Incidence of reproductive disorders and mastitis among small ruminants of Nigeria

[1]Yerima, J., Shitu, H., Idi, Y., [2]Abdussamad, A.M. and [3]Kalla, D. J. U.

[1]*Department of Animal Science, Faculty of Agriculture University of Maiduguri, PMB 1069 Maiduguri Borno State, Nigeria*
[2]*Department of Animal Science Bayero University, Kano*
[3]*Department of Animal Production, Abubakar Tafawa Balewa University, Bauchi P.M.B. 0248 Bauchi State Nigeria*

Corresponding Author: jibuni80@yahoo.com

Target Audience: Small Ruminant Producers, Animal Nutritionist, Reproductive Physiologist

Abstract

The study was carried out to determine the prevalence of reproductive disorders in ruminants that were presented to the Area Veterinary office Bauchi, Nigeria from May 2016 to March 2017. In one hundred and eight (108) cases presented, thorough physical examinations were carried out and the clinical signs of each disorder were used to identify it. The identified disorders include: mastitis, dystocia, uterine prolapse, agalactia and vaginal prolapse. The result of the study revealed that reproductive disorders were significantly (p<0.001) influenced by species and breeds. Highest incidence of reproductive disorders were recorded in sheep (51.90%) and the least in goat (48.10). Red Sokoto breed of goat had the highest (39.4%) disorder while Sudanese breed of sheep had the least (0.9%). Prolificacy and Body condition score were significantly (p<0.001) influenced by reproductive disorder. The overall incidence was higher (52.8%) in single and the least (2.8%) in quadruplets. The overall incidence was higher (67.9%) in obese animals and the least (23.7%) in moderate body animals. Sheep recorded the highest number of reproductive disorder compared to goat

Keywords: Reproductive disorder, Clinical signs, Breeds, Prolificacy, Body condition score

Description of Problem

The problems of small ruminant production in sub Saharan Africa include malnutrition, reproductive disorders and diseases and harsh climatic conditions (1). Reproduction disorders (dystocia, abortion, pyometra and vaginal prolapse) cause significant losses in small ruminants (2). Improvement in the reproductive efficiency of these animals would lead to improved animal production (3). According to (4, 5) some diseases besides their public health significance, were responsible for 30-40% economic losses through the death of sheep and goats in Nigeria. To counteract these losses, major disorders that affect the reproductive system of small ruminants need to be controlled.

According to (6) dystocia is one among the reproductive problems which cause death in both kids and dams. It leads to maternal trauma, flaring up of infections due to complications, may end up in decreased fertility predisposing the farmers to huge economic losses. Uterine prolapse has been recorded in all animal species. It is most common in cow and ewe, less common in doe and rare in mare (7) and is an emergency condition which needs prompt and immediate attention (8). Contagious agalactia affects all types of stock breeding, both traditional and intensive, throughout the world and its preferential mammary involvement presents a major health obstacle in the development of sheep and goat production. Mastitis is a disease of major

economic importance to the dairy industry worldwide. It is of particular concern in developing countries where milk and milk products are scarce (9). The objective of the study was to estimate the incidence of various reproductive disorders and mastitis in small ruminants.

Materials and Methods
Study area

The study was carried out at the area veterinary clinic Bauchi. The State spans two distinctive vegetation zones, namely the Sudan and Sahel Savannah. Bauchi State lies between longitude 9.0^0 and 12.3^0 north of the equator and latitude 8.5^0 and 11^0 east of the Greenwich meridian (10).

Case detail and identification of reproductive disorder and mastitis

Information on species, breed, age, body condition score, parity and prolificacy were recorded for each animal presented to the veterinary office from March to August 2017. A thorough physical examination was carried out and the clinical signs of each disorder were used to identify the particular reproductive disorder. Age of animal was determined by dentition as carried out by (11). One hundred and eight (108) cases were presented which comprised; caprine (52) and ovine (56).

Data analysis

Data obtained were subjected to ANOVA and the results were analyzed by Chi-square test for statistical significance using package for social science (SPSS version 21)

Results and Discussion
Incidence of reproductive disorder in species

Reproductive disorders in relation to the species of small ruminant were presented in Table 1. Significant differences (p<0.001) were observed between the reproductive disorders and species. The identified disorders include: mastitis, dystocia, uterine prolapse, agalactia and vaginal prolapse. Higher incidence of reproductive disorder was recorded in sheep (51.90%) and the least in goat (48.10). Higher incidence of mastitis was recorded in goat (90.6%) and least in sheep (9.4%), respectively. The result recorded in present study was higher than reported by (12) for goat. Incidence of dystocia was higher in sheep (65.8%) and least in goat (34.2%) which is contrary to that reported (49.5%) in goat by (12). Similar trend was observed in the case of agalactia where sheep recorded the highest (83.3%) followed by goat (16.7%). Vaginal prolapse was observed in 50% cases each in sheep and goat.

