Retrospective study on some diseases causing mortality in West African Dwarf (*Fouta djallon*) goats during the first year of life: an eight- year study

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Abstract

During an eight-year-study involving 242 kids born between 1993-2000, kid mortality for kids up to 1 year old was 47.52%. Irrespective of the age group, mortality was generally very high in young kids. The patterns of deaths were as follows: 29.57% before 3 months; 26.96% between 3 and 6 months; 12.17% between 6 and 9 months while 31.30% died between 9 and 12 months of age. Mortality rate for the 6-9 months period was significantly lower ($P < 0.05$) than at other periods. The causes of kids' mortality were bad mothering abilities, malnutrition and disease. Pneumonia (37.39%) and pneumoenteritis (34.78%) were the major causes of death during the first year of life. It was found out that kid with birth weight below 1.0kg and twins died before weaning. The introduction of new goat is a source of infectious disease especially PPR in the herd/flock. Also observed, as source is the introduction of new goats at age group 9-12 month. It is recommended that disease prevention, good management including the provision of adequate feeds for good growth and efficient veterinary care should be provided for goats in their first year of life.

Key words: Disease, Mortality, WAD goat, pneumoenteritis, feeds

Introduction

Goats are multipurpose animals, producing milk, meat, skin and fur. The West African Dwarf (WAD) goat is an important animal in subsistence agriculture on account of its unique ability to adapt and maintain itself in harsh environments. Dwarf goats are widespread in the humid zone of West Africa, with an advantage of being trypanotolerant (Upton, 1985). They serve mainly as supplements to cash and food crop

production, attracting a low labour input and low priority in comparison to traditional arable and cash crop farming (Oyenuga, 1967).

Kid mortality in the tropics is one of the main factors adversely affecting goat production. The losses incurred from kid mortality are high and may occasionally take off 50% of the kid crop (Gall, 1981). A number of factors have been implicated in kid deaths in various environments (Ahmed and Tantawy, 1970; Osuagwu and

Akpokodje, 1981; Akusu and Egbunike, 1990). These are related to systems of production, birth weight, milk production of the dam, predators, diseases and accidents. Many studies of the reproductive performance of WAD goat provide information on the general causes of kid losses (Mazundar *et al.*, 1980; Otesile *et al.*, 1983). This study reports the findings and the causes of kid mortality especially on the infectious diseases at different age groups.

Materials and Methods

The animals used for this study were 115 dead goat kids from a total of 242 WAD kids born at the Teaching and Research Farm, University of Ibadan, Ibadan, Nigeria during the period 1993 – 2000. Postmortem examinations were carried out on the dead goat kids to ascertain the probable causes of death. The periods of new introductions to the farm were noted.

The goats were reared semi-intensively. Between 0800 and 1500h they grazed on improved pasture consisting of elephant grass (*Pennisetum purpureum*) and giant star grass (*Cynodon plectostachum*). Cassava peels either fresh or dry were provided in the evening after grazing as a source of energy. These were supplemented with a corn-based concentrate at 1.0kg per head per day. They were returned to the paddocks after 1500h where fresh water was provided although there was water in the pens. Veterinary care was instituted when indicated and there were no routine medications. Litter type, birth weight were taken into consideration.

Management of kids from birth involved the dam nursing the kids for the first 90 days after which the kids were weaned. During this preweaning stage, the kids were allowed to stay in nursing pens for the first week. Subsequently, the dams grazed with their kids. After the weaning, the kids (weaners) were pooled to weaner's pens. In these

pens they were subjected to close monitoring, management and veterinary care. Dead kids were sent for the post mortem examination to ascertain the cause (s) of death.

Data analysis

The kids were weighed within 12 hours of birth, the litter type weight and age of the kids were recorded and any dead kids sent for post mortem examination. The cause of mortality and the number affected were recorded. Data obtained in this study were subjected to student 't' test and chi-square test for the establishment of significance (Snedecor and Cochran, 1973).

Results.

