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Prevalence of bacterial pneumonia in Sheep in and around Hyderabad, Telangana

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Abstract
The present study was aimed to record the incidence of bacterial pneumonia in sheep. A total of 2036 sheep were presented to Veterinary Clinical Complex, College of Veterinary Science, Rajendranagar, Hyderabad and Veterinary Hospital, Mailardevpally, PVNRTVU, Hyderabad during the study period October, 2021 to September, 2022. Among them, 196 sheep were diagnosed to be suffering from pneumonia. Out of the 196 sheep, 54 sheep were positive for bacterial pneumonia. Age wise incidence was studied in sheep from below one year to above four years. 33.33% were positive for bacterial pneumonia among the age group of <1 year, where as in the age groups of 1-2, 2-3 years, 3-4 years and above 4 years, 25.93%, 14.81%, 14.81% and 11.11%, sheep tested positive for bacterial pneumonia respectively. In male and female sheep, the incidence was 41.94% and 58.06% respectively. The incidence of bacterial pneumonia in sheep was highest during winter (51.85%) followed by rainy season (40.74%) and was least during summer (7.41%).

Keywords: Pneumonia, bacterial pneumonia, prevalence, sheep

Introduction
Sheep is one of the most important livestock species providing food and nutritional security to landless labourers and to the small and marginal farmers who constitute a large resource-scarce section of India. Pneumonia, a respiratory disease arising by the inflammatory response of the lung parenchyma usually accompanied with the inflammation of the bronchioles or with pleura is still the major disease limiting the production of animals in the tropics (Attoh-Kotoku *et al.*, 2018) [1]. The predisposing factors for development of pneumonia are exposure of animal to damp and cold environment, housing in an ill ventilated room, severe exertion, long transport by vehicles, severe hunger, malnutrition, chronic under-nutrition, sudden changes in weather, debilitating diseases, inhalation of dust, irritating vapour, etc. (Sah *et al.*, 2021) [9]. Pneumonia is regarded as a disease complex, involving interactions between the host, multiple etiological agents and environmental factors (Mekibib B *et al.*, 2019) [8]. Out of them, bacterial pneumonia due to variable clinical manifestations, severity of disease process and emergence of strains resistant to a number of chemotherapeutic agents has taken precedence. Limited information is available on the prevalence of bacterial pneumonia in sheep present in and around Hyderabad. In the current study, the prevalence of bacterial pneumonia based on age, gender, and season in sheep was ascertained. Understanding the epidemiology of bacterial pneumonia in sheep can potentially assist in its prevention and control.

Materials and Methods
The present study was carried out in sheep that were presented to the Veterinary Clinical Complex, College of Veterinary Science, Rajendranagar, Hyderabad and Veterinary Hospital, Mailardevpally, P.V. Narsimha Rao Telangana Veterinary University, Hyderabad during the period October 2021 to September 2022. Suspected cases were subjected for clinical examination, radiography, cultural examination of nasal swabs, haematological examination and blood gas analysis. The prevalence of bacterial pneumonia in sheep was determined and analysed based on age, gender, and season.

Results and Discussion
During the study period October 2021 to September 2022, a total of 2036 sheep were presented to the Veterinary Clinical Complex, College of Veterinary Science, Rajendranagar, Hyderabad and Veterinary Hospital, Mailardevpally, P.V. Narsimha Rao Telangana Veterinary

University, Hyderabad were screened. 196 sheep were identified to be suffering with clinical signs suggestive of pneumonia like nasal discharges, cough, dyspnea, etc. Out of the 196 sheep, 54 sheep were positive for bacterial pneumonia, 124 sheep were positive for non-specific pneumonia and 18 sheep were positive for verminous pneumonia. The overall incidence of pneumonia was 9.63% (196/2036). The incidence of bacterial pneumonia in sheep was 2.65% (54/2036). The findings corroborated with the observations of Venkatesh (2018) [12] who reported the incidence of ovine bacterial respiratory tract infections in sheep to be 2.57% in and around Tirupati, Andhra Pradesh and Singh *et al*. (2020) [10] who reported the incidence of pneumonia due to *Mannheimia haemolytica* infection in sheep and goat from different regions of India to be 2.22%. In contrast, Dar *et al*. (2012) [3] reported the incidence of ovine pneumonic pasteurellosis to be 18.46% in sheep slaughtered at Kashmir valley and Doley *et al*. (2018) [4] reported the incidence of bacterial respiratory tract infections caused by *Staphylococcus* spp. in small ruminants of Nagpur to be 44.94%. The variation in the incidence of bacterial pneumonia in different parts of India may be due to the diversity in the geography and climatic conditions in and around the location of the study.

