

**Study of sheep mortality, under traditional management,
in North Kordofan State, Sudan**

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Abstract: The study was conducted in North Kordofan state (Sudan) during Jan. to December 2014, with the aim of evaluating causes of Desert sheep mortality, under traditional management. The causes were investigated in total population of 67314 heads of sheep distributed in four localities. Each locality is under the supervision of a veterinary officer in addition to some assistants. Mobile clinics were used to cover the flocks and dead animals were usually examined within 24 hours post mortem for diagnosing and determine causes of deaths which then recorded throughout the year. Descriptive statistical measures were used in analyzing the collected data. The overall mortality rate was 15.31% per year. Thirteen causes of mortality have been reported while few causes (0.24%) were unidentified. The diseases differed in their prevalence and rate of deaths in the study area with enterotoxaemia (4.01%), malnutrition and general weakness (3.30%), enteritis (2.39%), blood parasites (2.13%) and pneumonia (1.30%) constituted the major disease entities encountered in these animals and caused most of these losses. There was no a big difference in overall mortality rate between the localities except Elkhawi where high mortality rate (21.14%) was recorded. From the present study, it can be deduced that major economical losses of sheep in the state are associated with the occurrence of diseases and malnutrition. Hence, attention should be directed towards the application of combined management, nutrition and prophylactic programmes based on findings of the present

and other studies. Also the study revealed some aspects that require further research in areas of diagnosis and control strategies that appeal to the local circumstances.

Keywords: Desert sheep, mortality, enterotoxaemia, malnutrition.

Introduction

Sudanese Desert sheep form more than 65% of sheep in the country and are distributed north of Latitude 10° N, extending eastward into Eritrea and westward into Chad (Sulieman *et al.* 1990). Sheep husbandry in North Kordofan is determined by natural conditions. Most sheep in the state are raised under nomadic conditions with traditional systems of management depending mainly on natural pasture in addition to crop residues sometimes. North Kordofan State is famous of Desert sheep which is considered as the best type in the country and estimated at 19754 thousand heads (A. A. H. of North Kordofan, 2010). Most sheep in the state are owned by nomadic tribes and usually move together with cattle and camels in search of grazing and water and hence most times are faced by environmental problems especially diseases and short of nutrients. Knowledge of when and how sheep mortality occurs may be helpful to keep mortality as low as possible. Also determination of the principal causes of sheep mortality may help in developing management strategies that may lead to reduction of losses in the state. This work was conducted to evaluate sheep mortality and causes of deaths in the state.

Materials and Methods

Study area: The study was carried out in North Kordofan State (longitudes 26° 56' – 32° 19' E and latitudes 12° 13' – 16° 34' N) during Jan. to December 2014, with the aim of evaluating the causes of Desert sheep mortality, under traditional management. The state lies within Savannah belt with maximum temperature (40°C) recorded in summer and minimum temperature (10°C) recorded during winter. Annual rainfall

ranged from 100-450 mm, with soil varies from sandy to sandy loam (El-Obeid Meteorological Station, 2013).

Data collection: The causes of sheep mortality in North Kordofan were investigated in four localities (Shiekan, Umsomaima, Elkhawi and Umrwaba). The total population of animals studied was 67314 heads distributed in the four localities (Figure 1). Each locality is under the supervision of a veterinary officer in addition to some assistants. Mobile clinics were used to cover the flocks and dead animals were usually examined within 24 hours post mortem for diagnosing and determining causes of deaths which then recorded throughout the year.

Statistical analysis: Descriptive statistical measures were used in analyzing the collected data from the field survey covering the four localities.

Results and Discussion

Figure (1) represents sheep population in the four localities of North Kordofan state, and it seems that there was no a big relationship between flock size and the rate of mortality. Data on sheep mortality in the state is presented in table 1. The overall mortality rate was 15.31% per year. Thirteen causes of mortality have been reported while few causes (0.24%) were unidentified. The diseases differed in their prevalence and rate of deaths in the study area (Figures 2, 3, 4). The study revealed that enterotoxaemia (4.01%), malnutrition and general weakness (3.30%), enteritis (2.39%), blood parasites (2.13%) and pneumonia (1.30%) constituted the major disease entities encountered in these animals and caused most of these losses. Dahab *et al.* (2014) reported that malnutrition and pneumonia were the main reasons of death in North Kordofan while pneumonia and foreign bodies were the main reasons in North Darfur Wilson *et al.* (1993) reported mortality rate of more than 30 percent of lambs, and that of adults is 10 – 12 percent per year. In the present study, the higher mortality rate due to enterotoxaemia was expected since ewes are not

