-48)	9 (7.50)	38.67	9 (18)	38.22	18 (10.59)	38.44
2	Favourable (49-67)	71 (59.17)	59.06	23 (46)	59.39	94 (55.29)	59.14
3	Strongly favourable (68-87)	40 (33.33)	71.47	18 (36)	72.56	58 (34.12)	71.81
4	Mean Xenotransplantation score	61.67		60.32		61.27	

n= number of respondents

Further, more of students were lying in favourable category as compared to scientists. On the whole, it can be seen that a majority of respondents were having moderate acceptance of xenotransplantation. Almost one third were having a strongly favourable perception.

Effect of Respondents Antecedents on Attitude toward Xenotransplantation: The perception in this study was conceptualized as positive or negative inclination about xenotransplantation. A schedule was used to assess this. The minimum and maximum possible scores were 29 and 87, respectively. The minimum score obtained by the respondents was 31 while the maximum was 79 indicating that there were significant variations in the opinion (Table 2). The average score of all the respondents was 61.27 indicating that a majority of respondents perceived xenotransplantation favourably (Fig. 1).

The development of xenotransplantation has raised a lot of ethical controversy. Critics have put forth different arguments while opposing this technology, which may conveniently be divided into two kinds: (1) intrinsic arguments and (2) extrinsic arguments (Kaiser, 2005) [13]. Intrinsic argument against xenotransplantation maintains that xenotransplantation is “objectionable in itself”. And extrinsic argument focuses on the “allegedly harmful consequences of making hybrid organ”. In this sense, xenotransplantation is ethically problematic because “it is unnatural to genetically engineer animals” (Comstock, 2002) [14]. In Science and Technology Studies various studies have shown the increasing linkages between biomedical advances and the market (Andrews and Nelkin 2001) [15], (Rose, 2007) [16]; (Sunder Rajan, 2006) [17],

(Waldby and Mitchell 2006) [18]. Organs and tissues have been treated as commodities on a large scale in recent decades. However, the commercialization of body parts is not a new phenomenon. It had already started during the Renaissance with the growing interest in anatomy (Andrews and Nelkin 2001) [15]. The experiments in organ transplantation techniques in the 1960s accelerated the phenomenon further. Organ transplantation was based on the concept of 'a gift'. However, in reality it works under commercial interest; more specifically, organ transplantation at large is a blend of altruism and commerce (Scheper-Hughes, 2000) [19] (Waldby, 2002) [20]. Body parts are extracted like a mineral, harvested like a crop, or mined like a resource. Tissue is procured- a term more commonly used for land and goods (Andrews and Nelkin 2001) [15]. In recent years, the development of xenotransplantation technologies is seen as one of the novel sources to fulfill the growing demand for organs and tissues (Waldby, 2002) [20]. Further, in the sense of extrinsic argument animal xenotransplantation is ethically wrong because of its negative consequences on human beings and animals. The moral status of an animal is another prime issue regarding xenotransplantation. Xenotransplantation intervenes with the intact body of animals and also threatens their essential characteristics.

The favourable perception, observed in the study, can at least partly, be attributed to the veterinary education. The education of an individual is known to have an impact on the perception about xenotransplantation. For example, (Frati *et al.* 2001) [21] conducted a survey on the acceptance of xenotransplantation. They assessed 190 respondents of various groups and found that medical students were more approving of

xenotransplantation. Similarly, (Canova *et al.* 2006)^[22] found that a significantly larger proportion of the students who approved of xenotransplantation were attending science courses rather than art courses. Conesa *et al.* (2006)^[23] concluded that attitudes toward future application of xenotransplantation were quite positive among doctors. However, the attitudes of nursing and ancillary personnel were similar to those of the general population (*ibid.*) (Knight 1999)^[24] opines about veterinarians that may be due to during

their training, the students have also traditionally been required to practice clinical, surgical and an aesthetic skills by anaesthetizing healthy animals, conducting surgical procedure on them, and killing any survivors at the end. Evidently, the respondents in the study perceived xenotransplantation favourably although it remains uncertain whether they have formed a mature opinion after navigating through the ethical dilemmas or have naively presumed it from utilitarian compulsions.

