RESEARCH ARTICLE

A Study on Awareness of Livestock Owners about Zoonoses in Jaipur District of Rajasthan

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Abstract

The present investigation was conducted from July to November 2021 in Jaipur district of Rajasthan using an exploratory research design. The data were collected from randomly selected 120 livestock owners with the help of structured and pre-tested interview schedule. Awareness index was calculated by using weighed mean score and maximum obtainable score. Awareness of livestock owners about zoonoses was observed on five different aspects covering zoonotic diseases, their mode of transmission, animal food consumption pattern, detail information on particular zoonotic disease, their vaccination, these are which zoonotic diseases you heard, diseases of animals can transmit to man and vice versa through, animal product consumption pattern, awareness regarding various zoonotic diseases, awareness about vaccination for zoonotic diseases. The findings of study showed that majority of livestock owners had medium level of awareness for zoonotic diseases.

Key words: Awareness, Livestock owners, Rajasthan, Risk, Zoonotic diseases.

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Introduction

Livestock is one in all the foremost vital assets of the poor to fulfil their living demands (Perry and Grace, 2009). Pet animals are good companions in many households and contribute to the physical, social, and emotional development of children and also the well-being of their owners (Robertson *et al.,* 2000), whereas non-domesticated animals provide a range of benefits to humans including economic, health, recreational, scientific, and ecological values (Soulsbury and White, 2016). The livestock provides livelihood to 2/3 of the rural community. It also employs about 8.8% of the population in India. The livestock sector contributes 4.11% of GDP and 25.6% of total Agriculture GDP (Anonymous, 2021). Animal diseases can have a crucial impact on the productivity and the quality of product produced (Rich and Perry, 2011), and also possess greatest risk for zoonotic disease transmission that occurs at the human-animal interface through direct or indirect human exposure to animals, their products (Dohoo *et al.,* 1998). Livestock excrete many micro-organisms like bacteria, virus, fungi etc. which have zoonotic potential (Atwill, 2005). Zoonotic diseases cause mortality and morbidity in human (Anonymous, 2006). Among all diseases, brucellosis is a second most important zoonotic disease of the world after rabies (Cutler and Whatmore, 2003) and economic losses due to brucellosis remain significant (Verma *et al.,* 2020). The recent COVID-19 outbreak in China and then other part of world is the 6th global health emergency in the current decade which killed around 3500 people and more than 100,000 people affected so far (Anonymous, 2006, Kumar *et al.,* 2020).

India has the world's second largest human population, two biodiversity hotspots (Myers *et al.,* 2000) and one of the world's greatest densities of tropical livestock (Kruska *et al.,* 2003). The Central Bureau of Health Intelligence (CBHI) provisionally reported around 110 cases of rabies, 1674 cases of Japanies Encephelitis, 14971 cases of swine influenza virus during 2018 (Anonymous, 2019). India possesses a favourable environment for the transmission of communicable diseases between man and animals (Jones *et al.,* 2008; Forman *et al.,* 2008). In 2015 out of 362 cases of scrub typhus 251 cases were found in Jaipur. Some other diseases like cutaneous leishmaniosis, rabies, swine flu, anthrax were also reported in Rajasthan (Anonymous, 2015). Zoonotic diseases can spread in a variety of ways: through the air, by direct contact, by contact with an inanimate object that harbours the disease by oral ingestion, and by insect transmission (Pelzer and Currin, 2009). Zoonoses work as a double-edged weapon, one side causing serious and fatal diseases in human beings and the other side by undermining animal health and productivity thus producing great financial losses to the animal industries (Pal, 2013; Gezmu *et al.,* 2017). On other hand, "One Health

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Initiative" approach introduction takes a general strategy to combine human, animal, and ecosystem health, which means, it connects human medical and veterinary science (Papadopoulos and Wilmer, 2011). Keeping in view all these, a comprehensive study was conceptualized on understanding public awareness and practice of livestock owners about zoonotic diseases that have received much attention now a days aiming as a useful tool in developing and improving existing control measures.

