



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; SP-12(10): 1949-1953
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www.thepharmajournal.com
Received: 07-07-2023
Accepted: 11-08-2023

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Preventive and control measures followed by livestock owners for minimizing the risk of zoonotic diseases

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Abstract

The present investigation was conducted during 2021 in July to November under Post Graduate Institute of Veterinary Education & Research (PGIVER) Jamdoli 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. Preventive and control measures play a pivotal role in safeguarding the well-being of individuals, communities, and ecosystem. The findings of study showed that majority of livestock owners had medium level of adoption of preventive and control measures for zoonotic diseases. Further, it was found that proper disposal of foetal membranes, cleaning of dung from animal shed regularly, treatment of sick animals and proper isolation of sick animals were fully adopted whereas cleaning of teat before and after milking, discussion with veterinarian for possible precaution in case of animal's diseases, wash hand with Dettol or antiseptic after handling and no spitting around milking place were partial adopted but vaccination of calves (calfood vaccine for brucella), use of common utensils with near farmers, vaccination regularly to self and animals (Rabies, T.B. Brucella etc.) were have no adoption by majority of livestock owners. Highly adopted preventive and control measures was proper disposal of fetal membranes (95.83%). The study revealed all over adoption was observed 75.47%. This study indicates that majority (75.83%) of Livestock owners had a medium level of adoption level of preventive and control measures followed for zoonotic diseases followed by 15.00% and 9.17% had high and low level of adoption, respectively.

Keywords: Preventive, control measures, adoption, zoonotic diseases, risk, livestock owners

1. Introduction

Livestock is one in all the foremost vital asset of the poor to fulfil living wants (Perry and Grace, 2009) [17]. 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) [21] whereas non-domesticated animals provide a range of benefits to humans including economic, health, recreational, scientific, and ecological values (Soulsbury and White, 2016) [24].

Animal diseases can have a crucial impact on the productivity and the quality of product produced (Rich and Perry, 2011) [20], 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) [8]. Livestock excrete many micro-organisms like bacteria, virus, fungi etc. which have zoonotic potential (Atwill, 2005) [5]. Zoonotic diseases cause mortality and morbidity in people (Anonymous, 2006) [1]. Among all diseases, brucellosis is a second most important zoonotic disease of the world after rabies (Cutler and Whatmore, 2003) [7] and economic losses due to brucellosis remain significant (Verma *et al.*, 2020) [25]. The recent COVID-19 outbreak in China and then other part of world is the 6th global health emergency in the past decade which killed around 3500 people and more than 100,000 people affected so far (Anonymous, 2006, Kumar *et al.*, 2020) [6, 13]. 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) [4].

India is the world's second largest human population, two biodiversity hotspots (Myers *et al.*, 2000) [14] and one of the world's greatest densities of tropical livestock (Kruska *et al.*, 2003) [12]. The Central Bureau of Health Intelligence (CBHI) provisionally reported around 110 cases of rabies, 1674 cases of JE, 14971 cases of swine influenza virus during 2018 (Anonymous, 2019) [3].

India possesses a favourable environment for the transmission of communicable diseases between man and animals (Jones *et al.*, 2008, Forman *et al.*, 2008) [11, 9]. 537 and 362 cases of scrub typhus were reported in 2014 and 2015, respectively. In 2015 out of 362 cases 251 cases were found in Jaipur. Some other diseases like cutaneous leishmaniosis, rabies, swine flu, anthrax was also reported in Rajasthan (Anonymous, 2015) [2]. Zoonotic diseases can be 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) [18]. 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) [15]. Contracting a zoonotic disease may have serious consequences for a poor person who will probably have poor access to healthcare and can ill afford to have his/her ability to work impaired by sickness (Samad, 2011) [22]. On other hand, “One Health 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) [16]. Keeping in view all these, a comprehensive study was conceptualized on the adoption of the preventive and control measures followed by livestock owners for minimizing the risk of zoonotic diseases that helps to achieve goals of “One Health Initiative” and safeguard health of human, animal and environment. Therefore, understanding public awareness and practice of livestock owners have received much attention now a days and it could be a useful tool in developing and improving existing control measures (Gezmu *et al.*, 2017) [10].

