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A cross-sectional study on the prevalence and associated risk factors of Rumen and Reticulum foreign bodies of cattle slaughtered at Wolaita Sodo Municipal abattoir, SNNPRS, Ethiopia

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Abstract

The objective of present study was to determine prevalence of rumen and reticulum foreign bodies, type of foreign bodies and associated risk factors at Wolaita Sodo Municipal Abattoir, Ethiopia. Ante mortem and postmortem examination was done for assessment of age, sex, body condition and recovery of foreign bodies respectively. From total of 384 cattle examined 66 (17.02%) were found positive for the occurrence of foreign bodies. The results showed statistically significant difference ($p < 0.05$) in prevalence among different sexes, age groups and body condition scores and higher prevalence was observed in female (20.7%), old animals (19.8%) and medium body conditioned (23.3%) animals respectively. Therefore sex, age, and body condition score can be considered as potential risk factors and it was concluded that continued awareness creation should be instituted to avoid the risk of foreign body ingestion by animals and appropriate solid waste disposal system need to implement in the study area.

Keywords: Abattoir, cattle, foreign body, reticulum, rumen, Wolaita Sodo

1. Introduction

Cattle play significant contribution in Ethiopian economy as source of meat, milk, drought power, income and foreign exchange. However, as other livestock in the country their contribution is below their expected potential due to prevalent livestock diseases, poor management system and poor genetic performance. Thus, the country is not utilizing this huge potential livestock resource and an improvement in this sector is needed [22]. Environmental pollution is one of the growing problems for grazing animals due to absence of recycling industries, cleaning of environment and improper disposal of plastic bags. Plastic bags are resistant to biodegradation and pollute the environment for decades and centuries and poses great risk to grazing animals and even human health in the environment [17]. Free grazing animals ingest plastic bags especially in towns and villages which are indigestible and their accumulation in the rumen of grazing animals may lead to adverse effect on health [6]. It was reported to be a condition of great economic importance as it causes loss of production and high mortality rates [15]. Ingestion of foreign bodies is mainly related to nutritive deficiency and feeding management of the animals [22] and it may also occur during period of feed scarcity [8]. Feed shortage usually occurs at specific time of the year in most parts of Ethiopia. Moreover, most owners do not provide supplementary feed to animals. These in turn may predispose the animals to negative energy balance and force them to feed on unusual materials including plastics, clothes, ropes and even metallic substances [21].

The problems that are caused vary with the duration that the foreign body has been present, the location of the foreign body, the degree of obstruction that is caused as well as problems associated with the material of the foreign body. Ruminant are notorious for ingestion of foreign bodies. Ingestion of non- dietary materials is mainly related to nutritive deficiency and feeding management of the animals and causes various problems in different organs of the animals. Among these, disease of rumen and reticulum are of great economic importance because of severe losses on productivity of the animals sometimes leading to the death of the animals [15]. The condition is serious in our country usually in urban and peri- urban areas where extensive construction is carried out and proper plastic material disposal is not conditioned. So it is thrown on roads or anywhere and that is way our dairy cattle are dying mainly associated with foreign bodies [17].

In Ethiopia, The fact that rumen impaction by these foreign bodies is mainly asymptomatic in nature and only diagnosed in live animals if the material is accumulated in large amount and thus, it can be adequately studied in abattoirs. Therefore, the study was carried out to estimate the current prevalence of foreign body in cattle slaughtered at Wolaita Sodo municipal abattoir, to identify the type of rumen and reticulum foreign bodies, and to study the risk factors associated with the ingestion of these foreign bodies in cattle.

2. Material and methods

2.1 Study Area

The study was conducted in Wolaita Sodo Municipal Abattoir which is located at 405kms south of Addis Ababa in Southern Nations, Nationalities and people's Regional state. The total livestock population of Wolaita zone is estimated to constitute 2,096,120 cattle, 430,490 sheep, 236,416 goats, 68,388 horses, 1,189 mules, 54,093 donkey, 1,532,589 Poultry and 88,728 bee hives^[4].

2.2 Study Population and Study Design

The study was carried out on cattle that were brought around Wolaita Sodo areas from farmers and most of these animals are managed under extensive type of management. A cross-sectional study was carried out from November 2015 to April 2016 at Wolaita Sodo Municipal Abattoir to assess the prevalence of rumen and reticulum foreign bodies, identifying types of foreign bodies and associated risk factors.