Plate 1 Sahelian doe

Plate 2 Sahelian doe
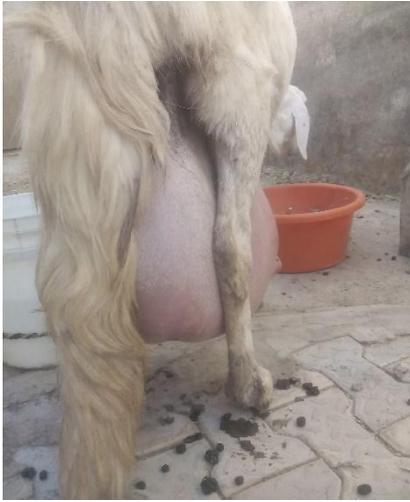
Plate 3 Sudanese fat tail ewe
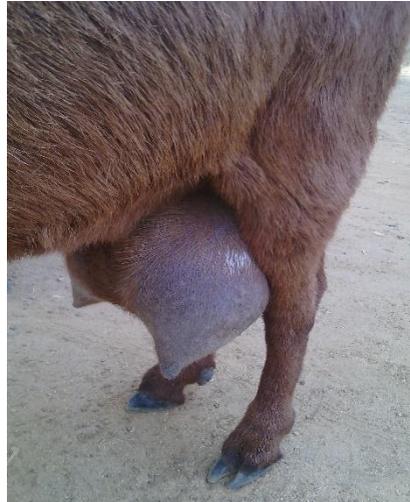
plate 4 Red Sokoto doe

Plates 5. Uterine prolapse in goat

Plate 6. Dystocia in sheep

Table 1: Incidence of reproductive disorder and mastitis in species of small ruminants

Reproductive disorders	Species	
	Caprine	Ovine
Mastitis	29(90.60)	3(9.40)
Dystocia	13(34.20)	25(65.8)
Uterine prolapse	5(41.70)	7(58.30)
Agalactia	4(16.70)	20(83.30)
Vaginal prolapse	1(50.00)	1(50.00)
Total	52(48.10)	56(51.90)
χ^2 = 35.185*** df=4		

***p<0.001

Incidence of reproductive disorder and mastitis in breeds

Significant differences (p<0.001) between reproductive disorders and breeds were presented in Table 2. Higher incidence of mastitis (65.6%) was recorded in Red Sokoto doe and the least (3.1%) in Sudanese fat tail ewe. In abattoir survey of small ruminant diseases in Bauchi, Nigeria (5) reported a significant disease condition (mastitis) in both sheep and goat. In current study, Yankasa ewe recorded dystocia (51.3%) which was lower than (79.1%) earlier reports of (3). The current is in contrast to the findings of (3) who recorded higher prevalence (89.3%) of dystocia in Red Sokoto doe. Red Sokoto recorded the highest incidence of uterine prolapse (41.7%) and the least in Balami ewe. According to (3), Yankasa ewe and Red Sokoto doe recorded 100% prevalence rate of uterine prolapse which is contrary to the lower prevalence rate of 8.1 and 41.7% observed in Yankasa ewe and Red Sokoto doe respectively. It has also been reported that most animals with uterine prolapse are hypocalcaemic (13). Higher incidence of agalactia (70.8%) was recorded in Yankasa while the least were recorded in Balami, Sahelian goat and Sudanese fat tail with (0.0%) each. Vaginal prolapse was higher in Red Sokoto doe and Uda ewe with 50% each which is in consistent with the work of (3) which reported higher prevalence of 100% in both Red Sokoto doe and Uda ewe.

