

*Original Research***Studies on Prevalence and Etiology of Anemia in Buffaloes in Krishna District, Andhra Pradesh****G. Priyanka<sup>1\*</sup>, N. Lakshmi Rani<sup>2</sup>, V. Vaikunta Rao<sup>2</sup> and C. Sreedevi<sup>3</sup>**<sup>1</sup>Department of Veterinary Medicine, N.T.R College of Veterinary Science, Gannavaram, Andhra Pradesh, INDIA<sup>2</sup>Department of Veterinary Clinical Complex, Srivenkateswara Veterinary University, Tirupati, Andhra Pradesh, INDIA<sup>3</sup>Department of Veterinary Parasitology, N.T.R College of Veterinary Science, Gannavaram, Andhra Pradesh, INDIA**\*Corresponding author:** [prema.vet.34@gmail.com](mailto:prema.vet.34@gmail.com)

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**Abstract**

The present study was conducted to determine the prevalence of anemia in buffaloes and to explore the probable etiology. Out of 1096 buffaloes of different age and sex reared under different managerial practices in Krishna district, 116 (10.58 %) animals were anemic. The prevalence of anemia was higher in buffalo calves (18.08%) followed by prepubertal heifers (16.25%) aged between 1-3 years and less in adult buffaloes (9.33%). Mineral deficiency and parasites were the major causes of anaemia in the present study. Mineral deficiency contributed to anemia in 72.41 per cent of the anemic buffaloes while parasitic etiology was recorded in 49.13% buffaloes.

**Key words:** Anemia, Buffaloes, Mineral Deficiency, Parasites, Prevalence**How to cite:** Priyanka, G., Rani, N., Rao, V., & Sreedevi, C. (2020). Studies on Prevalence and Etiology of Anemia in Buffaloes in Krishna District, Andhra Pradesh. International Journal of Livestock Research, 10(2), 30-35. doi: 10.5455/ijlr.20191030110243**Introduction**

Anemia is one of the most important clinical manifestations of diseases seen in buffaloes under field conditions. Anemia is considered as decrease in the haemoglobin, red blood cells and packed cell volume in the blood. Anemia in buffaloes is of great importance because of the direct and indirect losses in the form of loss of production, reduced reproduction and suppressed resistance thus affecting the viability of livestock production systems. Anaemia in cattle may be caused by several factors such as protozoan infections, bacillary toxins, Leptospirosis, *Mycoplasma wenyonii*, toxic feeds such as Brassica sps, rape, kale, onions, tomatoes, turnips, cabbages, poisoning by mercuric salts, pimelia, phenothiazine, copper and by prolonged administration of oxytetracycline (Diaz-Sanchez *et al.*, 2019). Some of the trace minerals

namely iron, copper, cobalt play an important role in the synthesis of haemoglobin in the animal's body. Their deficiency may result in reduced haemoglobin synthesis, thus ultimately affecting the animal's performance and productivity (Radostits *et al.*, 2010).

Early detection and clinical management can help to resolve the condition of anemia. As anemia is associated with diversified etiological factors, the underlying cause responsible for anaemia in buffaloes needs to be elucidated before taking up rational treatment. The present study was undertaken to study the prevalence of anemia in buffaloes in and around Gannavaram, Krishna district, Andhra Pradesh and to identify certain causes of anemia in buffaloes.

### Material and Methods

The study included 10 apparently healthy animals as control and 1096 buffaloes of different age groups of either sex were screened for anemia. All the buffaloes were managed under semi intensive conditions of rearing. The selected animals were divided into 3 categories on the basis of age viz. calves (less than 1 year), prepubertal buffalo heifers (between 1-3 years) and adult buffaloes (> 3 years). Selection of animals was based on history and confirmation based on the hematocrit values (Tvedten and Weiss, 2000). Buffaloes with PCV < 26 per cent were categorized as anemic. On the basis of PCV, the buffaloes were divided into two groups i.e., anemic and non- anemic.