A total of 242 kids were born during the period of study with an overall mortality of 47.52% recorded for kids up to one year old. The mortality rate of 29.5% occurred during the preweaning period (0-3 months). A relatively higher mortality rate of 31.31% occurred between 9-12 months and lower mortality of 26.96% at 3-6 months. The mortality rate at 6-9 months was 12.17% and was significantly ($P < 0.05$) lower than at other periods. Kids birth weight and litter type less than 1.0kg (twin and single) were used in determining preweaning mortality.

Disease factors influencing kid mortality were pneumonia (37.39%) and pneumoenteritis (34.78%). Deaths due to these conditions were significantly ($P < 0.05$) higher than those caused by malnutrition (10.43%) and helminthiasis (9.57%). A 2.61% of all mortalities were due to enteritis while other causes of death were suppurative encephalitis (0.87%), fatty liver (1.74%), septicemia (0.87%), sodium hydroxide toxicity (0.87%) and hepatic necrosis (0.87%), which accounted for a total of 5.22% mortality. The high outbreak of mortality at 9-12 months may be connected with new introduction at this

Table 1. Disease factors influencing kid mortality in West African Dwarf goats by age

Age in Months	0-3	3-6	6-9	9-12	Total	% of all kids born	% of Total mortality
Number of kids in each group	48	82	40	72	242	-	-
Kids birth weight (Kg)	1.34±0.25	1.14±0.27	1.22±0.	1.48±0.31	1.33±0.34	-	-
Pneumonia	12(10.43)	8(6.96)	3(2.61)	20(17.39)	43(37.39)	17.77 ^a	37.39 ^a
Pneumoenteritis (PPR)	11 (9.57)	12(10.43)	6(5.22)	11(9.57)	40(34.78)	16.53 ^a	34.78 ^a
Malnutrition	6 (5.22)	4(3.48)	2(1.74)	00	12(10.57)	4.96 ^b	10.43 ^b
Helminthiasis	00	5(4.35)	2(1.74)	4(3.48)	11(9.57)	4.54 ^b	9.57 ^b
Enteritis	2(1.74)	00	1(0.09)	00	3 (2.61)	1.24 ^c	2.61 ^c
Suppurative encephalitis	1 (0.87)	1(0.87)	-	-	2(1.74)	0.83 ^c	1.74
Fatty liver	-	1(0.87)	-	1(0.87)	1(1.74)	0.83 ^c	1.74 ^c
NaoH toxicity	1(0.87)	-	-	-	1(0.87)	0.41 ^c	0.86 ^c
Acute hepatic necrosis	1(0.87)	-	-	-	1(0.87)	0.41 ^c	100.00
Total	34	31	14	36	115	47.52	100.00
Overall % mortality	29.56	26.96	12.17	31.30 ^a	100.00	NA	NA
% of all kids born	14.05	12.81	5.78	14.88	47.52	NA	NA

•Numbers in parenthesis indicate percentages.

•a, b, c: numbers differently lettered, along column differed significantly ($P<0.05$)

•NA.: Not Applicable

period, which introduce PPR when maternal immunity has waned out.

The occurrence and causes of mortality according to age groups is shown in Table 1. Pneumonia and pneumoenteritis were the major causes of death during the preweaning and the immediate post weaning periods.

Pneumoenteritis was a major cause of kid mortality at 6-9 month. Pneumonia was obviously the main cause of mortality for kids at 9-12

months and it accounted for more than 50% of the deaths during this period. Pneumoenteritis was the second important cause of death for kids 9-12 months old.

Discussion

This study shows an over-all kid mortality rate of 47.52% for kids up to one—year-old. A similar mortality rate of 46.67% was reported by Misra (1985) in Assam local goat kid study in India.

