

# VIRTUAL STUDY ON OUTBREAK OF LUMPY SKIN DISEASE IN BANGLADESH 2020



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# VIRTUAL STUDY ON LUMPY SKIN DISEASE OUTBREAK IN BANGLADESH 2020



**A clinical report submitted as per approved style and contents**

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## **ABSTRACT**

Lumpy skin disease is a trans-boundary disease of cattle originated in Africa. In recent years it has emerged in different countries with a severe impact on production. Bangladesh has now encountered the second consecutive year outbreaks of LSD. The first outbreak occurred in 2019 while disease manifested with high fever, skin nodule and edema. The reported morbidity rate was 10-20% with 1-5% mortality rate. Sharp decrease in milk production, long time treatment cost and reproductive difficulties lead to the widespread financial loss of farmers. But the scarcity of literature of epidemiology, vector and genetic characteristics of the virus in Bangladesh cause delay in diagnosis and reporting which make the situation become worst. Quarantine and mass vaccination are efficient tools to halt the epidemic. However, extensive entomological surveillance might initiate a cost-effective measure through vector control.

# CHAPTER 1

## INTRODUCTION

Lumpy skin disease (LSD) causes significant economic damages in the livestock sector. This is caused by lumpy skin disease virus (LSDV) with prototype Neethling strain, which belongs to the genus Pox Viridae. LSDV is part of the genus capripox virus which includes sheep pox and goat pox virus (Al-Salihi, 2014). LSD is an enzootic, infectious, eruptive, and rarely fatal cattle disease characterized by nodules in the skin. Cattle and water buffalo are only affected species, with high morbidity but low mortality, although death rates among calves are higher (Al-salihi, 2014). LSD causes loss of milk and beef production, female abortion and male sterility. In 1929 the first LSD foci were from Zambia (Al-Salihi, 2014). On the African continent LSD is considered to be endemic disease. And in 1984, LSD become epidemic in Africa. It is reported in Madagascar, and in some Arab and Middle Eastern countries. The disease has recently been reported in LSD-free countries (Jordan, Syria, Lebanon, Turkey, Iran, Iraq) with potential economic loss for the livestock sector (Al-Salihi, 2014).

The field incubation time is considered to be 2-5 weeks, and lesion occurs first at the inoculation site in 4-20 days. Fever is an initial warning that nodules in the skin and mucous membrane grow within 2 days (Tuppurainen and Oura, 2012). A diagnosis of LSD is based on the clinical trends that are common. A confirmed diagnosis is based on electron microscope delivery, staining with Immunoperoxidase (IMP), ELISA and PCR test. A diagnosis of LSD is building upon the basis the typical clinical patterns. A confirmed diagnosis is based on transmission electron microscope, Immunoperoxidase (IMP) staining, ELISA and PCR test. LSD is not expressly handled. Infected animals should be diagnosis of LSD is based on the clinical trends that are common. A confirmed diagnosis is based on electron microscope delivery, staining with Immunoperoxidase (IMP), ELISA and PCR test treated with care therefore to alleviate clinical symptoms and avoid any secondary complications. The immunization of vulnerable animals in the effective methods of disease control in South Africa and the successful vaccine from Neethling strain was developed (Ayelet, et al., 2014).

## CHAPTER 2

### OVERVIEW OF LUMPY SKIN DISEASE

#### **Causative organism:**

The Capripox genus of the Pox Viridae family. Lumpy skin disease (LSDV) is closely antigenically associated with sheep and goat pox virus (Woods, 1988). LSDV is closely related to other members of Chordopoxvirinae, it contains a unique genus complement for the range and virulence of viral host. The complete sequence of several Capri Pox Viridae genomes, including LSDV, sheep pox and goat pox virus (Tulman, et al., 2001; Tulman, et al., 2002).

#### **Classification:**

Group 1: Ds DNA

ORDER – Unassigned

FAMILY – Pox viridae

SUB FAMILY - Chordopoxviridae

GENUS - Capripox

SPECIES - Sheep pox

Goat pox

Lumpy skin disease (Al-salihi, 2014)

#### **Epidemiology:**

##### **A. Morbidity and Mortality Rates:**

- Morbidity rate varies between (10-20%)
- Mortality rate (1-5%) is considered usual.
- In addition, high morbidity (30-40 percent) and 12 percent mortality were also recorded in a farm population of HF cattle in OMAN 2009 (Wainwright, et al., 2013).