Materials and Methods

A study was purposively conducted in the Jaipur district of Rajasthan. Data was collected from the selected livestock owners by using the structured interview schedule developed for the purpose. After the selection of the villages, a preliminary survey was conducted in the selected villages to know the total number of livestock owners who were engaged in livestock farming from generation to generation and presently rearing at least 3-4 livestock. Out of them, 6 livestock owners from each village, five villages from each tehsil and four tehsils from Jaipur district were selected randomly for the study. Thus, a total of 120 livestock owners was selected and interviewed on various identified statements/items as per the objectives of the study. The data were collected with the help of structured and pre-tested interview schedule in the month of July in the year 2021. The data included information about the awareness of livestock owners about zoonoses. Responses of livestock owners were obtained on two-point continuum scale like "aware", and "not aware" and weightage were given as 2 and 1, respectively. After collection of data, frequency, percent, mean, standard deviation values were computed by using Microsoft Excel and Adoption index was calculated by using formula:

$$\text{Adoption Index (\%)} = \frac{\text{weighted mean score}}{\text{Maximum obtainable score}} \times 10$$

Results and Discussion

Distribution of Livestock Owners according to their Personal Attributes

Majority of the livestock owners were middle aged (50.83%) and illiterate (33.33%); 49.17% of them had agriculture as their primary occupation and 64.17% had livestock plus agriculture as their entrepreneural occupation. Majority of the livestock owners had medium size families (68.34%) and were living in a joint family system (62.50%). Majority of the livestock owners had small land holding (33.33%), medium sized herd (83.33%) and medium level of experience in livestock farming (59.16%). The average livestock farming experience of livestock owners was 29.83 ±11.05 years. The average annual gross income of the livestock owners was ₹ 1,53,000 per annum and majority of the livestock owners (75.83%) were under the medium income group. Majority of them had medium level of extension contact (60.84%), mass media exposure (68.33%), while majority of them (78.33%) had no social participation.

Table1: Distribution of livestock owners according to their personal attributes (n=120)

Attributes	Description	No.	%
Age	Young (Up to 35years)	21	17.50
	Middle (36 to 50 years)	61	50.83
	Old (Above 50 years)	38	31.67
	Mean ± SD		43.78±9.96
Education	Illiterate	40	33.33
	Primary level	15	12.50
	Middle level	23	19.16
	High school level	17	14.17
	Intermediate level	05	4.17
	Graduate & above	20	16.67
Family size	Small (Up to 4 members)	20	16.66
	Medium (5 to 9 members)	82	68.34
	Large (Above 9 members)	18	15.00
	Mean ± SD		6.85±2.8
Family type	Nuclear	45	37.50
	Joint	75	62.50
Occupation (Enterprise basis)	Livestock farming + Agriculture	77	64.17
	Livestock farming (LF) + Labor	07	05.83
	LF + Agriculture + Business	04	03.33
	LF + Agriculture + Service	32	26.67
Primary occupation	Agriculture	59	49.16
	Livestock farming	22	18.33
	Labor	3	2.50
	Business	4	3.34
	Service	32	26.67
Land holding	Landless (0)	04	3.34
	Marginal (Upto1 hectares)	21	17.50
	Small (>1 to 2 hectares)	40	33.33
	Semi medium (>2 to 4 hectares)	34	28.33
	Medium (>4 to 10 hectares)	09	7.50
	Large (More than 10 hectares)	12	10.00
Herd size (Adult unit equivalent)	Small (Less than 2.47)	5	4.17
	Medium (2.47 to 12.85)	100	83.33
	Large (Above 12.85)	15	12.50
	Mean ± SD		7.66±5.19
Annual gross income	Low (Less than₹ 75,426)	6	5
	Medium (₹ 75,426 to ₹ 2,30,574)	91	75.83
	High (Above ₹ 2,30,574)	23	19.17
	Mean ± SD		153000±77574

