

Prevalence of Lumpy Skin Disease at District Veterinary Hospital in Sylhet District of Bangladesh

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Abstract: Lumpy skin disease (LSD) is an acute viral disease of cattle with major economic impacts and recently emerged very common in Bangladesh. This cross-sectional study was designed to evaluate the prevalence, temporal distribution, and risk factors for clinical LSD. The present study was performed in the District Veterinary Hospital, Sylhet during the period of January 2020 to December 2020. A total of 2762 cattle were examined where 377 cattle were found to be infected with Lumpy Skin Disease virus based on the clinical inspection, clinical history and owners complain. The results indicated that the overall prevalence of LSD was 13.65% (95% CI: 12.37-14.93%) in cattle. The incidence rate of the disease was discussed based on the effect of age, sex, breed and season. The temporal patterns indicate a higher number of LSD cases in May (46.99%) and June (48.69%). Moreover, the indigenous breed (15.34%) and adult cattle aged 1.5-3 years old (18.02%) were significantly ($p < 0.05$) higher for LSD. There was no statistically significant ($p < 0.53$) difference between the two sexes. So, it could be concluded that age, breed and time were found to be associated factors with the potential risk of LSD occurrence. Though, no serological test was conducted for the confirmatory diagnosis but this study will be helpful for future research on the subject under investigation.

Key words: Lumpy Skin Disease, Prevalence, Risk factor, temporal distribution.

I. INTRODUCTION

Bangladesh is one of the world's most densely populated countries in south Asia. In this region, livestock is a significant sub-sector that is considered the backbone of agriculture. The contribution of livestock in Gross Domestic Product (GDP) is about 1.43% and GDP growth rate of livestock is 3.04% in Bangladesh (Economic Report, DLS: 2020-unpublished data). Aside from that, the most essential raw resource for the leather industry is cattle hides. Bangladesh has 113 tanneries that generate 180 million square feet of hides and skins every year, valued \$75 billion in commerce. However, livestock diseases are the most important impediment to livestock development in Bangladesh. Lumpy Skin Disease (LSD) is a serious viral disease that affects cattle health and cattle's hide. Currently, this disease has a significant impact on cattle farming, especially small-scale farming, where economic losses are

putting farmers' livelihoods at risk and discouraging them from continuing to farm in our nation. LSD is suspected to be spread mechanically by blood-feeding arthropods. The outbreak of LSD occurs during the summer and autumn seasons, when the weather is moist and hot, which is favorable for fly breeding, and usually ceased in the winter [1]. LSDV transmission has been associated with hematophagous insects, such as biting flies, mosquitoes and stable flies [2]. Recently, Ixodid ticks are suspected to have a role in the transmission of LSDV in cattle [3,4]. The Lumpy skin disease virus (LSDV) also known as the Neethling virus, is a double-stranded DNA virus belonging to the genus Capripoxvirus and the family Poxviridae that causes the disease of cattle, including zebu[5]. The non-ruminant host is not infected by LSDV because it has a limited host range. LSDV can affect both sexes and all ages of cattle breeds [6]. The clinical manifestations of LSDV infection are varied, ranging from subclinical illness to death. These can include fever; eruption of skin nodules (2–5 cm in diameter) covering the neck, back, perineum, tail, hind legs and genital organs; lesions in the respiratory and gastrointestinal tracts, superficial lymph node enlargement and, in a few animals, oedema of the limbs and brisket together with lameness. There are severe economic losses due to emaciation, decreased or cessation of milk production, low weight gain, abortion, myiasis and permanent damage of hides which causes lowering of their commercial value [7, 8, 9, 10]. Insect activity, susceptibility, and the immune state of cattle all influence morbidity and mortality. Morbidity of LSD ranges from 3% to 85% in different areas depends on various situations. Most commonly the morbidity is estimated at 10% in endemic areas [11]. In the Republic of Zambia, it was first confirmed in 1929. In 2015 the first outbreak of LSD recorded in Europe through Greece and rapidly covered South-Eastern Europe [1]. In 2019, the outbreak reported for the first infected Bangladesh as well as in India and China and also re-emerged in Israel [1]. The first outbreak in Bangladesh was reported on 22nd July 2019 in Karnaphuli Upazila (sub-district) of Chattogram district, and was later confirmed as Lumpy skin disease through real-time PCR on 27th August 2019. The initial attack rate was 18% with no mortality [12]. Within a short time, the disease has surged to all parts of the country. However, this

disease causes considerable economic losses, a few studies has been on LSD in Bangladesh but merely common in Sylhet Sadar. The objective of this study was to determine the prevalence of lumpy skin disease and its associated factors (LSD) at Sylhet District of Bangladesh