vaccinated against the disease. Al-Ani (1989) reported that in explosive outbreaks of enterotoxaemia losses may range from 10 – 40%. He also mentioned that in unvaccinated lambs the average death loss is 1–3%. Malnutrition and general weakness are considered as important factors of sheep mortality, and most deaths occur during early rainy season when prolific old and weak ewes are suspected to heavy rain in open areas. It was reported that more than 30% of animal losses in North Kordofan state was due to malnutrition during dry seasons (Animal Resources Administration- El-Obeid, 2013). Also El-Hag *et al.* (2001) found that mortality rate was significantly ($P<0.05$) higher (30.2%) in the nomadic flock compared with the sedentary with the highest ewe mortality in rainy season. It can be said that, in the present situation of the state, losses due to malnutrition will continue to pose problems for sheep husbandry unless suitable strategies are taken. The losses could be greatly reduced by slight modification of sheep management like sorting of pregnant ewes, by palpation, to have special care. Also introduction of shelter and supplementation to weak animals during such conditions may have positive results.. Coccidiosis, internal parasites and bacterial infections were the important causes of enteritis. Economical losses due to coccidial infections may be due to many factors among which are deaths of animals. Abaker *et al.* (2001) reported that infection of lambs with coccidia caused diarrhoea, reduction in live weight and death. Likewise, lambs infected with *H. contortus* showed the same symptoms.

Most blood parasites like theileriosis are transmitted primarily by ticks. In the study area, the pasture is contaminated by many types of ticks due to the presence of cattle and camels. Hence periodic dipping or spraying of animals may reduce or eliminate the problem. On the other hand, it would seem to argue for an important role for cattle and camel in the epidemiology of ovine theileriosis. El Ghali and El Hussein (1995) reported that malignant theileriosis, caused by *Theileria hirci* infection is a major disease of sheep in Edamer province - Sudan. The disease is reported

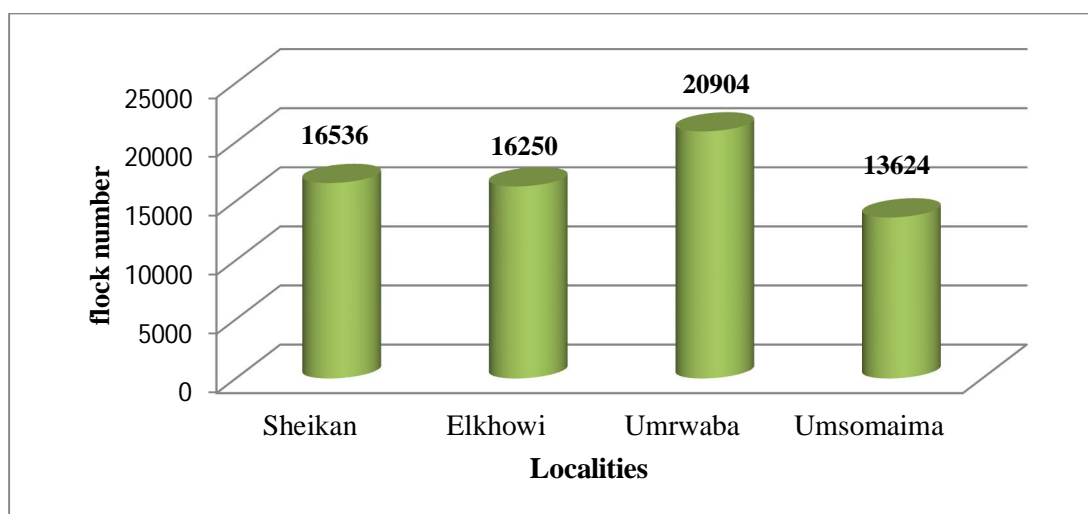
throughout the year, but is most prevalent during the hot season (El Hussein *et al.*, 1998). In the present study, deaths due to pneumonia were reported mainly during winter. Zaki *et al.* (2000) reported that sheep pneumonia constitutes one of the most prevalent clinical conditions in this species and accounts for considerable losses as killing disease. Also Wilson *et al.* (1993) reported that the major pathological causes of sheep death and debility include diseases of pulmonary complex, helminthiasis and sheep pox.