2.3 Sample Size Determination and Sampling Method

The sample size was determined by using the formula given by Thrusfield (1995)^[23] To calculate sample size, 17.07% expected prevalence from Rahel (2011)^[16] 95% confidence level and 5% desired absolute precision (d=0.05) was used. Therefore, according to Thrusfield, the sample size was determined as follows:

$$n = \frac{(1.96)^2 \times P_{ex}(1 - P_{ex})}{d^2}$$

Where

n= required sample size

P_e=expected prevalence (17.07%)

d = desired absolute precision

1.96= the value of Z of 95% confidence level.

Therefore according to the above formula, minimum of 217 animals should be sampled, but to increase the accuracy of the prevalence estimates, a total of 384 animals were sampled. During each visit day animals were selected by systematic random sampling.

2.4 Data Collection

2.4.1 Ante mortem Examination

Ante mortem examination on individual animals was done for assessment of age, sex and body condition of the animals. Age was categorized into young (<5 years), adult (5-10 years) and old (>10years) based on dentition eruption described by De-Lahunta and Habel (1986)^[10].

Body condition of cattle was recorded as poor, medium and good based on the appearance of the animal and manual palpation of the spine and transverse processes of the lumbar vertebrae described by Nicholson and Butterworth (1986)^[13].

2.4.2 Post mortem Examination

In the postmortem examination, rumen and reticulum was examined. Immediately after slaughtered, in the evisceration stage the stomach was carefully removed from the abdominal cavity and open and explored for the prevalence of any foreign non dietary material by inspection and palpation. Any foreign bodies obtained during inspection was washed with water to remove adhering feed material and then identified. When the finding is positive, the location and type of the foreign bodies was recorded.

2.5 Data Management and Analysis

The data collected was entered and scored in Microsoft excel worksheet. Before subjected to statistical analysis, the data was thoroughly screened for errors and properly coded. For analysis, STATA-11 (Stata Corp. College Station, Texas, USA) software was used and table was used to summarize and present the data collected. The prevalence of rumen and reticulum foreign bodies was calculated as percentage by dividing total number of animal positive for foreign bodies to the total number of animal examined. Pearson chi square (χ^2) test was employed to assess the existence of association between prevalence of the foreign bodies and different potential risk factors considered.

3. Results and Discussion

3.1 Occurrence

From the total of 384 cattle (355 male and 29 female) examined for the presence of any foreign bodies in their rumen and reticulum, 17.2% (66/384) of them were found positive (Table 1). Out of this 54 (81.8%) were in the rumen, 12 (18.2%) in reticulum (Table 2). The types of foreign bodies were needles, wires, plastics, leathers, clothes and ropes. Leathers, plastics and clothes were the most common as observed in 58 (34.37%) of the positive cases. Other metallic substances recovered from the reticulum were the needles 1 (100%) and wires 2 (66.7%). This level of prevalence of foreign bodies is significant to affect the health of the study animals. In Jordon, Ismail *et al.* (2007)^[9] reported that 77% cases of adult dairy cattle suffering from recurrent tympany had indigestible foreign bodies. Hailat *et al.* (1997)^[7] from Jordan reported 25 million USD estimated loss in productivity and health associated with plastic impaction. Ingestion of indigestible foreign materials by ruminants is a common worldwide problem also reported from Nigeria, Igbokwe *et al.* (2003)^[8], Remi- Adewumi *et al.* (2000)^[19] and Sudan Ghurashi *et al.* (2009)^[6]. The present prevalence rate of foreign bodies is almost equal to the report of Rahel (2011)^[16] who reported the prevalence of 17.07% on rumen and reticulum foreign bodies. However, the present report is not in consonant with the report of Nugusu *et al.* (2013)^[14] from Gondar, who reported the prevalence of 8.6% on rumen and reticulum foreign bodies in ruminants. On the contrary, higher prevalence (77.41%) and (54.14%) was reported by Ismail *et al.* (2007)^[9] and Anwar *et al.* (2013)^[11] respectively. The difference in the prevalence rate may be due to differences in the origin of animals presented for slaughter and type of waste management system between the countries.