Experience in livestock farming (in years)	Low (Less than 18.78)	23	19.16
	Medium (18.78 to 40.88)	71	59.17
	High (Above 40.88)	26	21.67
	Mean ± S.D.		29.83±11.05
Extension contacts	Low (Less than 3.13)	25	20.83
	Medium (3.13 to 8.59)	73	60.84
	High (Above 8.59)	22	18.33
	Mean ± SD		5.86±2.73
Mass media exposure	Low (Less than 2.56)	20	16.67
	Medium (2.56 to 11.3)	82	68.33
	High (Above 11.3)	18	15.00
	Mean ± SD		6.93±4.37
Social participation*	No participation	94	78.33
	Member	31	25.83
	Office bearer	02	01.67

*Sum of frequency exceeds the number of observations (n=120) due to multiple responses

Awareness of Livestock Owners about Zoonoses

Awareness of livestock owners about zoonoses was observed on five different aspects covering zoonotic diseases, their mode of transmission, animal food consumption pattern, detailed information on particular zoonotic disease and their vaccination. The results obtained are presented below in Tables from 2 to 5.

(A) Which zoonotic disease have you heard

Among six major zoonotic disease, 98.33% of respondents heard about rabies, 94.17% heard about tuberculosis, 40.00% heard about babesiosis, 5.00% heard about anthrax, 17.50% heard about brucellosis, while 29.16% of respondents heard about dermatophytosis. These findings were similar to Hundal *et al.* (2016), Rajput *et al.* (2016), and Kerorsa (2019).

Table 2: Distribution of livestock owners according to the zoonotic disease they heard (n=120)

Diseases	Aware	Not Aware
Rabies	118 (98.33)	02 (1.67)
Brucellosis	21 (17.50)	99 (82.50)
Tuberculosis	113 (94.17)	07 (5.83)
Anthrax	06 (5.00)	114 (95.00)
Dermatophytosis	35 (29.16)	85 (70.84)
Babesiosis	48 (40.00)	72 (60.00)

Values in parenthesis indicate the percentage

(B) Awareness about mode of transmission of zoonotic diseases

Majority (98.33%) of the livestock owners were aware of animal diseases that can be transmitted by ingestion of contaminated milk and water, and through the bite of animals or contact of animal's saliva. 88.33% of the livestock owners were aware of the transmission of diseases through the bite of arthropods, while 14.17% only new regarding inhalation as a mode of transmission. Moreover, only one-third (33.33%) of the respondents were aware about transmission of diseases by direct and indirect contact with animals, which was in line with Abera *et al.* (2016), who showed 25.6% respondents having awareness about the mode of transmission of zoonotic diseases by contact.

(C) Animal product consumption pattern

Table 4 indicates that majority (97.50%) of livestock owners were aware to consume boiled and properly cooked meat. Similarly, 95.83% of livestock owners were aware to consume boiled and properly cooked egg and 89.17% regarding aware about consumption of boiled milk. These results however contradicted with Abera *et al.* (2016) as there is a deep-rooted culture of raw meat consumption in Ethiopia where individuals were having the chance to consume more raw meat in different social ceremonies such as weddings and other local holy days.

Table 3: Distribution of livestock owners according to their awareness about diseases of animals can transmit to man and vice versa through various modes (n=120)

Statements	Aware	Not Aware
Direct contact or indirect contact of materials that have come in contact with animals	40 (33.33)	80 (66.67)
Ingestion of contaminated milk and water	118 (98.33)	2 (1.67)
Inhalation route	17 (14.17)	103 (85.83)
Bite of animals or contact of animal's saliva	118 (98.33)	2 (1.67)
Bite of vectors (flies, mosquitos, etc.)	106 (88.33)	14 (11.67)

Values in parenthesis indicate the percentage

Table 4: Distribution of livestock owners according to their awareness to consume boiled & properly cooked animal product (n=120)

Product	Aware	Not aware
Milk	107 (89.17)	13 (10.83)
Meat	117 (97.50)	03 (2.50)
Egg	115 (95.83)	05 (4.17)