There was no a big difference in overall mortality rate between the localities (table 1) except Elkhawi where high mortality rate (21.14%) was recorded (Figure 5). This may gain support from the fact of the indiscriminate purchase and introduction of sheep from other states to Elkhawi where initial quarantine measures were taken for export. Such situation may play a major role in the dissemination of diseases to the animals of the locality, in addition to the compition on local feed resources. Mohamed Ali and Makin (2012) reported that new diseases appeared in Elkhawi due to introduction of sheep from western states of Sudan.

From the present study, it can be deduced that major economical losses are associated with the occurrence of diseases and malnutrition so attention should be directed towards the application of combined management, nutrition and prophylactic programmes based on findings of the present and other studies. Also the study revealed some aspects that require further research in areas of diagnosis and control strategies that appeal to the local circumstances.

Table 1. Sheep mortality in North Kordofan State (4 localities) - Sudan

The disease	Sheika n	%	Elkho wi	%	Umrw aba	%	Umso maima	%	Total	%
Enterotoxaemia	373	2.25	1017	6.26	-	-	1310	9.6	2700	4.01
Pneumonia	233	1.4	229	1.4	300	1.43	116	0.85	878	1.30
Enteritis	367	2.2	350	2.15	495	2.36	103	0.75	1608	2.39
Sheep pox	193	1.16	-		-	-	100	0.73	293	0.44
Malnutrition and general weakness	409	2.47	777	4.78	945	4.52	90	0.66	2221	3.30
Dystocia	95	0.6	207	1.24	45	0.21	70	0.51	417	0.62
Snake venom	-	-	65	0.4	-	-	49	0.35	114	0.17
Mastitis	135	0.8	215	1.32	90	0.43	33	0.24	473	0.70
Pregnancy toxemia	-	-	-	-	-	-	31	0.22	31	0.05
Foreign bodies	-	-	13	0.08	-	-	30	0.22	43	0.06
Bloat	68	0.41	-	-	-	-	27	0.19	95	0.14
Blood parasites	289	1.7	270	1.66	875	4.1	-	-	1434	2.13
Unknown causes	162	0.97								0.24
Toxic plants	-	-	293	1.8						0.44
Total deaths	2162	13.08	3436	21.14	2750	13.16	1959	14.4	10307	15.31
Total flock	16536		16250		20904		13624		67314	

**Figure (1): Sheep population in North Kordofan State (4 localities) - Sudan**

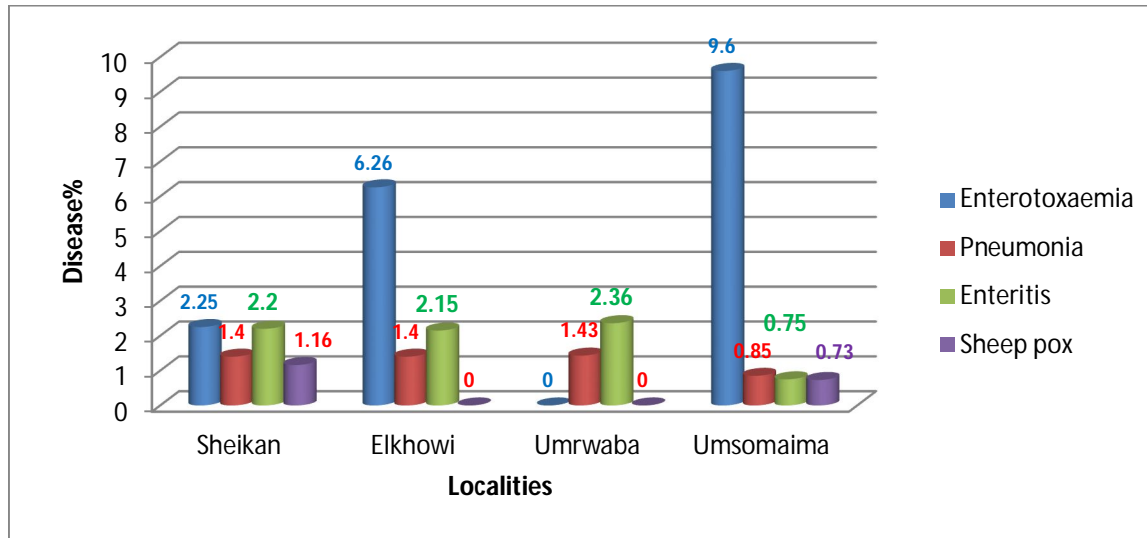


Figure (2): The prevalence of diseases in North Kordofan state (4 localities) - Sudan