II. MATERIALS AND METHODS

Study Period and Area: This study was performed at District Veterinary Hospital, Sylhet Sadar, Sylhet, Bangladesh during the period from January 2020 to December 2020.

Study Design: Cross sectional study was conducted.

Study Population and Data Collection: A total number of 2762 of clinical cases of cattle were registered at the district veterinary hospital, Mirjajangal during this reporting / study period. The owners of the affected animals willingly visited the hospital with patients for treatment. The requisite information were collected from record book of the veterinary hospital where information pertaining to all animals are recorded irrespective of disease suffered.

Clinical Examination and Diagnosis: After visual examination of the patient, the general clinical examination was conducted according to the merit of the individual case, based on the disease history, owner’s complaint and symptoms. Cases of LSD were diagnosed entirely based on clinical signs and clinical history.

Determination of Prevalence: Prevalence is a statistical concept referring to the number of cases of a disease that are present in a particular population at a given time which is determined by following equation,

$$\text{Prevalence} = \frac{\text{Total no of animals suffered at a given period of time}}{\text{No of animals suffered due to disease of your interest at same period of time}} \times 100$$

Statistical Analysis: All the data obtained from the hospital were entered in to Microsoft Excel spreadsheet, edited and analyzed using STATA 15. The collected data were analyzed through tabular and percentage. Chi squared test was performed. Difference between parameters were considered to be significant at p<0.05.

III. RESULTS

The study was conducted at Sylhet Sadar upazilla of Sylhet District from January to December, 2020. Total 2762 animals were examined where 377 animals were clinically positive for Lumpy Skin Disease. The overall prevalence was 13.65% (95% CI: 12.37-14.93%). The prevalence rate of lumpy skin

disease among the different age, sex, breeds are appeared in (repetition of table number)

Table 1: Prevalence of Lumpy skin Disease at different age, breed and sex in Cattle

	Animal examined	Animals infected	Prevalence (%)
As per age			
0-6 month	1092	146	13.37
6m – 1.5 yr	770	80	10.39
1.5 to 3 yr	566	102	18.02
> 3 yrs	334	49	14.67
p value	*0.001		
As per sex			
Male	1124	159	14.15
Female	1638	218	13.31
p value	*0.53		
As per breed			
Indigenous	1525	234	15.34
Cross	1237	143	11.56
p value	*0.00		

* Chi squared test was performed. Difference between parameters were considered to be significant at p<0.05.

As shown in Table 1, in total, 2762 cattle were examined clinically. Analysis of the age prevalence of LSD revealed that the highest prevalence was observed in ages of 1.5-3 years (18.02%). This was followed by >3 years (14.67%), 0-6 months (13.37%) and 6month-1.5year (10.39%) with statistically significant (p<0.05) differences. The risk of getting LSD cases in ages of 1.5-3 years not clear enough in expression than others. The prevalence rate of LSD in male and female cattle indicating higher prevalence in males (14.15%) than that of females (13.31%) but there was no statistically significant (p<0.53) between the two sexes. The risk of getting LSD cases in both male and female were almost similar. The susceptibility of various breeds of cattle is shown in Table 1. In the present study, a significant (p<0.05) variation in breed susceptibility was observed affecting mostly indigenous cattle (15.34%). The risk of getting LSD cases in indigenous cattle was 1.38 times higher than cross breed. Analysis of temporal data shows that the outbreaks activity was high during May-June, 2020, over the one-year study period (Fig. 2). The highest number of outbreaks occurred in June (48.69%) 2020, whereas no visible outbreaks activity was evident in November (0%) and December (0%), 2020.

