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Assessment of healthcare and management constraints perceived by livestock owners during the lumpy skin disease outbreak in Rajasthan

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Abstract

Lumpy Skin Disease (LSD) has emerged as a major transboundary viral disease affecting cattle and causing significant economic losses to livestock owners. The 2022 outbreak in Rajasthan severely affected livestock health and disrupted routine management and healthcare practices. The present study was conducted to assess the management and healthcare constraints perceived by livestock owners during the LSD outbreak in five severely affected districts of Rajasthan, namely Jaipur, Jodhpur, Barmer, Sri Ganganagar, and Bikaner. A total of 300 respondents were selected through a multistage sampling technique, and data were collected using a structured interview schedule. The severity of constraints was measured using the Mean% Score (MPS) method.

The findings revealed that among healthcare constraints, high charges of treatment (MPS = 83.67) were perceived as the most serious constraint, followed by difficulty in taking animals to hospitals for treatment (MPS = 81.67) and irregularity in the delivery of doorstep healthcare services (MPS = 78.33). Lack of availability of effective medicines in villages and inadequate follow-up by veterinary personnel were also reported as important challenges during the outbreak.

Regarding management constraints, fewer options available for transporting and disposing of dead carcasses (MPS = 95.56) emerged as the most severe constraint, followed by difficulty in disposing of dead carcasses (MPS = 92.22) and lack of proper places for carcass disposal (MPS = 89.67). Foul smell from carcasses and public objections regarding their disposal further aggravated the situation. Limited space for isolating sick animals, lack of separate housing facilities, and shortage of manpower to manage affected herds were also perceived as important management constraints.

Overall, the findings indicate that the LSD outbreak significantly disrupted livestock management and healthcare services, highlighting the need to strengthen veterinary services, improve carcass disposal systems, and enhance preparedness to reduce the impact of future disease outbreaks.

Keywords: Constraints, healthcare constraints, management constraints, lumpy skin disease, mean% score, Rajasthan

Introduction

Animal husbandry and dairying have long been integral components of the agricultural economy and rural livelihood systems in India. These activities not only contribute to the national food basket but also play a crucial role in providing employment, income generation, and nutritional security to millions of rural households. Livestock production and agriculture are closely interlinked, with each sector supporting the other in maintaining sustainable agricultural systems. In India, livestock serves as an important livelihood source particularly for landless, small and marginal farmers, and women ^[25].

According to the 20th Livestock Census, India possesses one of the largest livestock populations in the world, accounting for approximately 11.54% of the global livestock population with a total of 536 million animals ^[3]. The country ranks first in global milk production, producing about 247.87 million tonnes of milk during 2024-25, with a per capita availability of 485 grams per day (5). Rajasthan is one of the leading livestock states in India, having a livestock population of about 56.80 million and contributing 14.82% to the national milk production (5). The livestock sector has also demonstrated strong economic growth, with its share in the Gross Value Added (GVA) of agriculture and allied sectors increasing from 24.32% in 2014-15 to 30.38% in 2022-23 ^[18].

Despite its significant contribution to rural livelihoods and the national economy, the livestock sector remains highly vulnerable to disease outbreaks.

Animal diseases often lead to severe economic losses due to reduced productivity, mortality, decreased fertility, and increased treatment and control costs [20, 17]. Several infectious diseases have been reported to cause substantial economic losses in India, including brucellosis, peste-des-petits ruminants (PPR), haemorrhagic septicaemia (HS), and foot-and-mouth disease (FMD) [6, 7, 11]. Among emerging transboundary diseases, Lumpy Skin Disease (LSD) has gained significant attention due to its rapid spread and considerable impact on cattle productivity.

Lumpy Skin Disease is a viral disease caused by the Lumpy Skin Disease Virus (LSDV), which belongs to the genus *Capripoxvirus* of the family *Poxviridae* [1, 24]. The disease is characterized by fever, enlarged lymph nodes, skin nodules, reduced milk production, weight loss, infertility, and occasionally mortality in affected animals [13]. LSD spreads primarily through blood-feeding arthropods such as flies, mosquitoes, and ticks, making outbreaks difficult to control [9]. The disease is recognized by the World Organisation for Animal Health as a notifiable disease due to its significant economic impact on the livestock sector [15].