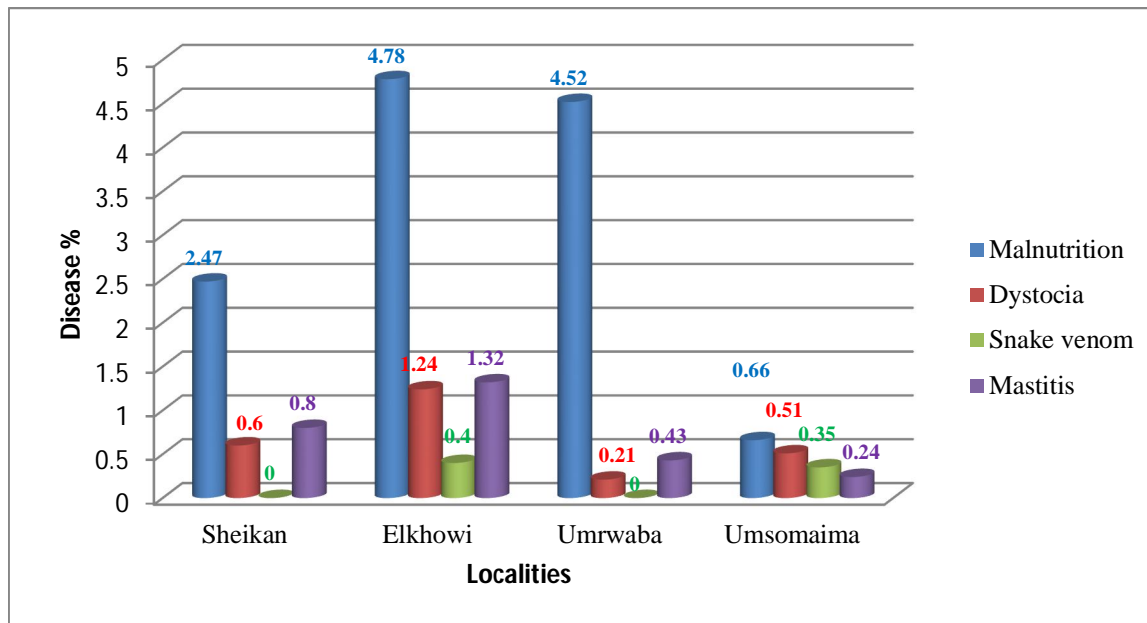


Figure (3): The prevalence of diseases in North Kordofan state (4 localities) - Sudan

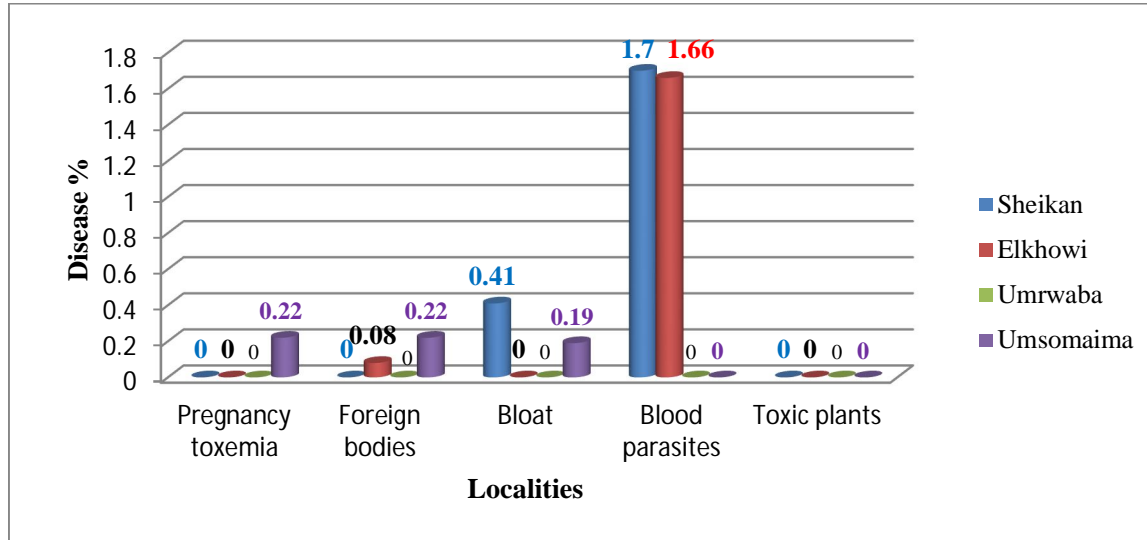


Figure (4): The prevalence of diseases in North Kordofan state (4 localities) – Sudan