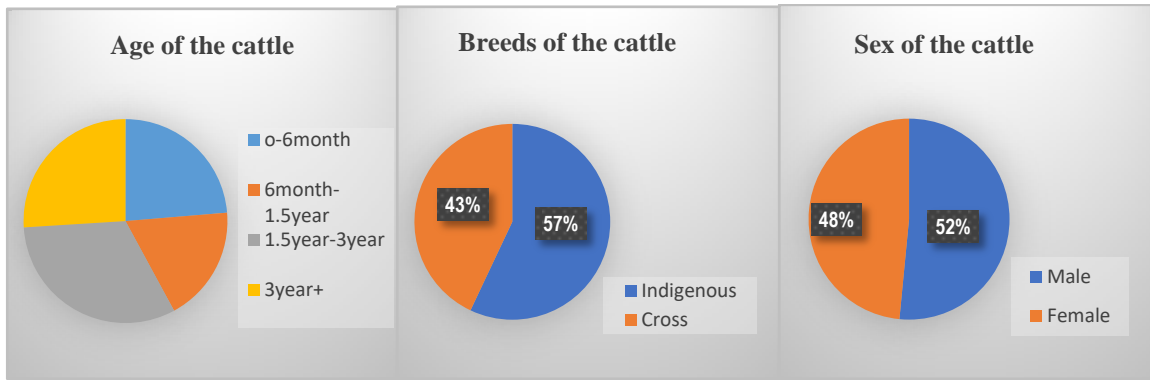


Figure 1. Pie chart showing the Proportions of LSD outbreak in relation to (A) Age of the cattle (B) Breeds of cattle, (C) Sex of the cattle

Temporal Distribution of LSD:

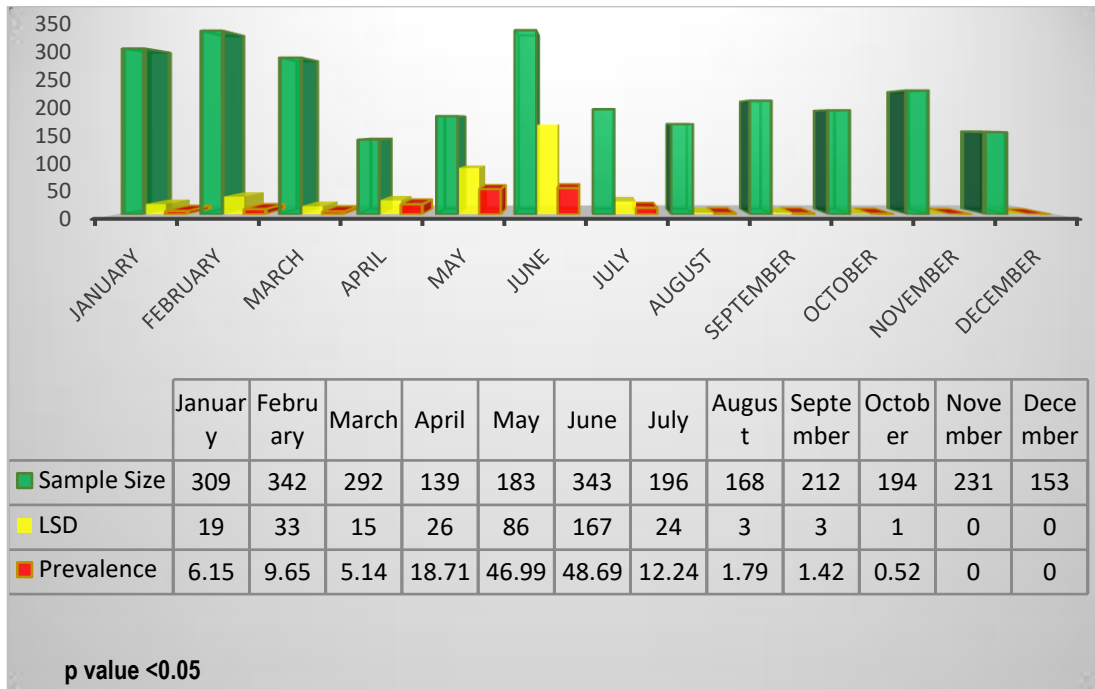


Fig. 2. Temporal distribution of LSD cases officially recorded in District Veterinary Hospital, Sylhet. This graph illustrates the monthly prevalence against LSD from January to December 2020.