Values in parenthesis indicate the percentage

(D) Awareness regarding various zoonotic diseases

Table 5 shows that only 5.00% of the livestock owner had knowledge that anthrax can be transmitted by direct contact with animals, while 5.00 %, 4.17 %, 0.84 %, 0.84 % and 5.00 % of them had knowledge that anthrax is highly fatal disease in dairy animals, anthrax can be transmitted by direct contact with discharge of animals, anthrax is highly fatal disease in human beings, anthrax can be transmitted by inhalation and death due to anthrax leads to bleeding from natural

orifices that doesn't clot, respectively. Majority (99.16%) of the livestock owners were not aware, while 00.84 % were aware that brucellosis can be transmitted by airborne infection, consumption of raw milk; brucellosis can cause orchitis and undulant fever in men, and brucella testing in animals needs to be done twice a year.

Further, majority (58.33%) of livestock owners were aware, while 41.67 % had no awareness about transmission of tuberculosis through inhalation of the droplet from pulmonary lesions. Majority (89.17%) of the livestock owners had awareness that tuberculosis can be transmitted by consumption of raw milk. Moreover, majority (98.33%) of livestock owners were aware that rabies to animals can be caused by the bite of rabid dog/cat, whereas 87.50 % of them knew that rabies in animals causes profuse salivation, depressMNion and convulsions (Table 5). These findings were similar to those of Mohan (2012), Thakkar (2013), Rajput *et al.* (2016), and Pawar (2018

Table 5: Distribution of livestock owners according to their awareness regarding various zoonotic diseases (n=120)

Diseases	Statements	Aware	Not Aware
Anthrax	Anthrax can be transmitted by direct contact with anima-9l	6 (05.00)	114 (95.00)
	can be transmitted by direct contact with the discharge of animals	5 (04.17)	115 (95.83)
	can be transmitted by inhalation	1 (0.84)	119 (99.16)
	death due to anthrax leads to bleeding from natural orifices that doesn't clot	6 (05.00)	114 (95.00)
	is a highly fatal disease in livestock	6 (05.00)	114 (95.00)
	is a highly fatal disease in human beings	1 (0.84)	119 (99.16)
Brucellosis	Brucellosis can be transmitted by airborne infection	1 (0.84)	119 (99.16)
	can be transmitted by consumption of raw milk	1 (0.84)	119 (99.16)
	It can be caused by direct contact with infected uterine discharge, aborted fetus, placenta, urine and other body fluids	19 (15.84)	101 (84.16)
	causes abortion in the last trimester in animals	15 (12.50)	105 (87.50)
	causes retention of the placenta in animals	20 (16.67)	100 (83.33)
	causes anestrus in animals	18 (15.00)	102 (85.00)
	causes repeat breeding in animals	20 (16.67)	100 (83.33)
	causes orchitis in man	1 (0.84)	119 (99.16)
	causes undulant fever in man	1 (0.84)	119 (99.16)
	Brucella testing in animals needs to be done twice a year	1 (0.84)	119 (99.16)
TB	TB can be transmitted by consumption of raw milk	107 (89.17)	13 (10.83)
	TB can be transmitted by inhalation of the droplet from a pulmonary lesion	70 (58.33)	50 (41.67)
	TB can be caused by indirect contact with contaminated material	53 (44.16)	67 (55.84)
	TB can be caused by direct invasion of bacillus through mucus membrane or abraded skin	2 (01.67)	118 (98.33)
	TB is curable in animals	93 (77.50)	27 (22.50)
	TB in an animal is characterized by chronic cough, dyspnea and emaciation	94 (78.33)	26 (21.67)
	TB in humans is characterized by hemoptysis, cough (not responding to treatment), fever and weight loss	107 (89.17)	13 (10.83)
	TB is curable in human beings	114 (95.00)	6 (05.00)
Rabies	Rabies to animals can be caused by the bite of a rabid dog/cat	118 (98.33)	2 (01.67)
	Rabies in animals causes profuse salivation, depression and convulsions	105 (87.50)	15 (12.50)
	Rabies to livestock owners can be caused by contact of bruised or injured body parts with the saliva of a rabid animal	53 (44.17)	67 (55.83)
	Rabies in human causes salivation, excitement, dysphagia, hydrophobia and convulsions	75 (62.50)	45 (37.50)