Ranatunga (1971) reported a rate of 18.7% and 16.6% in Barbari and Jamnapari breeds, respectively. The observed mortality rate in this study was higher than 35.36% reported by Koul and Biswas (1983) in Chequ goats in India. On the other hand, Minett (1950) reported higher mortality rates of 55% in different breeds of goat kids in government farms in India. Garcia *et al.* (1976) reported mortality rate of between 55.5% and 65.6% in four breeds of goats; Anglo-Nubian, Alpine, Toggenburg and Saanen. A very high mortality rate of 77.3% was reported by Singh and Sengal (1990) in Jamnapari goats in India. Prewaning mortality rate for this study was 14.05% which represented 29.57% of the total mortalities. This was lower than the rate of 24.56% reported by Akusu and Egbunike in (1990) in this breed. Singh and Sengal (1990) reported 26.56% mortalities for the preweaning period in Beetal goats. The death rate in this study is lower than the 63.33% preweaning mortality recorded in Black Bengal goat by Khan and Singh (1989), but higher than 40.6% reported by Berhannu *et al.* (1994) in East African goats. This may be due to different management, seasons and feeding. A general feature of these reports is that pre-weaning kid mortality is high and constitutes a limitation to goat production.

The immediate post weaning mortality rate was relatively lower (12.81%) on a flock basis and represented (26.96%) of total deaths. This finding is similar to report of Singh and Sengal, (1990) in Beetal, Black Begal and Jamnapari breeds of goat in India. It also lends support to the report of Koul and Biswas (1983) for the Chequ breed of goats. The reduction in mortality rate observed at this age group is however expected as some of the factors such as low birth weight and litter type which influenced preweaning mortality (Akusu and Egbunike, 1990; Berhannu *et al.*, 1994) may not influence kids at this age (3 – 6 months). Considering the

age group of 6-9 months old, a further decrease in mortality was observed compared to the two previous periods. This 12.57% mortality rate observed is lower than the 16.13% reported by Rajan *et al.*, (1966) in Malabari goats in Keala India; 15.2% and 23.86% reported by Singh and Sengal (1990) in Black Bengal and Barbari breeds of goats respectively. The reduced mortality rate could be due to the stage of stability which the goats attained at this age and the complete absence of weaning stress which kids at 3-6 months are exposed.

There was an increase in mortality rate during the 9-12 months age period. This appeared unexpected considering that most of the factors influencing mortality in the proceeding three period could have been outgrown at this period. There were reports of new introduction of goats purchased from local goat markets into the herd during the study. This may explain the reason for the high mortality at this age group since this could lead to outbreaks of peste des petit ruminants (PPR) due to the new introductions incubating the disease (Ikede, 1977). Usually, animals at this age group are susceptible to PPR infection because they were yet to be vaccinated. Hence annual vaccination against PPR is recommended and should be practiced in goat herds as this gives protection and reduce mortality rate (Adeoye, 1985). During the vaccination programme, all kids above 3 months of age should be vaccinated. This will result in a rapid increase in village flock numbers (ILCA, 1988).

Pneumonia and pneumoenteritis were the main causes of mortalities in goats of all age groups studied. This is consistent with the reports of Berhannu *et al.* (1994) in East African goats and Mittal (1976) in India goats. The results are not also surprising since PPR has been reported in several ecological zones in Nigéria (Durojaiye,

1983; Obi, 1983; Wosu *et al.*, 1992) Malnutrition, during the preweaning period, was often an important cause of kid mortality. This could have been the result of poor milk production. It is therefore suggested that the nutrition of pregnant does should be supplemented with concentrate feed in order to increase milk production which kids depend on during the preweaning period. Helminthiasis was similarly observed to be an important cause of death especially between 3-6 months of age. Worm infection can be controlled through the use of anthelmintics.

Conclusion

In conclusion, mortality in goats during the first year of life should be considered a major constraint from the disease point of view to goat production in Nigeria as has been observed in other parts of the world. The incidence can be reduced through quarantine measure, disease control, good management with adequate veterinary care in order to improve goat productivity.

