

PREVALENCE OF RUMEN IMPACTION IN RUMINANTS SLAUGHTERED AT SOKOTO MODERN ABATTOIR

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ABSTRACT

This study was conducted at Sokoto modern abattoir to assess the prevalence of indigestible rumen foreign body impaction and to identify the type of rumen foreign bodies in apparently healthy slaughtered cattle, sheep and goats. From the total of 535 ruminants [356 (66.5%) cattle, 119 (22.2%) sheep and 60 (11.2%) goats] examined within 3 days, 262 (49.0%) and 273 (51.0%) were males and females respectively, while 143 (26.7%) were found with rumen impaction. Polythene bags, rope, hair and paper were the various types of foreign bodies encountered. Polythene bags were the most commonly observed foreign body in all animals with positive cases. In both sexes the prevalence of rumen impaction was higher in females (65.7%) than in males (34.3%), it was highest in cattle (60.14%) and least in goats (11.19%). Findings of this work showed that the prevalence of rumen impaction in ruminants is quite high. Therefore, concerned agencies should work against contamination of the environment with indigestible foreign bodies and livestock farmers in the study area should provide mineral lick and supplementary feed for their free ranging livestock.

Keywords: ruminants, rumen impaction, Sokoto abattoir,

INTRODUCTION

Nigeria is naturally endowed with many livestock species and it is suitable for their production. The country is one of the African countries with the largest livestock population (Macmillan, 2020). It has estimated 34.5 million goats, 22.1 million sheep and 13.9 million cattle (Lawal-Adebowale, 2012). Indigenous breeds account for 98.95% of the total cattle population and the remaining are hybrid and exotic breeds. About 99.8% of the sheep and nearly all the goats' population in Nigeria are local breeds (Remi-Adewunmi *et al.*, 2004). Livestock contributes greatly to Nigerian economy through meat, milk, hides and skins, drought power, foreign exchange and income for the rural peasant farmers. However poor animal husbandry, among other factors, hampers full utilization of these vast livestock resources (Ibrahim, 1998).

In Nigeria, ruminants managed extensively within the urban and sub-urban settlements are most susceptible to ingestion of foreign materials (pica) (Remi-Adewunmi, *et al.*, 2004). Poor management and low plane of nutrition are responsible for scavenging for food and pica in ruminants (Misk *et al.*, 1984). Cattle have indiscriminating sense of taste and feeding habits that facilitate ingestion of foreign materials (Singh and Nigam 1981), but sheep and goats are extremely selective feeders thus, ingest significantly less quantity of foreign bodies (Hailat *et al.*, 1996). Ingestion of foreign body has reportedly caused great economic and production loss in ruminants (Igbokwe *et al.*, 2003; Ghurashi, *et al.*, 2009). The migrating foreign bodies within the gastrointestinal tissues cause many complications depending on their nature (Hailat *et al.*, 1996). They disrupt absorption of volatile fatty acids in the rumen and reticulum leading to slow rate of fattening in animal (Igbokwe *et al.*, 2003). Rumen impaction is mostly asymptomatic condition, poorly diagnosed in live animals until the accumulated material is large but accurate diagnosis is achieved at slaughter (Hailat *et al.*, 1996). Hence, the purpose of this study was to determine the prevalence, type of foreign bodies and factors associated with their ingestion in ruminants slaughtered at Sokoto modern abattoir.

MATERIALS AND METHODS

Study area

Sokoto modern Abattoir is located within the metropolitan areas of Sokoto town. It is geographically located in the extreme north western part of Nigeria and lies between latitudes 12°N to 58°N and longitudes 4.8°E to 6.54°E. The state shares boundaries with Zamfara state to the east, republic of Niger to the north, and Kebbi state to the west. Its average annual temperature ranges from 22.6 to 35.4 °C while the mean annual rainfall is 563.6 mm (Elisha *et al.*, 2017).

Study animals and design

The study was conducted on 535 apparently healthy slaughtered cattle, sheep and goats of local breeds at Sokoto modern abattoir. The animals were of 3 different species and of both sexes. They were identified during post-mortem inspection, number tagged and recorded for sample identification. A cross-sectional study was carried out to evaluate the prevalence and to identify the types of foreign bodies present in the rumen and their associated risk factors. Species and sexes of the studied animals were considered as risk factors for occurrence of indigestible foreign bodies. Based on species, occurrence was recorded for bovine, ovine and caprine. Sex was determined by observation of the genital organs (de Lahunta and Habel (1986). After slaughter, the stomach was carefully removed and examined as described by (Saulawa *et al.*, 2012).

Sample size determination

The sample size required for this study was determined based on sample size determination in random sampling for infinite population using expected prevalence of rumen foreign bodies in cattle, sheep and goats and the desired absolute precision according to (Charan and Biswas, 2012) as follows:

$$\text{Sample size} = \frac{Z_{1-\alpha/2}^2 p(1-p)}{d^2}$$

where, $Z_{1-\alpha/2}$ = Is standard normal variate at 5% type 1 error ($P < 0.05$) it is 1.96, p = Expected proportion in population based on previous studies or pilot studies. d = Absolute error or precision. So using the formula above and a prevalence of 11.02% reported by (Saulawa *et al.*, 2012) the minimum sample size was determined to be 151, nevertheless a total number of 535 animals were sampled.

