



Prevalence of Anemia in Small Ruminants in Garividi region of Andhra Pradesh

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ABSTRACT

The present clinical study was conducted from March 2022 to August 2022 to determine the prevalence of anemia in small ruminants that were presented to Veterinary Clinical Complex, College of Veterinary Science, Garividi. The purpose of the study was to determine the prevalence and associated etiologies causing anemia in the area. A total of 344 animals (238 goats and 106 sheep) were presented to the VCC with the history of generalized weakness, inappetance, diarrhea and poor weight gain. The overall prevalence of anemia was 70.3% among the presented cases. The prevalence was higher in sheep (74.5%) than goats (68.5%) with non-significant difference ($p > 0.05$). The prevalence in young ones was higher as compared with adult small ruminants with prevalence of 65.3% and 34.7%, respectively. The prevalence was higher in female (71.5%) than male (28.5%) but there is no significant difference ($p > 0.05$). Blood parameters were analyzed to rule out the anemia and its etiology. Anemia in small ruminants should be ruled out to prevent production, reproductive and economic losses in the flock. In sheep ectoparasitic infestation (30.4%), endoparasitic infection (44.3%), mixed infection (10.12%) and other conditions (15.2%), whereas in goats ectoparasitic infestation (38.6%), endoparasitic infection (25.8), mixed infection (16.6%) and other conditions (19.01%) were the etiologies that led to anemia.

Key Words: Anemia, Etiology, Hemoglobin Prevalence, Small ruminants.

INTRODUCTION

Sheep rearing is a traditional occupation and contribute greatly to the agrarian economy, especially in areas where crop and dairy farming are not economical, and play an important role in livelihood of a large proportion of landless, small and marginal farmers. The tropical climate conditions of Andhra Pradesh are most suitable for sheep rearing. Anemia is a condition which silently kills the production capabilities and reproductive traits and suppresses the resistance power of animals (Anumol *et al*, 2011). Clinically, anemia is characterized by pale mucus membranes, decrease in the packed cell volume (PCV), hemoglobin concentration (Hb), and total erythrocyte count (TLC) per unit volume of blood with values below the normal generally observed in hydrated animals (Neha *et al*, 2022). Anemia can be due to various

reasons like endoparasitism, ectoparasitism, hemoparasitism, nutritional deficiencies and secondary to certain infectious diseases.

MATERIALS AND METHODS

Sheep and goats presented to Veterinary Clinical Complex, College of Veterinary Science, Garividi during the period from April 2022 to August 2022 with signs of generalized weakness, debility, poor weight gain, diarrhea and mortality in flocks were screened for anemia based on history, clinical signs, hematology, fecal examination and peripheral blood smear examination. Clinical examination of the animals revealed pale pink to pale/blanched mucus membranes (Plate.1), pale mucus membranes with tachycardia in few animals and dehydration was also prominent in majority of animals. Whole blood and peripheral blood smears (PBS) were collected

for hematological studies. The data generated in the present study was analyzed using statistical analysis. In the present study, Sheep with hematocrit of less than 27 per cent (Radostits *et al*, 2006) and goats with hematocrit of less than 22 per cent (Banka *et al*, 2021 and Anumol *et al*, 2011) were considered as anemic.

RESULTS AND DISCUSSION

A total number of 344 small ruminants of which 106 sheep and 238 goats were presented to Veterinary Clinical Complex, College of Veterinary Science during the period from April 2022 to August 2022 were taken for the study. Out of total small ruminants, 79 sheep (74.5 per cent) and 163 goats (68.5 per cent) were found to be anemic (Fig. 1). The incidence of anemia in sheep and goats were also reported by 15.38 per cent to 48 per cent (Bhikane *et al*, 2006), 35 per cent (Velusamy *et al*, 2015) and 7.9 to 13.6 per cent (Banka *et al*, 2021). The difference in prevalence recorded by different workers might be due to different geographical locations, difference in feeding pattern, climatic variation, genetic variation of the animals and cases presented to the clinics.

Age-wise incidence

In sheep and goat highest incidence was recorded in young ones (less than one year) (68.2 per cent and 63.8 per cent, respectively) and lowest in adults (31.6 per cent and 36.2 per cent, respectively). This could be due to immune suppression in young animals making them prone to ectoparasites and endoparasites, dietary deficiency and secondary infections. The findings were similar to Goklaney *et al* (2012) and Ramesh and Suryanarayana (1999).

Sex-wise incidence

Incidence of anemia in sheep was higher in females (70.9 %) than males (29.1 %) and in goat incidence was also higher in females (71.8 %) than males (28.2 %) with non-significant difference ($p < 0.05$) which might be due to more presentation of females than males to the clinics. The findings are in accordance with observations of many earlier

scientists (Dutta *et al*, 2017; Bhatane *et al*, 2018 and Neha *et al*, 2022)

Hematology

In anemic small ruminants, highly significant reduction ($p < 0.01$) in Hb, PCV, RBC count were noticed. There is marked elevation of neutrophils and monocytes in anemic sheep and goat with mixed and other infections. Also a significant reduction ($p < 0.05$) in MCV were noticed. These findings were similar to those of Bhatane *et al*, (2018), Neha Rao *et al*, (2021) and Banka *et al*, (2021). The decreased hematological indices (Hb, PCV, and TEC) recorded in the present observations could be attributed to the reduced appetite, blood loss from scratching, and inflammatory response due to these infections. It has been found that lice infestation causes an increase in oxidative markers of blood and erythrocytes being very prone to oxidative damage can result in significant Anemia in infected animals (Ajith *et al*, 2017).