In India, the first outbreak of Lumpy Skin Disease was reported in Odisha in 2019 [12]. A major outbreak occurred in 2022 with Gujarat as the epicenter, which subsequently spread to several northern states including Rajasthan [21]. The outbreak caused widespread morbidity and mortality among cattle and resulted in substantial economic losses to livestock owners [22]. In Rajasthan, the disease spread rapidly across several districts, affecting more than 15 lakh animals and causing the death of thousands of cattle [4]. Such outbreaks not only affect livestock productivity but also create significant challenges in livestock management, healthcare service delivery, and disease control mechanisms. The unprecedented spread of LSD during the 2022 outbreak created numerous challenges for livestock owners, particularly in accessing veterinary healthcare services and managing diseased animals effectively. Understanding the constraints experienced by farmers during such outbreaks is essential for developing effective disease management strategies and strengthening veterinary service delivery systems.

Therefore, the present study was undertaken to assess the management and healthcare constraints perceived by livestock owners during the Lumpy Skin Disease outbreak in Rajasthan.

Materials and Methods

The present investigation was conducted in five districts of Rajasthan—Jaipur, Jodhpur, Barmer, Sri Ganganagar, and Bikaner. These districts were purposively selected as they were the most severely affected during the Lumpy Skin Disease (LSD) outbreak. Jaipur reported the highest number of cases (1,77,160), followed by Jodhpur (1,15,864), Barmer (1,11,204), Sri Ganganagar (95,236), and Bikaner (85,706) (Animal Husbandry Department, Rajasthan, 2022).

Two tehsils from each selected district were purposively selected based on the severity of LSD incidence, resulting in the selection of ten tehsils. A comprehensive list of villages under each tehsil was prepared in consultation with tehsil officials and secondary sources. From each tehsil, two villages were randomly selected, yielding a total of twenty villages for the study.

A list of livestock owners was prepared with the help of the Sarpanch and Patwari based on the criteria of possessing a minimum of five large animals and having their herd affected during the LSD outbreak. From each selected village, fifteen respondents were chosen randomly, resulting in a total sample size of 300 respondents.

The interview schedule was developed based on the objectives of the study and in consultation with subject experts and members of the advisory committee. Data collected from respondents were compiled, tabulated, and analysed using appropriate statistical methods.

The Mean% Score (MPS) technique was used to rank the healthcare and management constraints associated with the LSD outbreak. Respondents categorized each identified constraint into three levels: Most Serious, Serious, and Not so Serious. These categories were assigned weights of 3, 2, and 1, respectively.

Formula for MPS

$$\text{MPS} = [(f_1 \times 3) + (f_2 \times 2) + (f_3 \times 1)] / (3 \times N) \times 100$$

Where

- f_1 = Number of respondents reporting the constraint as Most Serious
- f_2 = Number of respondents reporting it as Serious
- f_3 = Number of respondents reporting it as Not so Serious
- N = Total Number of respondents

The maximum possible score for each constraint is $3 \times N$

The obtained score is then converted into a %age to generate the Mean% Score (MPS)

Results

Healthcare constraints perceived by respondents during the outbreak of Lumpy Skin Disease

Table 1 reveals that livestock owners experienced several healthcare-related constraints during the outbreak of Lumpy Skin Disease. Among the identified constraints, high charges of treatment emerged as the most serious healthcare constraint with the highest Mean% Score (MPS = 83.67) and was ranked first. This indicates that the cost of treatment created a considerable financial burden on livestock owners during the outbreak.

Difficulty in taking animals to the hospital for treatment was ranked second with an MPS value of 81.67, suggesting that farmers faced problems related to transportation, distance from veterinary facilities, and the weakened condition of animals.

Irregularity in the delivery of doorstep healthcare services was ranked third with an MPS value of 78.33, indicating that veterinary support at the field level was not consistently available during the outbreak.

Further, lack of availability of effective medicines in villages for LSD treatment was ranked fourth with an MPS value of 75.00, showing that farmers faced difficulties in obtaining proper medicines at the village level.

The lack of follow-up by veterinary personnel after providing initial healthcare services was perceived as the least serious healthcare constraint with an MPS value of 71.00 and was ranked fifth. Overall, the results indicate that both economic and accessibility-related issues significantly affected livestock owners in obtaining proper veterinary healthcare during the LSD outbreak.

Management constraints perceived by respondents during the outbreak of Lumpy Skin Disease

The results presented in Table 2 indicate that livestock owners also experienced several management-related difficulties during the LSD outbreak. Among the identified constraints, fewer options available for transporting and disposing of dead carcasses emerged as the most severe management constraint with the highest MPS value of 95.56 and was ranked first.

This was followed by difficulty in disposing of dead carcasses, which was ranked second with an MPS value of 92.22, indicating that farmers encountered serious challenges in managing carcass disposal during the outbreak.

The lack of a proper place available for the disposal of carcasses of LSD-affected cattle was ranked third with an MPS value of 89.67, highlighting the absence of suitable disposal facilities in many villages.