## **B. Susceptible Animal:**

The LSD has a narrow range of host vertebrates. Both cattle and buffalo are the animals that are naturally infected during field outbreak. Five clinical cases of LSD have been reported in Asian water buffalo (Ali, et al.,1990).

## **C. Transmission:**

- LSD virus transmission has not been fully grasped. Mechanical virus spread has mostly been associated with flying insect. Most of the cases are thought to be the result of an arthropod vector transmission. Biting flies (*Stomoxys calcitrans*) and male tick (*Rhipicephalus appendiculatus*) may play a role in virus transmission(Weiss, 1968).
- Where transmission can occur by fomites, such as ingestion of feed and water polluted with infected saliva, is not established.
- Direct contact is deemed to have a minor role, if any, in virus transmission.
- Animals can be experimentally infected with cutaneous nodule or blood inoculation material (OIE, 2017).

## **Clinical sign:**

Lacrimation and nasal discharges are common sign. High fever, sharp drop in milk production, nodular skin lesion in the area of (skin of the head, neck, perineum, genitalia, udder, limbs etc.). Sometimes painful ulcerative lesions develop in the cornea of one or both eyes. Skin lesion in the leg and on top of the joints may lead to deep s/c infection complicated by secondary bacterial infection and lameness. Pneumonia and mastitis are common complications(Tuppurainen, 2018).

## **Histopathology:**

It is characterized in the acute stage of the disease mostly by vasculitis lesion, thrombosis, infarction, fibroplasia etc. The polluted areas are invaded by inflammatory cells, which include macrophages, lymphocytes and eosinophils (Ali, et al.,1990). Edemas are in epidermis and dermis and infiltrated by large epitheloid macrophage cell.

The blood flow of the dermis and s/c undergo endothelial proliferation with blood vessel lymphocyte cuffing, which contributes to thrombosis and necrosis. There is a common body of intracytoplasmic inclusion in the different epithelial elements(Burdin, 1959).

## **Diagnosis of LSD:**

### **A Field presumptive diagnosis:**

- Contagious disease with generalized skin nodule
- Persistent fever, emaciation and low mortality(Al-Salihi, 2014)

### **Laboratory diagnosis:**

#### **Necropsy findings:**

Enlarge lymph node

Granulomatous reaction(Al-Salihi, 2014)

#### **Identification of the agent:**

Virus isolation

FAT

Agar gel immunodiffusion

ELISA

PCR(Al-salihi, 2014)

#### **Serology test:**

ELISA

FAT

Agar gel immunodiffusion(Al-Salihi, 2014)



## CHAPTER 3

### METHODS AND MATERIALS

The study was based on based on collecting data from online resources, Wikipedia, Previous literatures and articles. First select the study site (which articles or literature or reports were selected for study). Second, evaluate the result of the selected study site and discussion on it.

The reports based on Lumpy skin disease outbreak in Bangladesh were selected related on this topic. Reports with recent outbreak in Bangladesh that were carefully chosen were; Situation Report: Lumpy Skin Disease in Bangladesh; Recent outbreak statistics, epidemiology and control measure and Vaccination to curb LSD epidemic of cattle; Outbreaks of lumpy skin disease in Bangladesh, Management and treatment of lumpy skin disease in cattle at the Mohadevpur Upazila of Noagoan district in Bangladesh etc.(fscluster.org, 2019; OIE.int, 2019; www.dhakatribune.com, 2020; Rahman, 2020; Paul, 2020; Feyisa, 2018).

The situation report was published by food security cluster in the year 2019. Corporate author of this report was fscluter.org and the report title was lumpy skin disease in Bangladesh. Recent outbreak statistics, epidemiology, control and prevention this report was published by OIE bearing the title Lumpy skin disease, Bangladesh in the year 2019. This was an immediate report and the corporate author was OIE.int. For the vaccination status, visit the web page vaccination to curb LSD epidemic of cattle, name of the website Dhaka Tribune and it was published in 11 January, 2020. The corporate author of this webpage was www.dhakatribune.com. Epidemiology and vector, present status in Bangladesh, impact of it and prevention and vaccination visit the journal article and the article was taken from the Journal named SSRN Electronic Journal. The author name was Md. Sahidur Rahman and bearing the title Outbreaks of Lumpy Skin Disease of cattle in Bangladesh. In the next report discuss on the management and treatment of cattle in a particular area of Bangladesh (Mohadevpur Upazila). This was a conference proceedings the conference publication name The CVSBD 3<sup>rd</sup> AnnulaScientific Conference 2020. This was published by Patuakhali Science and Technology University. It was a case report on clinical management of a bull that was infected by LSD virus. This report was taken from the Journal of Veterinary Science and Technology (Feyisa, 2018).