### Diagnosis of Probable Etiology of Anemia

Blood smears from all the animals were examined for haemoprotozoan infections and microfilariae. Skin was examined for ectoparasites and faecal samples were examined for parasitic ova/cysts. Further, the animals due to infection /inflammation were considered based on serum biochemical changes and the estimation of minerals accounted for the diagnosis of nutritional anemia.

### Results and Discussion

The present study revealed anemia in 116 buffaloes with an overall prevalence of 10.58 per cent. This finding is in close agreement with the earlier reports of (Whitlock *et al.*, 1974, Randhawa 1999, Bhardwaj *et al.*, 2010 and Somu *et al.*, 2017) who reported prevalence of anemia as 10.6 per cent, 8.73 per cent, 13.90 per cent and 11.76 per cent respectively. On the converse, some authors reported a higher prevalence of anemia. This variation might be due to several factors like species differences, variations in feeding, health care and other managerial practices while in many of the conditions it was linked with the incidence of other diseases (Radostits *et al.*, 2010). The prevalence of anemia in buffaloes of individual farmers and dairy farms was 13.5 per cent and 9.78 per cent, respectively. The prevalence of anemia was non significantly high in buffaloes with individual farmers when compared to those at dairy farms ( $P > 0.05$ )

(Table 1). Lower incidence of anemic cases was recorded in organized dairy farms which could be due to better feeding practices, health management in comparison to buffaloes present with individual farmers.

**Table 1:** Prevalence of anemia in buffaloes of dairy farms and individual farmers

S. No.	Organised /unorganised	Number of buffaloes screened	Number of buffaloes anemic	Percentage (%)	Chi Square value
1	Dairy farms	859	84	9.78	2.721 <sup>NS</sup>
2	Individual Farmers	237	32	13.5	

NS: Not significant ( $P > 0.05$ )

It was evident from Table 2 that, the prevalence of anemia was found to be higher (18.08%) in buffalo calves aged up to 12 months followed by prepubertal heifers (16.25%) aged in between 1-3 years and less in adult buffaloes aged greater than 3 years (9.33%). The age wise prevalence varied significantly ( $P < 0.05$ ) between different age groups. These findings were similar to the observations of Ramin *et al.* (2012) who opined that anemia was more common in suckling calves due to lack of access to forages and concentrates up to weaning time. On the contrary, Khadjeh and Papahn (2002) and Mohan *et al.* (2009) reported a significant decrease in total erythrocyte count with increase in age, which might be due to reduction in erythropoiesis and buildup of sex hormones. However, Rengifo *et al.* (2010) stated that age had no effect on the incidence of anemia in calves. The observed variations in the incidence of anemia among different age groups in the present study could be due to reasons like variation in nutritional and managerial practices and existence of ecto and endoparasite infestation.

**Table 2:** Age wise prevalence of anemia in buffaloes

S. No.	Age	Number of buffaloes screened	Number of buffaloes anemic	Percentage (%)	Chi square value
1	Buffalo calves (Up to 12 months)	94	17	18.08	7.577*
2	Prepubertal heifers (Between 1-3 Years)	80	13	16.25	
3	Adult buffaloes (>3 Years)	922	86	9.33	
A	Non- pregnant non-lactating	122	6	4.92	
B	Pregnant	64	6	9.38	
C	Lactating	736	74	10.05	
	<b>TOTAL</b>	<b>1096</b>	<b>116</b>	<b>10.58</b>	