Values in parenthesis indicate the percentage

Majority (68.33%) of livestock owners were aware of vaccination of rabies, followed by 30.83 % were aware of vaccination of tuberculosis, while majority (94.14%) were not aware about the brucellosis vaccination.

Overall Awareness Level of Livestock Owners About Zoonoses

Majority (76.67%) of livestock owners had a medium level of awareness for zoonotic diseases followed by 12.50 %

and 10.83 % had high and low-level awareness for zoonotic diseases, respectively. The data presented in Table 6 indicate that awareness of livestock owners about zoonotic diseases they heard was 47.36 %, mode of diseases transmitted to man and vice versa was 66.50 %, animal product consumption pattern showed the highest level of awareness as 94.17 %, information on various zoonotic diseases was 33.15 % and for vaccination of zoonotic disease 35.00 %. The overall awareness level of livestock owners about zoonoses was 42.94 %.

Table 6: Awareness level of livestock owners on different aspects of zoonoses

Awareness aspect	No. of statements	Obtained score	Maximum obtainable score	Awareness level (%)
Which zoonotic disease have you heard	6	341	720	47.36
Diseases of animals can transmit to man and vice versa	5	399	600	66.50
Animal product consumption pattern	3	399	360	94.17
Awareness regarding various zoonotic disease	28	1114	3360	33.15
Awareness about vaccination for zoonotic disease	3	126	360	35.00
Overall average	**45**	**2319**	**5400**	**42.94**

Values in parenthesis indicate the percentage

Relationship between the Profile of Livestock Owners and their Awareness of Zoonotic Diseases

The age, land holding, and experience in livestock farming had a significant ($p<0.01$) negative relationship with their awareness of zoonotic diseases (r= -0.574, -0.362, -0.574), while education, extension contact, mass media contact, social participation and preventive and control measures had a significant ($p<0.01$) positive relationship with awareness of zoonotic diseases (r= 0.728, 0.425, 0.716, 0.311, 0.431, respectively). Family size, and annual gross income had a negative and non-significant relationship (-0.089, -0.047), whereas herd size had a positive and non-significant 8relationship (0.164) with awareness of livestock owners towards zoonotic diseases.

A negative and significant association with the age of livestock owners with awareness of zoonotic diseases showed that awareness is decreasing with an increase in age, *i.e.,* older age group was having a low level of awareness on zoonoses. Positive and significant association of education of livestock owners with awareness of zoonotic diseases may be attributed to the fact that educated people know the effect of zoonotic diseases and their negative impact on the productivity of animals. Further, a positive and significant association of mass media exposure, extension contact and social participation with awareness of livestock owners indicated that when the livestock owners have wide communication and use of mass media tools that increases their awareness regarding the effect of zoonotic diseases on health and animal productivity. Similarly, a positive and significant association of preventive and control measures with awareness of livestock owners suggested that farmer having better adopted these measures were having high awareness level.

Conclusion

It can be concluded from the study that majority of livestock owners were middle aged and had small land holding with agriculture as primary and dairy farming as their secondary occupation, low level of education, social participation, medium herd size, annual gross income, and limited sources of information for newly developed emerging diseases were the major constraint in awareness of zoonotic diseases. The study revealed that majority of livestock owners had low level of awareness of disease symptoms, transmission mode and their vaccination. Majority of livestock owners were not aware of vaccination and government programme for zoonotic diseases like anthrax, rabies, tuberculosis, brucellosis. 8Therefore, it is suggested to promote mass awareness programmes for enhancing knowledge on limiting zoonoses.

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