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Evaluation of mortality pattern in Deccani sheep and Osmanabadi goats in an organised farm in Telangana

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Abstract
A study was conducted over a five-year period, from 2018 to 2022, in an organized farm in Telangana to assess the mortality patterns in native sheep and goat breeds. This study includes a total of 665 Deccani sheep and 270 Osmanabadi goats. The overall mortality rates were found to be 8.18% for Deccani sheep and 11.44% for Osmanabadi goats. Notably, the mortality rate was higher in goats compared to sheep. The year 2020 recorded the highest mortality rates for both species. Pneumonia was identified as the primary cause of mortality in both sheep and goats, followed by enteritis. Furthermore, the mortality rates were found to be higher during the south-west monsoon season, with sheep experiencing a death loss of 40% and goats experiencing a death loss of 46.6%. Additionally, female individuals of both sheep (56%) and goats (76.66%) exhibited higher mortality rates compared to males. The mortality rate can be reduced by implementing appropriate measures pertaining to herd management and disease control.

Keywords: mortality, sheep, goat

1. Introduction
Sheep and goat play a significant role in the Indian economy, and their production is crucial for smallholder farmers, especially those in areas with limited resources. Their tiny size, early maturity, minimal capital asset per head, and quick returns makes them ideal for the demands of underprivileged resource farmers (Chenyambuga *et al.*, 2014) [1]. Sheep and goat rearing fulfils socioeconomic and cultural requirements while providing animal protein (meat), immediate financial gain, manure, raw materials (hides and skin), and capital investments (Dhaba *et al.*, 2012) [4].
According to the 20th livestock census, India currently has a population of 74.26 million sheep and 148.88 million goats, representing a 14.1% and 10.1% increase respectively, when compared to the previous census. Despite the large number of small ruminants in the country, the sheep and goat enterprises face several challenges that limit their performance and economic returns. These challenges include inadequate nutrition, suboptimal management practices, and the prevalence of diseases and parasitic infestations, which result in direct losses such as mortality, reduced production, and weight gain (Kumar *et al.*, 2003) [6]. Mortality rates have a significant impact on the economic returns of sheep and goat production. Therefore, effective livestock management strategies aim to minimize disease occurrence and enhance productivity and reproduction rates by monitoring the occurrence and patterns of animal diseases. In light of this, the current study aims to assess the various factors influencing mortality in sheep and goat production in a well-organized farm in Telangana.

2. Materials and Methods
The data was collected from livestock farm complex, college of veterinary science, Rajendranagar, Hyderabad for a period of five years from 2018-2022. The data includes 665 Deccani sheep and 270 Osmanabadi goats. Factors such as species, sex, season, and cause of death were taken into consideration for the evaluation of mortality patterns in native breeds. All the animals in the farm are maintained under semi-intensive system with supplementation of concentrate mixture (Maize-34%, groundnut cake-29%, deoiled ricebran-15%, redgram chunni-19%, mineral mixture-2% and salt-1%) @ 100-350 gm depending on the physiological status of the animals. The animals were allowed for 8 hrs of grazing on pasture daily. Routine health management practices such as dipping (once in 6 months), deworming (once in three months), and vaccination against Foot and Mouth Disease, Enterotoxaemia, sheep pox, Blue Tongue and *Peste des Petits Ruminants* (PPR) were performed as per the schedule.

The seasons were categorized as summer (March to May), south-west monsoon (June to August), north-east monsoon (September to November), and winter (December to February). Various causes of death as recorded in the post-mortem records were as described by Maru *et al.* (1986) [7]. The mortality rate was calculated as the number of animals died by a specific cause/effect divided by the total no of animals died due to all causes.

3. Results and Discussion

The overall mortality rates for sheep and goats over a five-year period were 8.18% and 11.44%, respectively. Similar findings were reported by Sheeba *et al.* (2021) [11] for Ramnad White Sheep and by Deepak *et al.* (2021) [3] in goats. However, Sarkar *et al.* (2008) [10] observed a higher mortality rate of 15.4% in the sheep kept on a farm. Also, the mortality rate was found to be higher in goats compared to sheep. Notably, the highest mortality rates were recorded in the year 2020, which coincided with the Covid-19 pandemic (Table 1). During this period, there was a shortage of adequate feed at the farm and inadequate monitoring of animal health due to movement restrictions. Additionally, many staff and farm labourers were affected by Covid-19. The lack of sufficient feed resulted in poor nutrition, which likely compromised the animals' immunity and contributed to increased mortality on the farm.