3.2 Prevalence of Foreign Bodies with Regard to Sex

Of the 17.2% total prevalence of foreign bodies in cattle, 16.9% and 20.7% were detected in male and female animals, respectively. The differences in prevalence observed between

female and male cattle have also been reported earlier in Ethiopia [1, 12, 22]. This might be associated with physiological difference between male and female animals. Female animals face higher demand for certain minerals during late pregnancy to support fetal growth and during early lactation for milk production and the resulting increase in appetite and possible development of pica may lead to ingestion of foreign bodies. [20, 25] It may also be associated with longevity of female animals which increases their chance of exposure [24].

3.3 Prevalence of Foreign Bodies with Regard to Age

Out of 355 male and 29 female animals examined for presence of rumen and reticulum foreign bodies, statistically significant difference in prevalence ($p < 0.05$) among different age groups was observed and prevalence of 0%, 16.5% and 19.8% were observed for young, adult and old animals respectively. Foreign bodies were more frequently encountered in old animals than other two groups. This finding is in agreement with the work of Reddy *et al.* (2014) [18] and Fromsa and Mohammed (2011) [5], who reported the higher prevalence of (93%) and (81.25%) of foreign bodies in old cattle respectively. The highest prevalence in old cattle might be associated with increase of exposure through life and gradual accumulation of foreign bodies in the rumen and reticulum which lead the undead animals to be positive.

3.4 Prevalence of foreign bodies with regard to body condition score

In this study it was found that animals with medium body condition has the highest prevalence of foreign bodies, from 146 animals categorized under medium body condition 34(23.3%) recorded as positive which is highest when compared with good 31(13.4%) and poor 1(14.3%) respectively. So statistically significant differences ($P < 0.05$) between different body condition scores was recorded (Table 1). This finding was in agreement with Tiruneh and Yesuwork (2010) [24] who reported the higher prevalence of foreign bodies in ruminants with medium body condition score than that of average, fatty and emaciated but disagree with the work of Tesfaye and Chanie (2012) [22] and Anwar *et al.* (2013) [1], who recovered foreign body at highest prevalence (72.72%) and (54.5%) from the rumen and reticulum of poor body condition animal respectively. Poor body condition by itself might be due to the contribution of the foreign body that is the animal loss weight after it has been exposed or it might be due to the interference of foreign body with the absorption of volatile fatty acid and thus causes reduced weight gain. But in the present study poor body condition may be associated with other chronic diseases. The animals with good body condition may not be exposed to indigestible foreign bodies

because they are managed at home with adequate nutrients and are not left to graze usually.

3.5 Prevalence of foreign bodies with regard to location

From 66 positive cases of foreign body, 54 (81.8%) were found in rumen and 12 (18.2%) in reticulum (Table 2). Metallic foreign bodies; wires 2 (66.7%) and needles 1 (100%) were most frequently recovered from reticulum and non-metallic foreign bodies clothes 19 (86.4%), plastics 26 (86.6%) and leathers 6 (100%) were recovered from rumen (Table 2). The finding is in agreement with the work of Tesfaye *et al.* (2012) [21] who reported the higher number of foreign body occurrence in the rumen (79.2%) than reticulum (20.8%) and Anwar *et al.* (2013) [1] also reported that most foreign bodies are encountered in the rumen (58.45%) than reticulum (19.32%) of Achai Cattle. The higher prevalence of foreign body in rumen may be due to its larger size.

The results of this study indicated metallic foreign bodies were most frequently recovered from reticulum. From 5 metallic materials recorded 3(60%) were found from reticulum and the remaining 2(40%) from rumen. This finding is in line with the finding of Radostits *et al.* (2007) [15], Tesfaye *et al.* (2012) [21] and Tesfaye and Chanie (2012) [22] who reported the prevalence of 90%, 87.5% and 65.3% from reticulum respectively. The reason might be due to retention of these foreign bodies by the honey comb structure of the reticular mucosa and due to gravity these heavy foreign bodies settle in the ventral part of the fore stomach.