Data analysis

The types of foreign bodies obtained were recorded in accordance to their frequency of occurrence in different species. Data obtained from this study was presented in tables. Prevalence of indigestible rumen foreign body was expressed in percentage as; number of cases of foreign bodies found to the total number of animals examined at the abattoir.

RESULTS AND DISCUSSION

A total of 535 ruminants, 356 cattle (66.5%), 119 sheep (22.2%) and 60 goats (11.2%) were examined for the presence of indigestible foreign bodies, of these, 262 (49.0%) and 273 (51.0%) were males and females, respectively. The prevalence of rumen impaction was 26.7% (143/535), of the positive cases the prevalence was highest in cattle (60.14%), followed by sheep (28.67%) and least in goats (11.19%) as shown in Table 1. Also, the prevalence in bovine, ovine, caprine and ovine and caprine combined were found to be 86/356 (24.16%), 41/119 (34.45%), 16/60 (26.66%) and 57/179 (49.94%) respectively. Furthermore, in all the species examined, rumen impaction was more common in female 94 (65.73%) than in males 49 (34.27%) as presented in Table 2.

The types of foreign bodies found at post mortem include polythene bags, rope, hair and paper. Polythene bag was consistently found in all animals with positive cases. This study revealed an overall prevalence of 26.7% ($n = 143$) foreign body in 535 ruminants (cattle, sheep and goats) slaughtered at Sokoto modern abattoir within 3 days. This prevalence was higher than 11.02% in small ruminant slaughtered at Katsina Central abattoir, Katsina state, Nigeria (Saulawa *et al.*, 2012) and 6.1% prevalence was reported in small ruminants at Luna Export Abattoir, East Shoa, Ethiopia (Fromsa and Mohammed, 2011). The ovine prevalence of this study was higher than 19.3% in sheep presented for slaughter at Maiduguri abattoir (Igbokwe *et al.*, 2003) and 8.9% reported in Awassi sheep in Jordan (Hailat *et al.*, 1996). However, the combined prevalence of sheep and goat in this study was lower than a reported 97% in sheep and goats brought from urban areas for slaughter at Zaria abattoir, Kaduna state Nigeria (Remi-Adewunmi, *et al.*, 2004).

Table 1: Prevalence of rumen impaction in different species of ruminants slaughtered at Sokoto abattoir

Species	Total number	Affected number	Percentage (%)
Bovine	356	86	60.14
Ovine	119	41	28.67
Caprine	60	16	11.19
Total	535	143	100.00

Table 2: Sex distribution of rumen foreign body in ruminants slaughtered at Sokoto abattoir

Sex	Total number	Affected number	Percentage (%)
Male	262	49	34.27
Female	273	94	65.73
Total	535	143	100.00

These variations might be due to differences in origin and management of animals under the investigations, as well as differences in the mode of waste management from country to country. Ingestion of foreign materials has reportedly been attributed to scarcity of forage and increased pollution of grazing land with non-degradable foreign bodies (Hailat *et al.*, 1996). In Nigeria, shortage of feed is prevalent when dry season is protracted and many peasant livestock owners could not provide supplementary feed to their ruminants. Furthermore, indiscriminate disposal of waste, polythene bags in particular, has persistently polluted both the urban and peri-urban areas.

Finding of this study agrees with Fromsa and Mohammed (2011) as lower frequency of rumen impaction was encountered in goats (26.66%) than in sheep (34.45%), this is because goats are more selective in nature while grazing (Remi-Adewunmi, *et al.*, 2004). It was also discovered that the rate of occurrence of rumen foreign body is higher in cattle than in sheep and goats, and this agrees with (Mekuanint *et al.* 2017). This is expected as cattle are indiscriminate feeders and hardly differentiate taste (Singh and Nigam 1981). In support of Igbokwe *et al.* (2003) finding, this study also found more female animals with rumen foreign bodies than male. Increased appetite in female animals usually during gestation and lactation might be responsible for this. Moreover, female animals remain in production herd longer than the males, hence are more predisposed to accumulated foreign bodies than the male animals.

Polythene bags were found in all of the animals with rumen impaction in this study and this is in accordance with the findings of (Fromsa and Mohammed 2011). Extensive use and improper disposal of polythene bags in the study area could be the reason for this.

CONCLUSION AND RECOMMENDATION

This work showed the risks posed by extensive use and improper disposal of non-degradable materials in the environment to the health of ruminants reared in the study area. In Nigeria, extensive system of management can be attributed to, among other predisposing factors, high prevalence of rumen impaction with indigestible foreign bodies. Furthermore, improper waste management and inadequate awareness of the risk associated with foreign body ingestion to ruminant health also contributed to the high prevalence. Forage scarcity during the long dry season as well as mineral and vitamin deficiencies also increases possibility of pica in ruminants. The findings of this study could increase awareness of livestock owners and veterinarians on risks of non-degradable foreign materials on the health and productivity of ruminant animals, and help policy makers and concerned agencies on proper legislation on waste management in Nigeria.

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