## CHAPTER 4

### RESULT

In the situation report, discussion of the LSD outbreak in different areas of Bangladesh was reflected. This information had been tracking by the DLS (District Livestock Service) across the country with a daily reporting system from the Upazila Livestock Office (ULO's). The first outbreak in Bangladesh was reported to the Department of the Livestock Services on 22/07/2019. Cases occurred in three Upazila (Anowara, Karnofuli and Patiya) in Chattogram district of Chattogram division. An investigation revealed 66 cases in cattle with LSD clinical sign of 360 susceptible animals (Attack Rate 18%) and no deaths. Samples were collected and tested positive for capri pox by real time PCR at the DLS Central Disease Investigation Laboratory(CDIL)(fcluster.org, 2019).

#### Cumulative cases of LSD reported to DLS as of 3/12/2019

<b>Division</b>	<b>Cattle population</b>	<b>LSD Cases</b>	<b>Cases per 1000 head</b>	<b>Death</b>
<b>Barisal</b>	1,770,563	22,232	96	1
<b>Chattogram</b>	3,145,717	259,765	590	22
<b>Dhaka</b>	3,906,043	17,300	62	7
<b>Khulna</b>	3,610,506	235,633	492	64
<b>Mymensingh</b>	2,437,626	306	0	0
<b>Rajshahi</b>	4,276,463	13,854	26	3
<b>Rangpur</b>	4,608,034	4,256	5	0

<b>Sylhet</b>	1,572,944	182	1	0
<b>Total</b>	25,327,896	553528	1272	97

(fscluster.org, 2019)

From the discussion of the impact of LSD on regional area and in Bangladesh in this paper it was noticed that traditional trading routes from India to Asia through Bangladesh make it possible for a large number of cattle to reach the country daily from India and pass via Bangladesh to meet the demand for beef in Bangladesh and other countries in the region, such as China(fscluster.org, 2019).

LSD causes permanent damage to the hide, emaciation, decreased milk production, abortion, infertility, death. Bangladesh's epidemic has a huge effect on the livelihoods of small-scale farmers, who make up the bulk of the country's cattle owners. The cost of providing 2-3 months support during the recovery period is unrealistic for many of those low-income families(fscluster.org, 2019).

The second study site based on new outbreak statistics in Dhaka Municipality that include total affected animals, epidemiology, control measure and diagnostic result.

#### **Summary of Outbreak (Total Animal Affected)**

Species	Susceptible	Cases	Death	Slaughter
Cattle	108	16	0	0

(OIE.int, 2019)

### Epidemiological study

Outbreak area	Sonargaon municipality, Noagoan, Tarabo municipality, Tarabo, Bhulta, Sonargaon, Ruggang, Narayangonj, Dhaka.
Date of start of the outbreak	28/07/2019
Outbreak status	Resolved (5/03/2020)
Epidemiological unit	Village
Epidemiological comment	Surveillance and monitoring in the infected area
Control measure	Control vector, Disinfection, Quarantine, Treatment of the affected animal, Vaccine permitted.
Laboratory test (name and type)	Central Disease Investigation Laboratory, Dhaka Species- cattle, Test – Real time PCR Test date- 4/09/2019 Test result- positive

(OIE.int, 2019)

They administered Goat pox vaccine in Chattogram district against LSD and the vaccinated cattle were showing an effective immune system against LSD. Experimental vaccination in two different farms in same area and result were as given on the following page:

### Vaccination Status

Name of the Farm	Administration vaccine	Result
Mamata Dairy Farm, Patiya	68 cattle	Show effective immune response against LSD.
National Dairy Farm, Patiya	167 cattle	3 cattle were diagnosed with the disease rest of the cattle did not show any symptom.

(www.dhakatribune.com, 2020)

### Outbreak of lumpy skin disease in Bangladesh:

Here scenario of epidemiology and vector, lumpy skin disease in Bangladesh, impact on livestock production and prevention by vaccination etc. were seen.

In Bangladesh, the first outbreak was believed to begin in Chattogram district's Karnaphuli Upazila on July 22, 2019, although confirmed as a lumpy skin disease on August 27, 2019 via real-time PCR. According to the situation report published by the livestock services department, the total number of cases reached 5,53,528 among the 25 million livestock population and the total number of deaths since 3 December was 97,2019 in total (Rahman, 2020).