IV. DISCUSSION

This study revealed that the overall prevalence of LSD was 13.65% in Sylhet Sadar Upazilla, Sylhet of Bangladesh. But other authors reported the dissimilar prevalence of LSD such as, the author Sarkar et al., [13] found 41.06% in Dinajpur, Bangladesh; Haque & Gofur [14] 49% in Naogon, Bangladesh; Khalil et al., [15] 21% in Barishal, Bangladesh; Badhy et al., [16] 23% in Chattogram, 0.21% in Dhaka, 0.87% in Narayangonj, 1.42% in Gazipur, 0.06% in Satkhira, 0.05% in Pabna, Bangladesh; Elhaig et al., [17] 17.4% in Egypt, Ochwo et al., [18] 8.7% in Uganda and Molla et al., [19] 26.5% in Ethiopia. In fact, the prevalence may differ from region to region. Additionally, the prevalence of diseases also depends on some several factors. Among them, the most common in herd level which was sex, age, farm size and breed

of an animal. In considering the age of animals, the prevalence was higher in adult animal when compared to young having similarities with the findings of the authors Haque & Gofur, [14] & Abd Elmohsen et al., [20]. There was statistically significant difference between animal age and prevalence rate in this study. Earlier, Elhaig et al. [17] and Molla et al. [19] reported statistically significant variation on age group and prevalence. The authors' Sarkar et al. [13] and Abera et al. [7] reported the LSD prevalence was higher in young cattle in comparison with adult. This dissimilar report to this study was probably due to variation in study place and time. The low prevalence in calves in this study may be associated with lower susceptibility of calves to biting flies and keeping them where there is less insect activity (Rweyemamu et al., [21]; Troyo et al., [22]). Another possibility may be the presence of passive maternal immunity

which protects calves for about 6 months (Weiss [23]). On the contrary, under field conditions, very young calves and lactating and malnourished animals developed severe disease which might have been due to impaired cellular immunity or lack of vaccination (Hunter & Wallace, [24]). Though this study suggests that there was no significant ($p > 0.05$) influence of sex on LSD prevalence despite of slightly higher prevalence of LSD infection in male (14.15%) than female (13.31%). Also, the authors Badhy et al., [16] and Abd Elmohsen et al., [20] reported that the prevalence of LSD was moderately higher in male than female. But Ochwo et al. [18] reported that the sex of cattle had significant effect on LSD in Uganda. Interestingly, this study was in line with the findings of Sarkar et al., [13], Elhaig et al., [17] and Molla et al. [19] who found no significant association of sex on LSD occurrences. Abera et al. [7] indicated that males exhibited a higher disease susceptibility than females because of exposure to stress factors such as fatigue from heavy work. In this study, the prevalence was significantly higher proportion in May-June month which was also observed by the authors Badhy et al., [16] and Abd Elmohsen et al., [20]. This might be due to the greater action and breeding season of mechanical vectors engaged with the transmission of the infection (Chihota et al., [25]). Although the indigenous breeds cattle are in lower risk to diseases (Kiplagat et al., [26]) but in this study the comparatively higher prevalence found in indigenous breed cattle than the cross breed. This could be due to presence of increase number of indigenous breeds in that study area. On the other hand, the prevalence of the disease was mostly associated with the presence of insect vectors, livestock grazing, watering points, husbandry systems, wet seasons and market conditions etc. Tuppurainen & Oura, [27].

V. CONCLUSION

In conclusion, the results of this study alluded that the outbreak of LSD had significant association with the sex, breed, and age of cattle. It may be mentioned that higher prevalence rate was recorded in 1.5-3-year old cattle (18.02%) and in indigenous cattle (15.34%). Outbreak of this disease was the highest in the month of May (46.99%) and June (48.69%). Therefore, appropriate preventive measures and control strategy should be taken to prevent this disease in Bangladesh.

Limitations of the study

The data in this study is based on reported cases diagnosed through cardinal clinical signs only. There was no serological test perform for confirmatory and differential diagnosis. Only cattle cases are included in this study.

ACKNOWLEDGEMENT

The author(s) acknowledge the continuous guidance and support of Prof. Dr. Saiful Islam Siddiqui, Department of Anatomy & Histology, Sylhet Agricultural University, Sylhet-3100, Bangladesh.

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