Age wise incidence

Out of the 54 sheep diagnosed with bacterial pneumonia, 18 sheep (33.33%) in the age group of less than one year tested positive for bacterial pneumonia, 14 sheep (25.93%) in the age group of 1-2 years were positive for bacterial pneumonia while 8 sheep (14.81%) in the age group of 2-3 years, 8 sheep (14.81%) in the age group of 3-4 years and 6 sheep (11.11%) aged above 4 years were found to be positive for bacterial pneumonia respectively. The higher prevalence of bacterial pneumonia in lambs may be due to weak immunity when compared to other age groups. These findings are in agreement with the findings of Bell (2008) [2], Marru *et al*. (2013) [7], Singh *et al*. (2020) [10] who have recorded significantly higher rate of pneumonic pasteurellosis in sheep aged less than one year. However, Tewodros and Annania (2016) [11] observed that the prevalence of pneumonic pasteurellosis was significantly higher (52.97%) in sheep aged less than 2 years when compared to adult sheep (21.26%) aged more than 2 years.

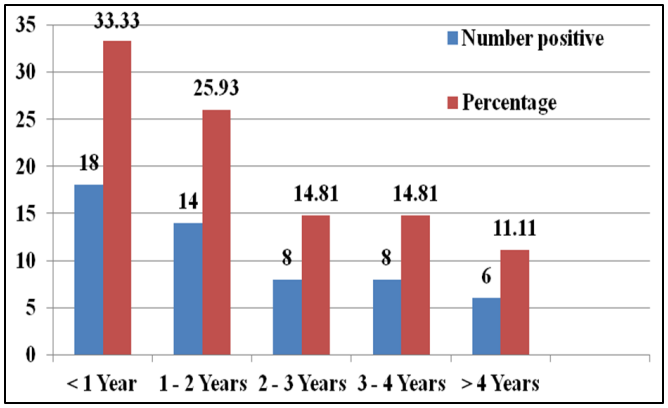

Fig 1: Age wise incidence of bacterial pneumonia in sheep

Gender wise incidence

In the present study, the incidence of bacterial pneumonia in female sheep was 58.06% (32/54) comparatively higher than that of male sheep 41.94% (22/54). This may be attributed to the flock's makeup rather than the vulnerability of one sex to the disease. The finding concurred with the observations of Bell (2008) [2], Tewodros and Annania (2016) [11], Venkatesh (2018) [12] who reported greater incidence of bacterial pneumonia in female sheep. However, Marru *et al*. (2013) [7] reported that gender had no correlation with the incidence of ovine pneumonic pasteurellosis in Haramaya District, Ethiopia.

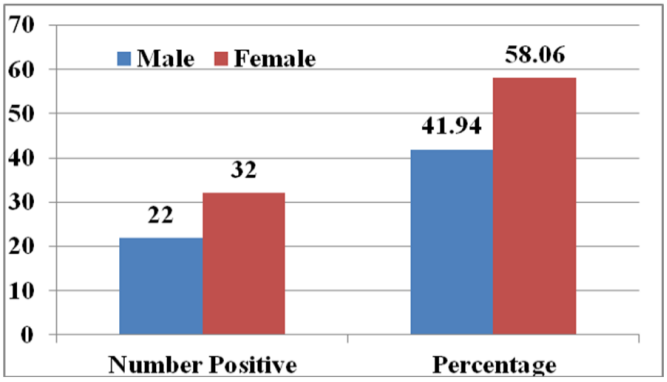

Fig 2: Gender wise incidence of bacterial pneumonia in sheep

Season wise incidence

In the present study, incidence of bacterial pneumonia in sheep was highest during winter (51.85%) followed by rainy season (40.74%) and was least during summer (7.41%). The observations were in agreement with the findings of Dar *et al*. (2012) [3], Tewodros and Annania (2016) [11], Venkatesh (2018) [12], Singh *et al*. (2020) [10]. These findings may be attributed to lowered ciliary beat frequency and dimnished mucus transport in the respiratory tract epithelium on exposure to cold air (Kilgour *et al*. 2004) [5] apart from cold stress which depresses the cellular and humoral components of the immune system (Mäkinen *et al*. 2009) [6] and huddling behaviour hypothesised to be facilitating in the spread of bacterial infections.

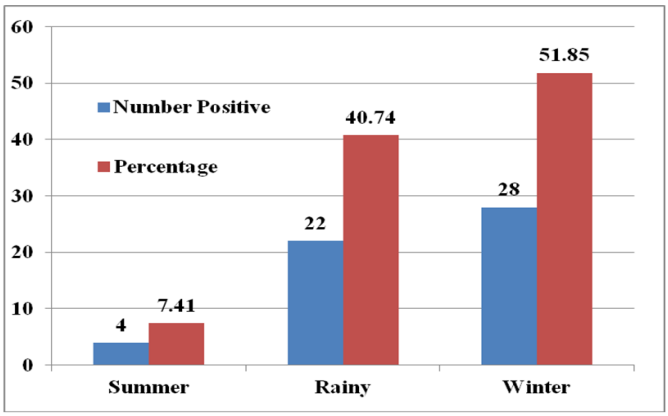

Fig 3: Season wise incidence of bacterial pneumonia in sheep

4. Conclusion

From the present study, the prevalence of ovine bacterial pneumonia was found to be 2.65% with the highest prevalence in sheep aged less than one year, in females when compared to males and during the winter season. Hence, it may be concluded that lambs should be given extra care and attention to prevent bacterial pneumonia especially during winter season.

5. Acknowledgment
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6. References

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