In the current study it was observed that plastics 30(45.5%), clothes 22(33.3%), leathers 6(9%) and wires 3(4.5%) were most commonly recovered foreign bodies from rumen and reticulum of cattle in the study area, in addition to that one needle, one nail, one rope and two stones were also recovered. This finding is in consonant with the previous work [7, 8, 19, 24], who reported that plastics, clothes, leathers, nails, wires and needles were the most commonly recovered foreign bodies from rumen and reticulum of ruminants. The occurrences of these foreign bodies in the study area might be associated with rapid industrialization, increase in the garbage disposal mostly in plastic bags, increased urbanization, keeping animals in the area of new construction sites, shortage of feed during the long dry season and lack of awareness among livestock owners on the risk of ingestion of these foreign materials. The result of this study identified plastics and clothes were the most common cause of rumen impaction found in 52 (78.8%) of the study animal. This might be considered as a result of their availability to be ingested by the animals from their grazing environment due to improper disposal of plastics and clothes in the area.

Table 1: Prevalence of foreign body among sex, age and body condition

Risk factors	Categories	No. Examined	No. Positive	%	χ^2 value	P-value
Sex	Female	29	6	20.7	0.2703	0.403
	Male	355	60	16.9		
Age	Young	5	0	0	1.6455	0.439
	Adult	273	45	16.5		
	Old	106	21	19.8		
Body condition	Good	231	31	13.4	6.1622	0.046
	Medium	146	34	23.3		
	Poor	7	1	14.3		

Table 2: Types and prevalence of rumen and reticulum foreign bodies

Types of Foreign body	Location		Total
	Reticulum	Rumen	
	No. (%)	No. (%)	No. (%)
Clothes	3(13.6%)	19(86.4%)	22 (33.3%)
Plastics	4(13.3%)	26(86.6%)	30 (45.5%)
Leathers	0	6(100%)	6 (9%)
Nails	0	1 (100%)	1(1.5%)
Needles	1(100%)	0	1(1.5%)
Wires	2(66.7%)	1(33.3%)	3(4.5%)
Stone	2(100%)	0	2(3.03%)
Rope	0	1(100%)	1 (1.5%)
Total	12 (18.2%)	54 (81.8%)	66(100%)

4. Conclusion

The present study revealed an overall prevalence of 17.2% (n= 66) of rumen and reticulum foreign body in the study area. In the present study age, sex and body condition score were considered as risk factor and higher prevalence of foreign bodies of rumen and reticulum was recorded in animals with old age and animals with medium body condition. The types of foreign bodies detected in this study were plastic and other indigestible materials (rope, leather, stone and cloth) and metallic (nail and wire). Most of the plastic and other indigestible foreign bodies were found in rumen while metallic foreign bodies found in reticulum. Cloth and plastic were recovered as the most common foreign bodies in the study area followed by leathers, nails, wires stones and needles.

5. Acknowledgement

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6. Conflict of Interest

There is no conflict of interest between the authors.