2. Materials and Methods

A study was conducted during 2021 in July to November under Post Graduate Institute of Veterinary Education & Research (PGIVER) Jaipur. The present 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 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 existing preventive and control measures followed by the livestock farmers to limit zoonosis. Responses of livestock owners were obtained on three-point continuum scale like “full adoption”, “partial adoption” and “no adoption” and weightage were given as 3, 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 following formula:

$$\text{Adoption Index (\%)} = \frac{\text{weighted mean score}}{\text{Maximum obtainable score}} \times 100 \dots\dots(1)$$

3. Results and Discussion

3.1 Adoption of preventive and control measures for limiting zoonoses

The data on adoption of preventive and control measures followed by livestock owners for zoonotic diseases were presented in Table 1 revealed that follow vector (flies, mosquito, etc.) control measures were preventive and control measures fully adopted by (50.00%), partial adopted by (43.33%), not adopted by (6.67%) and adoption index is 81.11%. Take vaccination regularly to self and animals (Rabies, T.B. Brucella etc.) fully adopted by (0.84%), partial adopted by (20.83%), not adopted by (78.33%) and adoption index is 40.83%. Vaccination of calves (Calfhood vaccine for brucella) fully adopted by (0.84%), partial adopted by (05.83%), not adopted by (93.33%) and adoption index is 35.83%. Discuss with veterinarian for possible precaution in case of animal’s disease fully adopted by (13.33%), partial adopted by (67.50%), not adopted by (19.17%) and adoption index is 64.72%. Wash hand with dettol/ antiseptic after handling fully adopted by (27.50%), partial adopted by (65.83%), not adopted by (06.67%) and adoption index is 73.61%. Avoid eating or drinking in animal handling areas fully adopted by (10.83%), partial adopted by (15.00%), not adopted by (74.17%) and adoption index is 45.56%. Follow check-up regularly to self and animals fully adopted by (23.33%), partial adopted by (30.00%), not adopted by (46.67%) and adoption index is 58.89%. Clean dung from animal shed regularly fully adopted by (95.00%), partial adopted by (05.00%), not adopted by (0.00%) and adoption index is 98.33%. Clean animals regularly fully adopted by (80.83%), partial adopted by (19.17%), not adopted by (0.00%) and adoption index is 93.61%. Follow proper drainage and cleaning around shed fully adopted by (70.00%), partial adopted by (29.17%), not adopted by (0.83%) and adoption index is 89.72%. Prevent animals crowd in the shed fully adopted by (86.66%), partial adopted by (11.67%), not adopted by (01.67%) and adoption index is 95.00%. Follow no spitting around milking place fully adopted by (35.83%), partial adopted by (56.67%), not adopted by (07.50%) and adoption index is 76.11%. Follow proper disposal of foetal membranes fully adopted by (95.83%), partial adopted by (04.17%), not adopted by (0.00%) and adoption index is 98.61%. Clean teat before and after milking fully adopted by (21.67%), partial adopted by (78.33%), not adopted by (0.00%) and adoption index is 73.89%. Follow proper disposal of animal carcass at village fully adopted by (02.50%), partial adopted by (27.50%), not adopted by (70.00%) and adoption index is 44.17%. Follow proper disposal of animal excreta at village fully adopted by (03.34%), partial adopted by (35.83%), not adopted by (60.83%) and adoption index is 47.50%. Maintain proper drainage fully adopted by (65.00%), partial adopted by (34.17%), not adopted by (0.83%) and adoption index is 88.06%. Follow isolation/ separation of sick animals fully adopted by (90.83%), partial adopted by (05.00%), not adopted by (04.17%) and adoption index is 95.56%. Follow treatment of sick animals fully adopted by (92.50%), partial adopted by (07.50%), not adopted by (0.00%) and adoption index is 97.50%. Use common utensils with near farmers fully adopted by (0.00%), partial adopted by (08.33%), not adopted by (91.67%) and adoption index is 36.11%. Follow clean milk production practices fully adopted by (79.17%), partial adopted by (20.83%), not adopted by (0.00%) and adoption index is 93.06%. Avoid contact of animals from

wild or stray animals fully adopted by (85.83%), partial adopted by (13.33%), not adopted by (0.84%) and adoption index is 95.00%. Avoid milking when ill/have wound on hand fully adopted by (81.67%), partial adopted by (17.50%), not adopted by (0.83%) and adoption index is 93.61%. Purchase animals from known sources fully adopted by (88.34%), partial adopted by (10.83%), not adopted by (0.83%) and adoption index is 95.83%.

The study revealed that over all adoption was observed 75.47%. These findings collaborate with Singh *et al.* (2015)^[23] revealed that about 90% of animal owners buried the foetal membrane after its expulsion. Rajkumar *et al.* (2016)^[19] found that vaccination for brucellosis is adopted by only 0.8% of animal owners, and Chowdhury *et al.* (2018)^[6] found in his study that preventive measures against fly/mosquito adopted by 86.96%.