\*Significant difference at  $P < 0.05$

Among the adult buffaloes the prevalence of anemia was higher in lactating (10.05%) followed by pregnant (9.38%) and non-pregnant and non-lactating (4.92%). This was in accordance with the findings of Seker and Unsuren (1989) and Das *et al.* (2016) who reported a greater prevalence of anemia in cows with high milk yield. Kumar *et al.* (2001) reported that anemia in pregnant buffaloes could be attributed to altered hematological parameters during pregnancy. The various causes for anaemia established during the present

study included mineral deficiency, parasites, systemic causes, infectious causes, poisoning and neoplasm was in accordance with Thrall *et al.*(2004) and Radostits *et al.* (2010). The present study revealed presence of parasites in 57 buffaloes (49.13%) of which gastrointestinal parasites were noticed in 22.41%, nasal schistosomes in 3.45 %, haemoparasites in 15.52% and ectoparasites in 7.75% of anemic buffaloes. Parasites as important etiological agents for anaemia has also been highlighted by many authors (Samanta *et al.*,1995 and Singh *et al.*,2014). Anaemia due to either primary or secondary macro/micro mineral deficiency was recorded in 72.41% of the buffaloes. Samanta *et al.* (1995) reported that parasitism was the major cause of anemia in 79.28% and nutritional deficiency in 20.71% of anaemic cattle.

Systemic involvement was noticed in 16 (13.79%) of anemic buffaloes which included involvement of hepatobiliary system in 7, urinary system in 5 and multisystemic involvement was noticed in 4 buffaloes. The other causes identified were infectious diseases in 5 (Infectious bovine rhinotracheitis in 2, Foot and mouth disease in 1 and mastitis in 2) poisoning in two buffaloes and neoplasm in one buffalo. In the present study more than one etiological agent contributed to the cause of anemia in majority of the cases.

**Table 3:** Prevalence of anemia based on etiology (n=116)

S. No	Etiology	Number of Animals	Percentage (%)
I	Parasitic	57	49.13
1	Ectoparasitic infestation	9	7.75
2	Endoparasites	48	41.38
A	GI parasites	26	22.41
i	Amphistomes	8	6.89
ii	<i>Trichostrongylespp.</i>	8	6.89
iii	Coccidia	5	4.31
iv	<i>Toxocaravitulorum</i>	4	3.45
v	Fasciola	1	0.86
B	Nasal Schistosomes	4	3.45
C	Haemoparasites	18	15.52
i	Microfilaria	6	5.17
ii	<i>Trypanosomaspp.</i>	3	2.59
iii	<i>Theileriaspp.</i>	3	2.59
iv	<i>Babesiaspp.</i>	4	3.45
v	<i>Anaplasma spp.</i>	2	1.72
II	Systemic	16	13.79
III	Infectious	5	4.31
IV	Poisoning	2	1.72
V	Neoplasm	1	0.86
VI	Mineral Deficiency	84	72.41

Mixed etiology (both parasites and mineral deficiency) as the major cause of anemia as observed in the present study was in accordance with the findings of Fekete and Kellems (2007) who documented the

interrelationship between nutrition and parasitic infections. The nutritional deficiency made the animals more prone to parasitic infestations due to reduced immunity. On the other hand presence of parasites in animals reduced the voluntary feed intake and interfered with absorption and resulted in micronutrient deficiency.

## Conclusion

Anemia in buffaloes was caused by multiple factors. Mineral deficiency followed by parasites either alone or in combination was considered as major etiological factors in the development of anemia in buffaloes.