7. References

- Anwar K, Khan I, Aslam A, Mujtaba M, Din A, Amin Y et al. Prevalence of indigestible rumen and reticulum foreign bodies in Achai cattle at different regions of Khyber Pakhtunkhwa. *ARNP Journal of Agricultural and Biological Science*. 2013; 8(8):580-586.
- Calfee T, Manning TO. Nonhealing subcutaneous wounds in the cat and proposed surgical management techniques. *Clinical techniques in small animal practice*. 2002; 17(4):162-167.
- Cavedo AM, Latimer KS, Tarpily HL, Bain PJ. Traumatic reticuloperitonitis (hard ware diseases in cattle veterinary clinical pathology clerk ship program university of Georgia. Athens, 2004, 1-4.
- CSA (Central Statistical Agency) Agricultural Sample Survey Report on Livestock and livestock characteristics (Private peasant holdings). *Statistical Bulletin 570*. Addis Ababa, Ethiopia, 2013.
- Fromsa A, Mohammed N. Prevalence of indigestible foreign body ingestion in small ruminants slaughtered at Luna export abattoir, East Shoa, Ethiopia. *Journal of Animal and Veterinary Advances*. 2011; 10(12):1598-1602.
- Ghurashi MAH, Seri HI, Bakheit AH, Ashwag EAM. Effect of surgical removal of foreign body from goat's rumen with special reference to the prevalence of foreign body in goats in Southern Darfur. *Australian Journal of Basic and Applied Sciences*. 2009; 3(2):664-668.
- Hailat N, Nouh S, Al-Darraj A, Lafi S, Al-Ani F, Al-Majali A. Prevalence and pathology of foreign bodies (plastics) in Awassi sheep in Jordan. *Small Ruminant Research*. 1997; 24(1):43-48.
- Igbokwe IO, Kolo MY, Egwu GO. Rumen impaction in sheep with indigestible foreign bodies in the semi-arid region of Nigeria. *Small Ruminant Research*. 2003; 49(2):141-146.
- Ismail ZB, Al-Majali A, Al-Qudah K. Clinical and surgical findings and outcome following rumenotomy in adult dairy cattle affected with recurrent rumen tympany associated with non-metallic foreign bodies. *American Journal of Animal and Veterinary Sciences*. 2007; 2(3):66-71.
- Lahunta AD, Habel RE. *Applied veterinary anatomy* WB Saunders, 1986.
- Mccurnin DM, Bassert JM. *Clinical textbook for veterinary technicians* 6th ed. St. Louis Elsevier Saunders, 2006, 224-244.
- Mushonga B, Habarugira G, Musabyemungu A, Udahemuka JC, Jaja FI, Pepe D. Investigations of foreign bodies in the fore-stomach of cattle at Ngoma Slaughterhouse, Rwanda. *Journal of the South African Veterinary Association*. 2015; 86(1):1-6.
- Nicholson MJ, Butterworth MH. *A guide to condition scoring of zebu cattle*. ILRI (aka ILCA and ILRAD), 1986, 1-29.
- Nugusu S, Velappagounder R, Unakal C, Nagappan R. Studies on foreign body ingestion and their related complications in ruminants associated with inappropriate solid waste disposal in Gondar Town, North West Ethiopia. *International Journal of Animal and Veterinary Advances*. 2013; 5(2):67-74.
- Radostits OM, Gay CC, Blood DC, Hinchcliff KW, Constable PD. *Veterinary medicine. A text book of disease of cattle, horse, sheep, pig and goat*, 10th edition, London, England, Saunders Elsevier, 2007, 112-522.
- Rahel M. Study on fore stomach foreign body in cattle Slaughtered Hawassa Municipal Abattoir. Ethiopia, DVM Thesis Gondar University, Faculty of Veterinary Medicine, Gondar, Ethiopia, 2011, 3-9.
- Ramaswamy V, Sharma, HR. Plastic bags–threat to environment and cattle health: a retrospective study from Gondar city of Ethiopia. *IIOAB J*. 2011; 2(1):6-11.
- Reddy YR, Latha PA, Reddy S. Review on metallic and non-metallic foreign bodies: A threat to livestock and environment. *International Journal of Food, Agriculture*

- and Veterinary Sciences. 2014; 4:6-14.
19. Remi-Adewunmi, BD, Gyang EO, Osinowo AO. Abattoir survey of foreign body rumen impaction small ruminants. Nigerian Veterinary Journal. 2004; 25(2):32-38.
 20. Sykes AR, Russel AJF. Deficiency of mineral macroelements. Diseases of sheep, 4th ed., Blackwell Publishing, Oxford, UK, 2000, 363-377.
 21. Tesfaye D, Yismaw S, Demissie T. Ruminal and reticular foreign bodies in small ruminants slaughtered at Jimma Municipal Abattoir, Southwestern Ethiopia. Journal of Veterinary Advances. 2012; 2(8):434-439.
 22. Tesfaye D, Chanie M. Study on rumen and reticulum foreign bodies in cattle slaughtered at Jimma Municipal Abattoir, South West Ethiopia. American-Eurasian. Journal of Scientific Research. 2012; 7(4):160-167.
 23. Thrusfield M. Veterinary Epidemiology, 2nd edition. University of Edinburgh, Blackwell Science Ltd, 1995, 180-182.
 24. Tiruneh R, Yesuwork H. Occurrence of rumen foreign bodies in sheep and goats slaughtered at the Addis Ababa Municipality Abattoir. Ethiopian Veterinary Journal. 2010; 14(1):91-100.
 25. Weaver AD. Lameness above the foot. In: A.H. Andrews, R.W. Blowey, H. Boyd and R.G. Eddy (Eds.), Bovine Medicine: diseases and husbandry of cattle, 2nd ed., Blackwell Science, Oxford, UK, 2004, 435-467.