Table 1: Distribution of livestock owners according to preventive and control measures followed for limiting zoonotic diseases

Sl. No.	Preventive and Control Measures	No Adoption	Partial Adoption	Full Adoption	Adoption Index (%)
1.	Follow vector (flies, mosquito, etc.) control measures	8 (6.67)	52 (43.33)	60 (50.00)	81.11
2.	Vaccinate regularly to self and animals (Rabies, T.B., Brucella etc.)	94 (78.33)	25 (20.83)	1 (0.84)	40.83
3.	Vaccination of calves (Calfhood vaccine for brucella)	112 (93.33)	7 (05.83)	1 (0.84)	35.83
4.	Discuss with veterinarian for possible precaution in case of animal's disease	23 (19.17)	81 (67.50)	16 (13.33)	64.72
5.	Wash hand with dettol/ antiseptic after handling	8 (06.67)	79 (65.83)	33 (27.50)	73.61
6.	Avoid eating or drinking in animal handling areas	89 (74.17)	18 (15.00)	13 (10.83)	45.56
7.	Follow check-up regularly to self and animals	56 (46.67)	36 (30.00)	28 (23.33)	58.89
8.	Clean dung from animal shed regularly	0 (0.00)	6 (05.00)	114 (95.00)	98.33
9.	Clean animals regularly	0 (0.00)	23 (19.17)	97 (80.83)	93.61
10.	Follow proper drainage and cleaning around shed	1 (0.83)	35 (29.17)	84 (70.00)	89.72
11.	Prevent animals crowd in the shed	2 (01.67)	14 (11.67)	104 (86.66)	95.00
12.	Follow no spitting around milking place	9 (07.50)	68 (56.67)	43 (35.83)	76.11
13.	Follow proper disposal of foetal membranes	0 (0.00)	5 (04.17)	115 (95.83)	98.61
14.	Clean teat before and after milking	0 (0.00)	94 (78.33)	26 (21.67)	73.89
15.	Follow proper disposal of animal carcass at village	84 (70.00)	33 (27.50)	3 (02.50)	44.17
16.	Follow proper disposal of animal excreta at village	73 (60.83)	43 (35.83)	4 (03.34)	47.50
17.	Maintain proper drainage	1 (0.83)	41 (34.17)	78 (65.00)	88.06
18.	Follow isolation/ separation of sick animals	5 (04.17)	6 (05.00)	109 (90.83)	95.56
19.	Follow treatment of sick animals	0 (0.00)	9 (07.50)	111 (92.50)	97.50
20.	Use common utensils with near farmers	110 (91.67)	10 (08.33)	0 (0.00)	36.11
21.	Follow clean milk production practices	0 (0.00)	25 (20.83)	95 (79.17)	93.06
22.	Avoid contact of animals from wild or stray animals	1 (0.84)	16 (13.33)	103 (85.83)	95.00
23.	Avoid milking when ill/have wound on hand	1 (0.83)	21 (17.50)	98 (81.67)	93.61
24.	Purchase animals from known sources	1 (0.83)	13 (10.83)	106 (88.34)	95.83
Overall adoption					75.51
Values in parenthesis indicate percentage					

3.2 Category of livestock owners according to adoption level of preventive and control measures followed for limiting zoonoses

Table 2: Distribution of livestock owners according adoption level of preventive and control measures followed for limiting zoonoses (N=120)

Category	Frequency	Percentage (%)
Low (Less than 49.85)	11	9.17
Medium (49.85 to 58.89)	91	75.83
High (Above 58.89)	18	15.00
	Mean \pm S.D.	54.37 \pm 4.52

The data presented in Table 2 indicates that majority (75.83%) of Livestock owners had medium level of adoption of preventive and control measures for zoonotic diseases followed by 15.00% and 9.17% had high and low level of adoption, respectively.

4. Conclusion

It can be concluded from the study that majority of livestock owners were fully adopted proper disposal of foetal membranes whereas cleaning of teat before and after milking were partial adopted and vaccination of calves (calfhood vaccine for brucella), and vaccination regularly to self and animals (Rabies, T.B. Brucella etc.) were preventive and control measures had no adoption by majority of livestock owners. Therefore, it is suggested to promote mass awareness programmes for enhancing knowledge on limiting zoonoses.

5. Conflict of interests

The authors have declared no conflict of interests exists.

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