In milking cows and calves, LSD occurred in subacute and acute form having greater severity. The initial clinical sign was found as numerous skin nodules with a high fever in the animal's entire body. These nodules become ruptured in severe consequences and produced pus which attracts flies. The condition in the calf was worst due to nasal and ocular discharge, together with other common symptoms that lead to difficulty in breathing and death (Rahman, 2020).

Because of its major adverse effects on the livestock population, LSD has been considered an economic disorder. Milk yield has dropped sharply and also impeded the production of semen in bulls, leading to various reproductive problems (Rahman, 2020).

There is no evidence of any effective LSD cure and care plan. Mass vaccination thus used an important method for preventing infection. In Bangladesh, live attenuated goat pox vaccine was used in intradermal or subdermal routes in 2019 to prevent infection from spreading among the susceptible cattle population(Rahman, 2020).

### **Clinical Management of lumpy skin disease:**

The research that was carried out at Mohadevpur Upazila during the month of October 2019 (Paul,2020) was record of 300 cattle with signs of LSD were treated with paracetamol bolus 500 mg / kg body weight for 10 days three times a day, adding diclofenac sodium gel to the swelling area twice a day until swelling stops, adding sulphonamide powder to the nodular lesion that was ruptured with discharge secretion to stay secreted(Paul, 2020). After such therapeutic approach, no muscle necrosis was observed in any cattle in this sample. No cattle died after treatment had ended. It was also observed that the nodular lesion was ruptured and discharge secretion was detected at 40 percent of cattle after the procedure was begun. Since beginning treatment the appetite of the infected animal was normal(Paul, 2020).

Another research paper was focused on a clinical treatment of bull lumpy skin disease. In November 2017, the Ababa University College of Veterinary Medicine, Veterinary Teaching Hospital, presented a local breed bull with a complaint about nodular eruptions on different body parts. A physical examination showed that the bull was febrile at rectal body temperature and had minor flare-ups circumscribing large-size nodule on different parts and particularly neck area. Besides, lameness, inflammation of both prescapular and prefemoral lymph nodes, developed. The condition was treated aggressively with combined treatment (Dexamethasone 0.2 mg / kg / day for three consecutive days and 10 percent Oxytetracycline 10 mg / kg / day for five consecutive days) and the bull was recovered and sold curiously(Feyisa, 2018).

## **CHAPTER 5**

### **DISCUSSION**

Based on the clinical sign, history and the diagnostic result, the incident was confirmed as LSD. The infected animals showed fever, lacrimation, increased nasal secretion, anorexia, and disinclination to move. LSD is not associated with high mortalities; however, the economic losses accompanying LSD eruption is higher. The losses are significantly due to decreased feed intake, milk production, weight conversion, abortion, infertility, and damage hide. Systemic antibiotic and anti-inflammatory drugs are obligatory for skin infections, cellulitis or pneumonia and considerably to avoid further complication and economic losses(Feyisa, 2018).

The report involved in epidemic LSD and their impact on Bangladesh, helped us to select the area for treatment purpose, also run the area for vaccination(OIE, 2017). In the another report submitted to OIE, discuss about the overall feature of the LSD that include recent outbreak, epidemiological data and their nature, control measure that taken to prevent the epidemic of LSD. They also discuss the diagnostic facilities that include real-time PCR and the laboratory name Central Disease Investigation Laboratory, Dhaka, Bangladesh. Experimental vaccination was done and that gave positive feedback on this vaccination. It was declared by Chattogram District Livestock Officer Dr. Md. Reajul Huq. In a meeting with field veterinary teams he said, they have administered goat pox vaccine to 34,000 heads of cattle in Chattogram district and the vaccinated cattle were showing an effective immune system against LSD.” We were distributing posters and leaflets and holding awareness rising meetings with the farmers,” Dr. Reajul added([www.dhakatribune.com](http://www.dhakatribune.com), 2020).

## **CHAPTER 6**

### **CONCLUSION**

LSD has considered as economic disease due to its significant negative impact on cattle population. Poor farmers and farm owners face severe economic losses as LSD causes damage to hide, abortion and infertility. The best protection comes from prophylactic vaccination of the entire cattle population, carried out well in advance in at risk areas. As LSD is a contagious disease, cattle movement inside the country and across the borders should be controlled or totally banned in affected area. In affected village, cattle herds should be kept separate from other herds by avoiding communal grazing. Cattle should be treated regularly with insect repellents to minimize the risk of vector transmission of disease.



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