Further, foul smell of dead carcasses (MPS = 86.11) and public objection due to foul-smelling carcasses (MPS = 82.67) were ranked fourth and fifth, respectively, indicating that carcass decomposition created environmental and social problems in the village surroundings.

Lack of space available for separate housing of sick animals (MPS = 72.00) and less space available for isolation of sick animals (MPS = 71.00) were ranked sixth and seventh, respectively. The lack of manpower available to manage the LSD-affected herd was perceived as the least severe constraint with an MPS value of 66.00 and was ranked eighth.

Discussion

Healthcare constraints

The findings of the present study indicate that livestock owners faced several healthcare-related challenges during the LSD outbreak. The high cost of treatment observed in the present investigation is in agreement with the findings of Ambore ^[2], who reported that a majority of respondents perceived veterinary treatment as expensive.

Similarly, the difficulty in transporting animals to veterinary

hospitals observed in the present study is consistent with the findings of Godara ^[10], who reported that transportation problems were one of the major constraints faced by livestock owners during disease outbreaks.

The irregularity in the delivery of doorstep veterinary healthcare services also supports the observations of Godara ^[10], who reported that veterinary field services were not consistently available during crisis situations. These findings suggest that financial constraints and limited access to veterinary healthcare services significantly affected livestock owners during the LSD outbreak.

Management constraints

The management-related constraints identified in the present study are also supported by earlier research findings. Ridham ^[19] reported that movement restrictions during disease outbreaks created major challenges in transporting animals, which supports the top-ranked constraint related to the transportation and disposal of dead carcasses observed in the present investigation.

Similarly, Meena *et al.* ^[14] reported that the lack of proper carcass disposal facilities was a significant problem during livestock disease outbreaks, which is consistent with the second and third ranked constraints identified in the present study. The findings are further supported by Paikrao ^[16], who also reported that farmers faced considerable difficulties in carcass management due to inadequate disposal infrastructure.

In contrast, Ambore ^[2] reported that most respondents did not perceive housing space as a major issue. However, the present study revealed that farmers experienced limitations in providing separate housing and isolation facilities for diseased animals. These findings are partially supported by Surkar *et al.* ^[23], who reported that many livestock owners lacked sufficient space for animal management activities.

Furthermore, Ambore ^[2] and Bharadwaj ^[8] also reported labour shortages and management difficulties during livestock disease outbreaks, which supports the constraint related to lack of manpower observed in the present investigation.

Table 1: Healthcare constraints perceived by livestock owners during the outbreak of Lumpy Skin Disease

Healthcare Constraints	MPS	Rank
High charges of treatment	83.67	I
Difficulty in taking animals for treatment at hospital	81.67	II
Irregularity of delivering of door step health care service	78.33	III
Lack of availability of effective medicine in the village for LSD treatment during the LSD outbreak	75.00	IV
Lack of follow up by veterinary personnel after providing healthcare service	71.00	V

Table 2: Management constraints perceived by livestock owners during the outbreak of Lumpy Skin Disease

Healthcare Constraints	MPS	Rank
There were fewer options available for transporting and disposing of dead carcasses.	95.56	I
Difficulty in disposing of dead carcasses	92.22	II
Lack of a proper place available for the disposal of carcass of LSD-affected cattle	89.67	III
Foul smell of dead carcasses	86.11	IV
Objection of the public about foul-smelling dead carcasses	82.67	V
Lack of space available for separate housing of sick animal	72.00	VI
Less space available for the isolation of sick animals	71.00	VII
Lack of manpower available to manage the LSD-affected herd	66.00	VIII

Conclusion

The present study revealed that livestock owners faced several healthcare and management-related constraints during the outbreak of Lumpy Skin Disease in Rajasthan.

Among the healthcare constraints, high charges of treatment emerged as the most serious problem, followed by difficulty in taking animals to hospitals for treatment and irregularity in the delivery of doorstep healthcare services. The lack of

availability of effective medicines in villages and inadequate follow-up by veterinary personnel further complicated the treatment process during the outbreak.

Similarly, several management-related constraints were also experienced by the respondents. The most severe constraint was the limited availability of options for transporting and disposing of dead carcasses, followed by difficulty in carcass disposal and lack of proper places for carcass disposal. Environmental and social issues such as foul smell of carcasses and public objections were also reported by livestock owners. In addition, farmers experienced problems related to lack of space for isolation of sick animals and shortage of manpower to manage affected herds.

Overall, the study highlights that both healthcare and management challenges significantly affected livestock owners during the LSD outbreak. Therefore, strengthening veterinary healthcare services, ensuring timely availability of medicines, improving carcass disposal facilities, and enhancing management support at the village level are essential to effectively manage future disease outbreaks and reduce the burden on livestock owners.

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The authors declare that there is no conflict of interest related to this study.

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