Table 2: Incidence of reproductive disorder and mastitis in breeds

Reproductive disorders	Breeds					
	Red sokoto doe	Uda ewe	Yankasa ewe	Balami ewe	Sahelian doe	Sudanese fat tail ewe
Mastitis	21(65.6)	0(0.0)	0(0.0)	2(6.30)	8(25.0)	1(3.1)
Dystocia	12(30.8)	2(5.1)	20(51.3)	2(5.1)	2(5.1)	0(0.0)
Uterine prolapse	5(41.7)	4(33.3)	1(8.3)	2(16.7)	0(0.0)	0(0.0)
Agalactia	4(16.7)	3(12.5)	17(70.8)	0(0.0)	0(0.0)	0(0.0)
Vaginal prolapse	1(50.0)	1(50.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
Total	43(39.8)	10(9.3)	38(35.2)	6(5.6)	10(9.3)	1(0.9)
χ^2 =69.92*** df=20						

***p<0.001

Incidence of reproductive disorder and mastitis on age and parity

Age and parity were not significantly (p>0.05) influenced by the incidence of reproductive disorder as presented in Table 3 and 4. The overall prevalence of reproductive disorders was higher (52.3%) in age group 1-2 years in this study which is consistent with the work reported by (3) with 54.9% in age group 1-2 years. Above 2 years, the incidence rate 30.3% falls within the range 0.5 to 40.6% similar to earlier reports by (3). The overall incidence ranged from 0.9 to 27.8%, from 1st to 11th parity. The incidence of mastitis, dystocia, uterine prolapse and agalactia ranged from 3.1 to 28.1%, 0.0 to 36.8%, 0.0 to 33.3% and 0.0 to 33.3%, respectively.

Table 3: Incidence of reproductive disorder and mastitis on age

Reproductive disorders	Age		
	<1 yr	1-2 yrs	> 2 yrs
Mastitis	3(9.4)	17(53.1)	12(37.5)
Dystocia	6(15.8)	19(50.0)	13(34.2)
Uterine prolapse	3(25.0)	6(50.0)	3(25.0)
Agalactia	6(25.0)	14(58.3)	4(16.7)
Vaginal prolapse	1(50.0)	1(50)	0(0.0)
Total	19(17.6)	57(52.8)	32(29.6)

χ^2 = 6.811 NS df=8

NS= not significant

Table 4: Incidence of reproductive disorder and mastitis on parity

Reproductive disorders	parity								
	1st	2nd	3rd	4th	5th	6th	7th	8th	11th
Mastitis	3(9.4)	7(21.9)	9(28.1)	5(15.6)	2(6.3)	1(3.1)	2(6.3)	2(6.3)	1(3.1)
Dystocia	14(36.8)	5(13.2)	7(18.4)	6(15.8)	2(5.3)	2(5.3)	1(2.6)	1(2.6)	0(0.0)
Uterine prolapse	3(25.0)	4(33.3)	1(8.3)	2(16.7)	0(0.0)	1(8.3)	1(8.3)	0(0.0)	0(0.0)
Agalactia	8(33.3)	7(29.2)	5(20.8)	1(4.2)	1(4.2)	1(4.2)	0(0.0)	1(4.2)	0(0.0)
Vaginal prolapse	2(100.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
Total	30(27.8)	23(21.3)	22(20.4)	14(13.0)	5(4.6)	5(4.6)	4(3.7)	4(3.7)	1(0.9)

χ^2 = 24.159 NS df =32

NS= not significant

Prevalence of reproductive disorder on prolificacy

Prolificacy was significantly (p<0.001) influenced by reproductive disorder as showed in Table 5. The overall incidence was higher (52.8%) in single and least (2.8%) in quadruplets. Higher incidence of mastitis was recorded in twins and least in quadruplets with 46.9% and 9.4%, respectively. Dystocia incidence was highest in singlets (65.8%) and least in quadruplets (0.0%). Uterine prolapse and agalactia were higher in twins and single and least in Triplets and quadruplets with (66.7% and 79.2%) and (0.0%) each respectively. Vaginal prolapse was 50% each in single and twins while 0.0% in Triplets and quadruplets.

Table 5: Incidence of reproductive disorder on prolificacy

Reproductive disorders	Prolificacy			
	Single	**Twins**	**Triplets**	**Quadruplets**
Mastitis	8(25.0)	15(46.9)	6(18.8)	3(9.4)
Dystocia	25(65.8)	9(23.7)	4(10.5)	0(0.0)
Uterine prolapse	4(33.3)	8(66.7)	0(0.0)	0(0.0)
Agalactia	19(79.2)	5(20.8)	0(0.0)	0(0.0)
Vaginal prolapse	1(50.0)	1(50.0)	0(0.0)	0(0.0)
Total	57(52.8)	38(35.2)	10(9.3)	3(2.8)
χ^2 = 31.330*** df=12				

***$P < 0.001$

Prevalence of reproductive disorder on body condition score

Reproductive disorder was significantly ($p < 0.001$) influenced by body condition score as shown in Table 7. The overall incidence was higher (67.9%) in obese animals and the least (23.7%) in moderate body animals. Incidence of mastitis was higher (84.4%) in obese animals and least (3.1%) in moderate body animals. Incidence of dystocia and uterine prolapse were higher in obese animals and least in moderate body animals with (71.1 and 66.7%) and (0.0 and 8.3%), respectively. Higher incidence of agalactia (54.2%) was recorded in emaciated animals and the lowest (4.2%) in moderate body animals. Vaginal prolapse was 50% each in moderate and obese animals while 0.0% in emaciated animals.