## References

1. Bhardwaj, R. K., Randhawa, C. S. and Randhawa, S. S. (2010). Incidence of iron deficiency in crossbred cow calves reared on pucca floor. *Indian Journal of Animal Sciences* 80:1037-1040.
2. Das, H., Lateef, A., Mehul, P. D. and Ali, M, A. (2016). Effect of age, sex, pregnancy and lactation on serum mineral profile of banni buffalo (*Bubalus bubalis*). *Life Sciences Leaflets* 77: 1-10.
3. Diaz-Sanchez, A. A., Corona-Gonzalez, B., Meli, M, L., Alvarez, D, O., Canizares, E, V., Rodriguez, O, F. and Hofmann-Lehmann, R. (2019). First molecular evidence of bovine hemoplasma species (*Mycoplasma* spp.) in water buffalo and dairy cattle herds in Cuba. *Parasites and Vectors* 12 : 78. DOI: <https://doi.org/10.1186/s13071-019-3325-y>.
4. Fekete, S, G., and Kellems (2007). A review on interrelationship of feeding with immunity and parasitic infection. *Veterinary Medicine Journal* 52 : 131.
5. Khadjeh, G, H., and Papahn, A, A. (2002). Some haematological parameters in the Iranian (Khuzestan native) buffaloes. *Indian Journal of Animal Science* 72 : 671-673.
6. Kumar, R., Sharma, I, J., Rao, M, L, V., and Quadri, M, A. (2001). Status of haemogram, plasma proteins, minerals and electrolytes during pregnancy, anorexia and sub-clinical ketosis in cows and buffaloes. *The Indian Journal of Animal Sciences* 71: 118-121.
7. Mohan, N, H., Debasish, N., Waghaye, J, Y. and Singh, H, N. (2009). Age-related haematological changes in Murrah buffalo (*Bubalus bubalis*) calves. *Indian Journal of Animal Sciences* 79 : 369-371.
8. Radostits, O, M., Gay, C, C., Blood, D, C. and Hinchcliff, K, W. (2010). *Veterinary Medicine: A Textbook of Diseases of Cattle, Sheep, Pigs, Goats and Horses*, 9th ed. WB Saunders, Harcourt Publishers Ltd., London.
9. Ramin, A, G., Razaeei, S, A., Paya, K., Eftekhari, Z., Jelodary, M., Akbari, H. and Ramin, S. (2012). Evaluation of anemia in calves upto 4 months of age in Holstein dairy herds. *Vet scan* 7: 87-92.
10. Randhawa, S, S. (1999). Role of copper and soil plant system in maintaining health and production in farm ruminants. Proceedings of National Symposium on Sustainable Development In Animal Health Care Measures – Vision for the future, Orissa Veterinary College, Bhubaneswar pp 8-18.
11. Rengifo, S, A., Silva, R, A., Botteon, R, C, C, M. and Bottron P, T, L. (2010). Hemogram and auxiliary serum biochemistry in neonatal crossbred calves and disease occurrence. *Brazilian Journal of Veterinary and Animal Sciences* 62 : 993-997.
12. Samanta, A, K., Sarkar, S., Basu, S., Biswas, U. and Biswas, S. (1995). Effect of grazing in production of nutritional anemia in cattle. *Indian Journal of Veterinary Medicine* 15: 61-63.
13. Seker, Y., Unsuren, H. (1989) Changes in total blood ketones values and serum glucose, calcium, inorganic phosphorus and magnesium level and clinical signs in high yielding dairy cows. *Doga-Turkish Journal of Veterinary and Animal Sciences* 13: 372-383.
14. Singh, J., Gupta, S, K., Singh, R. and Hussain, S, A. (2014) Etiology and haemato-biochemical alterations in cattle of Jammu suffering from anemia. *Veterinary World* 7: 49-51.
15. Somu, Y., Mani, S., Muthusamy, R., Mani, S., Thangamani, A., Konappan, J. and Palanisamy, S.

- (2017). Haemato-biochemical and electrolyte alterations in naturally occurring *Theileria* associated bovine anaemia (taba). *Journal of Animal Health and Production* 5: 64-67.
16. Thrall, M, A., Dale, C., Baker, E. and Duam, L. (2004). Veterinary Hematology and Clinical chemistry. Lippincott Williams and Wilkins, London pp195.
  17. Tvedten, H. and Weiss, D, J. (2000). Classification and laboratory evaluation of anemia schalms veterinary haematology (eds. Feldman, B. F., Zinkl, J, G. and Jain, N, C.) Fifth edition. Lippincott Williams and Wilkins, Philadelphia, pp143-150.
  18. Whitlock, R. H., Little, W. & Rowlands, G, J. (1974). The incidence of anemia in dairy cows in relation to season, milk yield and age. *Research in Veterinary Science* 16, 122-124.