Table 4: Relationship of dependent and independent variables

Variable	Category (No. of respondent)	Perception about xenotransplantation				F/Z value
		Less favorable (29-48) Mean ± SD (No. of respondent)	Favorable(49-67) Mean ± SD (No. of respondent)	Strongly favorable (68-87) Mean±SD (No. of respondent)	Mean±SD	
Age (years)	Young (upto 30) 132	39.25±4.41(12)	59.17±4.48(76)	71.57±3.10(44)	61.49±9.24	0.25
	Middle (31-45) 22	39±6.06(4)	58.20±6.21(10)	72.12±2.36(8)	59.77±12.85	
	Old (Above 45) 16	32.50±2.12(2)	60±4.34(8)	73.17±3.76(6)	61.50±13.48	
Gender	Male 106	40.90±4.91(10)	58.98±4.76(57)	71.74±3.01(39)	61.97±10	1.0639
	Female 64	35.28±2.83(8)	59.38±4.49(37)	71.95±3.27(19)	60.11±11.65	
Educational qualification	B.V.Sc. 1 yr (20)	45±0(1)	55.93±3.15(14)	72±2.65(5)	59.40±8.36	3.97**
	B.V.Sc. 2 yr (20)	39±0(1)	58.44±3.48(16)	70±1.73(3)	59.20±7.09	
	B.V.Sc. 3 yr (20)	38±4.38(6)	58.80±3.16(10)	72.50±1.29(4)	55.30±13.16	
	B.V.Sc. 4 yr (20)	36±0(1)	59.40±4.67(10)	71±3.35(9)	63.45±9.51	
	B.V.Sc. 5 yr (20)	-	60.85±5.32(13)	69.57±1.81(7)	63.90±6.09	
	M.V.Sc. (30)	47±0(1)	62.08±4.64(12)	72.53±3.61(17)	67.50±7.54	
History of pets	Ph.D. (40)	37.13±5(8)	59.21±4.62(19)	72.77±2.98(13)	59.15±13.49	0.13
	No pets 73	40±4.11(8)	59.08±5.36(39)	72.04±2.95(26)	61.62±10.71	
	In childhood 38	38.50±5.80(4)	57.47±3.63(19)	70.60±2.90(15)	60.66±10.52	
	In recent past 18	37.50±6.45(4)	62.25±3.33(8)	73±4.15(6)	60.33±14.07	
Belief in animal mind	At present 41	34±1.41(2)	59.48±4.07(28)	72.27±2.87(11)	61.63±9.25	1.3265
	Low (≤20) 64	45±0(1)	59.52±4.39(46)	71.59±3.26(17)	62.50±7.08	
Religiousness	High (>20) 106	38.06±4.76(17)	58.77±4.88(48)	71.90±3.02(41)	60.53±12.30	1.94
	Low (0-37) 45	38.25±6.70(4)	58.78±59.49(18)	71.87±3.02(23)	63.64±11.07	
	Medium (38-74) 109	39.27±4.73(11)	59.49±4.51(69)	71.86±3.20(29)	60.74±9.94	
Extraversion	High (75-111) 16	35.67±3.06(3)	56.57±3.21(7)	71.33±3.08(6)	58.19±13.43	0.0451
	Low (8-24) 47	38.25±5.74(4)	58.96±4.75(28)	71.53±3.36(15)	61.21±10.12	
Agreeableness	High (25-40) 123	38.50±4.88(14)	59.21±4.62(66)	71.91±3(43)	61.29±10.89	1.1011
	Low (9-27) 21	39±0(1)	57.76±3.99(17)	74.67±3.51(3)	59.29±8.49	
Conscientiousness	High(28-45) 149	38.41±5.05(17)	59.44±4.73(77)	71.65±3(55)	61.55±10.92	0.7770
	Low (9-27) 24	39±0(1)	57.89±4.07(18)	71.80±3.27(5)	60±8.19	
Neuroticism	High(28-45) 146	38.41±5.05(17)	59.43±4.73(76)	71.81±3.08(53)	61.48±11.02	1.8754
	Low (8-24) 119	39.82±4.92(11)	59.55±4.51(65)	72.23±3.23(43)	62.31±10.20	
Openness	High(25-40) 51	36.29±4.35(7)	58.21±4.86(29)	70.60±2.23(15)	58.84±11.39	1.8490
	Low (10-30) 18	-	59.20±4.80(10)	71±2.93(8)	64.44±7.22	
	High(31-50) 152	38.44±4.90(18)	59.13±4.64(84)	71.94±3.10(50)	60.89±10.95	