Table 1: Year wise mortality in Deccani sheep and Osmanabadi goats

Year	Deccani sheep			Osmanabadi goats		
	No. of deaths	Stock	Mortality %	No. of deaths	Stock	Mortality %
2018	8	158	5.06	6	42	14.29
2019	10	178	5.62	7	55	12.73
2020	18	101	17.82	7	51	13.73
2021	4	116	3.45	5	57	8.77
2022	10	112	8.93	5	65	7.69
Total	50	665	8.18	30	270	11.44

Table 2 presents a comprehensive overview of the various causes of mortality in sheep and goats from the year 2018 to 2022. The primary cause of mortality in both species, as observed in this study, is pneumonia, which accounts for 56% and 40% of deaths in sheep and goats, respectively. Enteritis follows as the second leading cause, responsible for 16% and 23.3% of mortalities, while bloat accounts for 6% and 6.6%. Other factors contributing to mortality include shock, snake bites, and septicaemia. These findings align with previous studies conducted by Dillip *et al.* (2020) [5], Sheeba *et al.* (2021) [11], and Deepak *et al.* (2021) [3], which also identified pneumonia as the primary cause of mortality. However, contrary to our results, Upadhyay *et al.* (2015) [12] and Merkine *et al.* (2017) [9] reported that digestive disorders were the leading cause of mortality. The high incidence of pneumonia in our study may be attributed to sudden environmental changes, and infections caused by parasites, viruses, and bacteria. Pneumonia poses a significant health threat to small ruminants in tropical regions, resulting in substantial losses in production due to both morbidity and mortality (Mekbibib *et al.*, 2019) [8]. These losses have economic implications, including decreased productivity, expensive medical treatments and trade restrictions (Daniel *et al.*, 2006) [2].

Table 2: Causes of mortality in Deccani sheep and Osmanabadi goats

Causes of mortality	Deccani sheep		Osmanabadi goats	
	No. of deaths	Mortality %	No. of deaths	Mortality %
Pneumonia	28	56.00	12	40.00
Enteritis	8	16.00	7	23.33
Bloat	3	6.00	2	6.66
Miscellaneous causes	11	22.00	9	30.00
Total	50	100.00	30	100

Table 3 presents data on the mortality rates of sheep and goats during different seasons. The mortality rates were found to be highest during the south west monsoon season, with rates of 40% for sheep and 46.6% for goats. This was followed by the winter season, with rates of 26% for sheep and 23.33% for goats. The pre-monsoon and post-monsoon seasons had lower mortality rates of 18% and 16.6% for sheep, and 16% and 13.3% for goats, respectively. The higher mortality rates during the south west monsoon season can be attributed to factors such as high humidity, constant exposure to rain, and poor floor conditions. This finding is consistent with previous studies conducted by Dillip *et al.* (2020) [5] and Deepak *et al.* (2021) [3], who also observed a seasonal effect on mortality in goats. However, the results of this study contradict with the findings of Sheeba *et al.* (2021) [11] and Merkine *et al.* (2017) [9], who reported higher mortality rates during the northeast monsoon and winter seasons in sheep, respectively. The variations in mortality rates between seasons in sheep and goats can be attributed to differences in disease incidence and pasture availability.

Table 3: Seasonal wise mortality in Deccani sheep and Osmanabadi goats

Season	Deccani sheep		Osmanabadi goats	
	No. of deaths	Mortality %	No. of deaths	Mortality %
Pre monsoon	9	18.00	5	16.67
South west monsoon	20	40.00	14	46.67
Post monsoon	8	16.00	4	13.33
Winter	13	26.00	7	23.33
Total	50	100.00	30	100.00

The mortality rates of sheep and goats, categorized by sex, are presented in Table 4. The study reveals that females of both species exhibited a higher mortality rate compared to males. Specifically, the mortality percentages for females and males

in sheep were 56% and 44%, respectively, while in goats, the corresponding percentages were 76.6% and 23.3%. The lower mortality rate observed in males could potentially be attributed to their limited presence on the farm, as they are promptly disposed of upon reaching the market age. These findings align with the research conducted by Deepak *et al.* (2021) [3] and Upadhyay *et al.* (2015) [12], who also documented higher mortality rates among females. However, contrasting results have been reported by other researchers such as Dillip *et al.* (2020) [5] and Merkine *et al.* (2017) [9], who observed high mortality rates in males.

Table 4: Sex wise mortality in Deccani sheep and Osmanabadi goats

Sex	Deccani sheep		Osmanabadi goats	
	No. of deaths	Mortality %	No. of deaths	Mortality %
Male	22	44.00	7	23.33333
Female	28	56.00	23	76.66667
Total	50	100.00	30	100.00

4. Conclusions

Based on the aforementioned data, it can be deduced that the mortality rate was higher in goats compared to sheep, with the highest death losses occurring during the south west monsoon and winter seasons. The present study identifies pneumonia as the primary cause of mortality in both sheep and goats, with a higher mortality rate observed in females as opposed to males. To mitigate mortality on the farm, it is imperative to accurately identify the underlying causes of pneumonia and implement appropriate measures to eradicate them. Additionally, given that females exhibit a greater susceptibility to diseases; particular attention should be given to reducing stress levels, particularly during pregnancy and lactation.

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