Table 7: Prevalence of reproductive disorder on body condition score

Reproductive disorders	Body condition score		
	Emaciated/thin	**Moderate**	**obese**
Mastitis	4(12.5)	1(3.1)	27(84.4)
Dystocia	11(28.9)	0(0.0)	27(71.1)
Uterine prolapse	3(25.0)	1(8.3)	8(66.7)
Agalactia	13(54.2)	1(4.2)	10(41.7)
Vaginal prolapse	0(0.0)	1(50.0)	1(50.0)
Total	31(28.7)	4(3.7)	73(67.6)
χ^2 = 26.843*** df=8			

***$P < 0.001$

Conclusion and Applications

1. Sheep recorded the highest number of reproductive disorder with higher percentage in single birth (52.8%) as compared to goat. Red Sokoto had the highest incidence of mastitis (65.6%) and vaginal prolapse (50%). Yankasa sheep recorded the highest incidence of dystocia (51.6%) and agalactia (70%), respectively.
2. Disorders such as dystocia, uterine prolapse and mastitis are much common to obese animals.
3. Proper feeding management can be used to reduce the risk of overweight in small ruminants
4. Early identification and proper intervention improves can reduce the case of uterine prolapse and dystocia

References

1. Fakae, B. B., Musongong, G. A.,

Chiejina, S. N., Behnke, J. M., Ngongeh, L.A and Wakelin, D. (2004). Variability in the resistance of the Nigerian West African Dwarf goat to abbreviated escalating trickle and challenge infections with *Haemonchus contortus*. *Veterinary Parasitology*, 122(**1**):51-65.

2. Arthur, G. H., Noaks, D. E., Pearson, H. and Parkinson, T. J. (1998). Veterinary Reproduction and Obstetrics. (7th Edition), Saunders Company Ltd., Philadelphia, PA,WB.

3. Neils, J. S.*,* Abdu, P. A and Sackey, A. K. B (2009). Some Reproductive Disorders of the Indigenous Sheep and Goats in Zaria, Northern Nigeria. *Nigerian Veterinary Journal,* 30 (1):46-50.

4. Lamorde A., (1985). Relevance of veterinary medicine in production of human vaccine. *Nigeria Livestock Farm,* 4: 153-157.

5. Kudi A. C., Kalla D. J. U., Alkali Y., Ladan S. M., Kudi M. C., Mai H. (1997) Abattoir survey of small ruminant diseases in Bauchi, Nigeria. *Revue Élev. Méd. vét. Pays trop.*, 50 (4): 281-284.

6. Aziz, D. M. and Taha, M. B. (1996). Dystocia in Awassi ewes: causes and treatments a review. *Iraqi Journal of Veterinary Science*, 9 (1): 1-12.

7. Roberts, S.J., 1986. Injuries and Diseases of the Puerperal Period", in S J Roberts (Ed.), *Veterinary Obstetrics and Genital Diseases*, 3rd Edition, (Vermont, Woodstock, 1986) 353-397.

8. Noakes, D. E., Parkinson, T. J., England, G. C. W. (2009). Noakes's' veterinary reproduction and obstetrics. London, Saunders.

9. Abebe, R., Hatiya, H., Abera, M., Megersa, B., & Asmare, K. (2016). Bovine mastitis: prevalence, risk factors and isolation of *Staphylococcus aureus* in dairy herds at Hawassa milk shed, South Ethiopia. *BMC Veterinary Research*, 12: 270.

10. BASGD (2006). Bauchi State Government Diary Published by (BREPOL)

11. Butswart, 1.S R. and Zaharadeen, D.T. (1998). Comparison of some reproductive parameters in Red Sokoto and Kano brown breeds of bucks. *Nigerian Journal of Animal Production* 25 (1)1-5.

12. Wosu, L. O. and Anene, B. M. (1990). Incidence and seasonality of reproductive disease conditions in small ruminants in Nsukka area, Nigeria. *Beitr Trop Landwirtsch Veterinarmed*, 28 (2):185-9.

13. Fubini, S. L. and G. N. Ducharme, 2006. Surgical Conditions of the Post-Partum Period in Text Book of Farm Animal Surgery, 333-338.