References

- Kress, Jack M. Xenotransplantation: ethics and economics. Food & Drug LJ, 1998, 53:353.
- Verhoog H. The concept of intrinsic value and transgenic animals. Journal of Agricultural and Environmental ethics. 1992; 5(2):147-160.
- Kaiser M. Xenotransplantation—ethical considerations based on human and societal perspectives. Acta Veterinaria Scandinavica. 2004; 45(1):S65.
- Pearce CE, Thomas APM, Clements DAV. The ethics of xenotransplantation: a survey of student attitudes. Xenotransplantation. 2006; 13(3):253-257.
- Te Velde H, Aarts N, Van Woerkum C. Dealing with ambivalence: farmers' and consumers' perceptions of animal welfare in livestock breeding. Journal of agricultural and environmental ethics. 2002; 15(2):203-219.
- Schacter, Daniel. Psychology. Worth Publishers, chap 4, 2011,
- Goldstein E. Sensation and Perception. 8, Cengage Learning, 2009, 5-7.
- George DR. Overcoming the social death of dementia through language. The Lancet. 2010; 376(9741): 586-587
- Hills AM. Empathy and belief in the mental experience of animals. Anthrozoös. 1995; 8(3):132-142.
- Hernandez, Brittany C. The religiosity and spirituality scale for youth: development and initial validation." PhD diss., Louisiana State University, 2011. Accessed on June 3, 2016.
- John OP, Srivastava S. The Big Five trait taxonomy: History, measurement and theoretical perspectives. In L. A. Pervin, & O. P. John (Eds.), Handbook of personality: Theory and research. New York, Guilford Press, 1999, 102–138
- Edwards AL, Kilpatrick FP. A technique for the construction of attitude scales. Journal of applied psychology. 1948; 32(4):374.
- Kaiser M. Assessing ethics and animal welfare in animal

- biotechnology for farm production. *Revue scientifique technique-Office international des epizooties*, 2005; 24(1):75.
14. Comstock G. Ethics and Genetically Modified Foods” in *Genetically Modified Foods: Debating Biotechnology*, M Ruse & Castle, Prometheus Books New York, 2002.
 15. Andrews L, Nelkin D. *Body bazaar: the market for human tissue in the biotechnology age*, 2001.
 16. Rose N. *The Politics of Life Itself: Biomedicine, Power, and Subjectivity in the Twenty-First Century*. Princeton University Press, 2007.
 17. Sunder Rajan K. *Biocapital: The Constitution of Post genomic Life*. Duke University Press, 2006.
 18. Waldby C, Mitchell R. *Tissue Economies: Blood, Organs and Cell Lines in Late Capitalism*. Duke University Press, 2006.
 19. Scheper-Hughes N. The global traffic in human organs. *Current Anthropology*. 2000; 41(2):191-224.
 20. Waldby C. Stem cells, tissue cultures and the production of biovalue. *Health*. 2002; 6(3):305-323.
 21. Frati G, Frati P, Muzzi L, Oricchio G, Papalia U, Yacoub MH. Medical and ethical issues in xenotransplantation: the opinion of the public, patients and transplant candidates in Italy. In *Transplantation Proceedings Elsevier*. 2001; 33(1):1884-1885
 22. Canova D, Bona MD, Rumiati R, Masier A, Ermani M, Naccarato R *et al*. Understanding of and attitude to xenotransplantation among Italian university students: impact of a 3rdyr university course. *Xenotransplantation*. 2006; 13(3):264-271.
 23. Conesa C, Ríos A, Ramírez P, Sánchez J, Sánchez E, Rodríguez MM *et al*. Attitudes of primary care professionals in Spain toward xenotransplantation. In *Transplantation proceedings Elsevier*. 2006; 38(3):853-857.
 24. Knight A. Alternatives to harmful animal use in tertiary education. *ATLA. Alternatives to laboratory animals*. 1999; 27(6):967-974.