Fecal examination revealed parasitic eggs of Strongyles Spp., Trichuris Spp., Fasciola Spp., and Strongyloides Spp., along with certain protozoa like Balantidium Spp., and Eimeria Spp., Peripheral blood smear revealed presence of Theileria Sp., in seven goats.

Etiological factors

In the anemic small ruminants (79 sheep and 163 goats), the various etiologies included in sheep were ectoparasitic infestation (30.4 %), endoparasitic infection (44.3 per cent), mixed infection (10. %) and other conditions (15.2 %), whereas in goats ectoparasitic infestation (38.6 %), endoparasitic infection (25.8 per cent), mixed infection (16.6 %) and other conditions (19.01 %) (Fig. 2).

The incidence of tick and lice infestation were highest in ectoparasitic infestation (38.6 per cent) contributing to anemia in goats, where as in sheep the incidence of Hemonchus Spp., Strongyloides Spp., Trichuris Spp., and Fasciola Spp., contributed to the anemia under endoparasitic infection (44.3 per cent) followed by ectoparasitic (tick and lice

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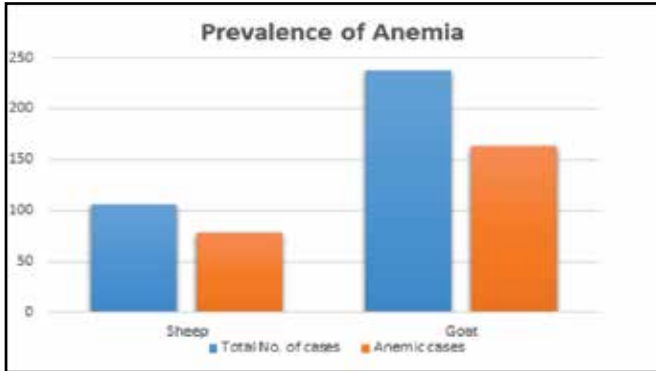


Fig.1 Prevalence of anemia in small ruminants

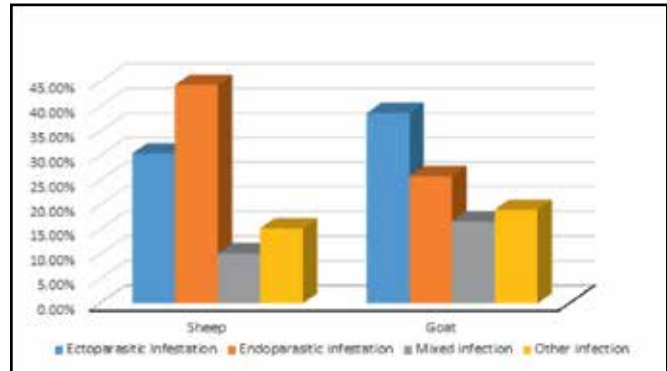


Fig.2 Etiologies causing anemia in small ruminants

infestation) in sheep and endoparasitic infestation (Strongyle Spp., Trichuris Spp., Fasciola Spp., in fecal sample and Theileria Spp., in PBS) in goats. Similar findings were seen by Anumol *et al*, (2011) who recorded 38.89 % anemic goats with tick infestation, followed by lice (27.78 %) and mites (25.93 %).

Yakhchali and Hosseini (2006) and Bhatane *et al*, (2018) reported that ectoparasitism was the major cause for anaemia in small ruminants that leads to major economic loss due to poor management practices. Climatic condition conducive to the growth and multiplication of ectoparasites, poor management, poor awareness among farmers and poor animal health services contributed to the widespread occurrence of ectoparasites (Sertse and Wossene, 2007).

ArunShaju (2001), Velusamy *et al*, (2015),

Haritha and VaraPrasada Rao (2020) and Banka *et al*, (2021) identified intestinal parasites such as Strongyles, Trichuris, Moniezia, Amphistoma, Fasciola and Coccidia in sheep and goats with anemia in their study. Increased incidence of endoparasites in small ruminants in present study could be due to poor management systems i.e., animals repeatedly grazing on infested pastures, animals allowed to graze on nearby ponds/water sources, overcrowding in unhygienic pen, immunosuppression due to nutritional/mineral deficiency and transport stress predispose the animals to high parasitic infections.

The lowest incidence in sheep (10.12 percent) and goat (16.6 per cent) was observed in mixed infection which included both ectoparasitic, endoparasitic infestation and hemo-protozoal infection. Peripheral blood smear of seven goats revealed Theileria Spp., Anumol *et al*, 2011 and



Plate .1 Pale mucus membrane in anemic sheep

Banka *et al*, 2021 reported the incidence of Theileria Spp., in blood smears which is similar to the finding of our study.

However, in case of other infections like bacterial (Pneumonia, Enteritis), viral (PPR, Contagious Ecthyma) and nutritional deficiencies, anemia was observed as secondary clinical sign leading to delayed recovery, generalized weakness and poor weight gain with an incidence of 15.2 per cent and 19.01 per cent in sheep and goat, respectively. Anaemia in these animals may be attributed to the negative influences of the pathological and clinical features of the disease (i.e., diarrhea, malabsorption, etc.), which distort protein synthesis in the liver and also the production of erythrocytes in the bone marrow and chronic inappetance leading to malnutrition.

CONCLUSION

The present case study determines the prevalence of anemia in small ruminants and their contributing etiologies leading to anemia. Anemia in small ruminants is multifactorial which includes ectoparasites, endoparasites, mixed and other infections which leads to clinically generalised weakness, pale mucus membranes, poor weight gain, immunosuppression, secondary bacterial infections and mortality in extreme cases.

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