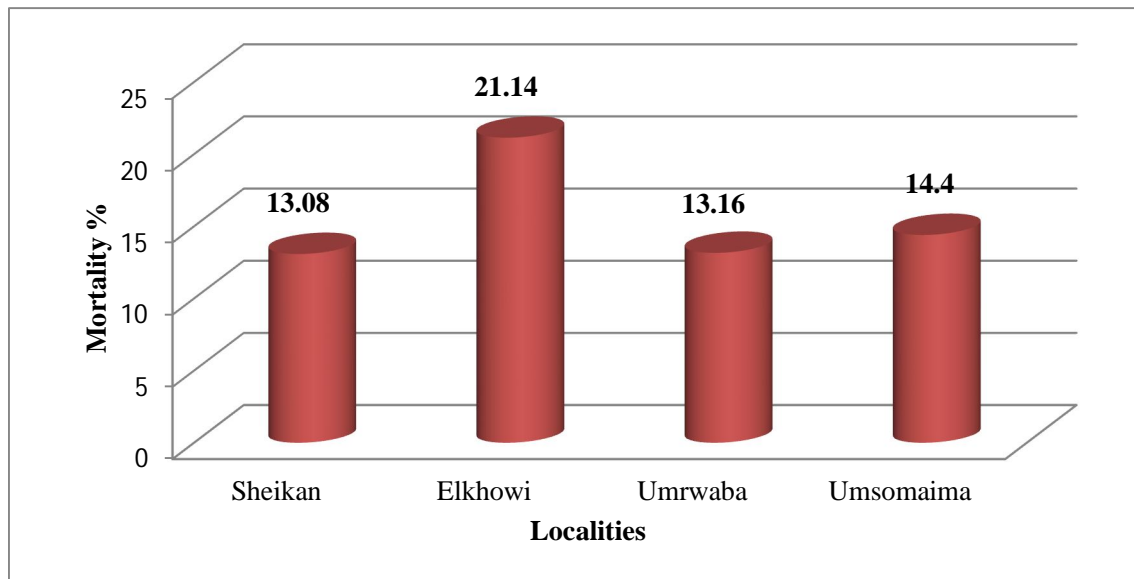


Figure (5): The rate of sheep mortality in North Kordofan state (4 localities) - Sudan

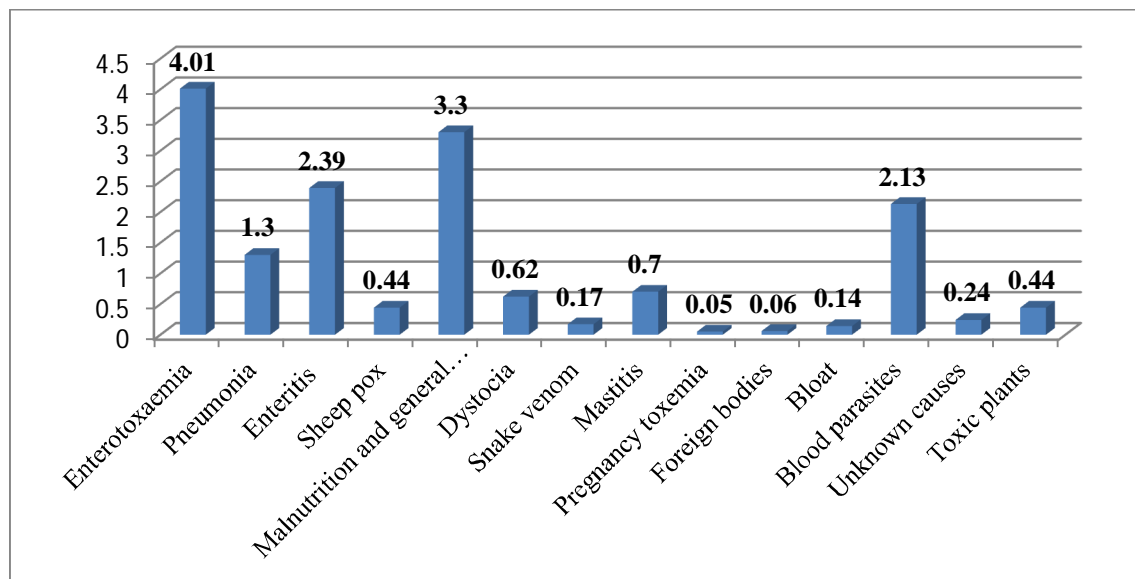


Figure (6): Prevalence of diseases within sheep flocks in North Kordofan State - Sudan

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