References

- Adeoye, S.A.O; 1985** Reproductive performance of West African Dwarf goats in South Western Nigeria. In Wilson R.T and Bourzat D. (eds), Small Ruminants in African Agriculture, proceedings of conference held at ILCA, Ethiopia, September 30 to Oct. 4 pp 19-24.
- Ahmed, F.A and Tantaway, A, O. 1970.** Studies on Egyptian Baladi goats 11: Some factors affecting mortality rate. *Empire Journal of Experimental Agriculture* 28: 104-108
- Akusu, M.O. and Egbunike, G.N. 1990.** Preweaning performance of kids of the WAD goat in their native environment. *Bulletin of Animal Health and Production in Africa* 39:339-403
- Berhanu, B.M., Ntenga, L.A and Kifaro, G.O. 1994.** Studies on some factors affecting reproductive performance and mortality rate of small East African Goats and their crosses. *Small Ruminant Research Network, ILCA*. No. 28 pp 8 – 14.
- Durojaiye, O.A. 1983.** Brief notes on history epizootiology and the economic importance of PPR in Nigeria. In: Hill D.H. (Ed). *Pestes des petit ruminants (PPR) in sheep and goats. Proceedings of the International Workshop held at IITA, Ibadan, Nigeria, 24-26 September ILCA Addis Ababa, Ethiopia* pp. 24-27.
- Gall, C. 1981.** Goat production, C.Gall, Editor, Academic Press Inc., London
- Garcia, O., Castillo, J., Verde, S. and Osal, N. 1976.** kid mortality in four imported goat breeds in Venezuela. *Memoria Association Latino Americana de production Anima* 11, 27
- Ikede, B.O 1977.** The pattern of respiratory lesions in Goat. *Bulletin of Animal Health and production in Africa* 25 (2) : 49-59.
- ILCA 1988.** International Livestock Centre for Africa. Small Ruminant Network. Pp 29-57
- Khan, A.A and Singh, D.K. 1989.** All-India co-ordinated Research project on goats for meat production. Annual progress report. Birsa Agric. University Ranchi (Bihar) .
- Koul, G.N and Biswas, J.C. 1983.** All India Co-ordinated Research project on goats for pashmina production. Annual Progress Report India Vet. Res. Institute Mukteshwar-Kumaon (Nainital).

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- Mazumdar, N.H; Mazumdar, A and Goswani, K.K. 1980.** Studies on some factors affecting mortality and survival rates in Paslimina kids. *Indian Journal Animal Science* 50:251-255.
- Minett, F.C. 1950.** Mortality in sheep and goat in India. *Indian Journal of Veterinary Science* 20:69-103
- Misra, R.K. 1985.** All India coordinated Research project on goats, Central Institute for Research on Goat, Makhdoom Farah Uttar Pradesh Technical Report
- Mittal, J.P. 1976.** A study on mortality in kids. *India Veterinary Journal* 53 (9) 681-684.
- Obi, T.U., Taylor, W. P., Ojo, M.O. 1983.** Studies on the epidemiology of peste des petitis ruminants in southern Nigeria. *Tropical Veterinarian*, 1: 209 – 217.
- Osugwuh, A.I.A and Akpokidje, J.U. 1981.** West African Dwarf (WAD) (Fouta Djallon) Goats 1: Causes of Early mortality. *International Goat and sheep Research* 1 (4) 303-309.
- Otesile, E.B., Kasalli, O.B and Nzekwu, C.K.N. 1993.** Mortality in Goats in the University of Ibadan farm. *Bulletin of Animal Health and Production in Africa* 31: 281 – 285.
- Oyenuga, V.A 1967.** Agriculture in Nigeria, FAO United Nations Rome PP 259.
- Rajan, A., Maryamma, K. and Nair, M.K. 1966.** Mortality in goats: A study based on postmortem observations. *Indian Journal Veterinary Science*, 7:79-83.
- Ranatunga, P. 1971.** kid mortality on two major government farm in Ceylon *Tropical Animal Health and Production*. 3:52-61.
- Singh, S.N. and Sengal, O.P.S. 1990.** Studies on combining ability of desirable character of important breeds of goat. Final Technical Reports. R.B.C College Bichpuri, Agra Uttar Pradesh.
- Snedecor, G.W and Cochran, W.C. 1973.** Statistical Methods, 6th Edition, Iowa State University Press Amee.
- Upton, M. (1985).** Returns from Small Ruminants Production in South West Nigeria. *Agricultural Systems* 17 (2) 65-84
- Wosu, L.O. Okiri, J.E. and Enwezor, P.A. (1992).** Optimal time for vaccination against peste de petitis Ruminants (PPR) disease in goats in the humid tropical zone in Southern Nigeria. Proceedings of the first Biennial Conference of the African Small Ruminants Research Network: ILCA Nairobi Kenya .

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