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Prevalence of Foreign Bodies in Cattle Rumen and Reticulum at Herat Slaughterhouse, Afghanistan

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ABSTRACT

Background: Cattle in developing countries are at high risk of ingesting foreign objects due to inadequate feeding practices, improper waste disposal, nutritional deficiencies, and poor livestock management. This can cause serious gastrointestinal complications, including obstruction, infection, and perforation. To prevent these issues, livestock producers should focus on providing a balanced diet, improving waste management, enriching pastureland, enhancing supervision, and educating stakeholders. By addressing these factors, farmers can maintain the health and well-being of their cattle.

Materials and Methods: A randomized research study was conducted in Herat, Afghanistan to assess the prevalence of indigestible materials in the fore-stomach (rumen and reticulum) of cattle. A total of 400 healthy cattle of local breeds were slaughtered from April to September 2017. The types of foreign bodies and their prevalence in the rumen and reticulum were determined using IBM Microsoft software SPSS version 26 for analysis.

Findings: Of the 400 cattle randomly selected and examined, 24.25% (97 animals) were found to have indigestible foreign bodies in their forestomach (rumen and reticulum). These foreign bodies were primarily located in the rumen (71%), followed by the reticulum (19%), and both chambers (10%). The most common types of foreign bodies were plastic (78%), clothes (76%), thread (76%), leather (25.7%), metal (18.5%), bone (41.2%), wood (72.1%), and glasses (8.2%). The prevalence of foreign bodies was significantly higher in male cattle (24.56%) compared to female cattle (23.43%). Interestingly, the highest prevalence rate of foreign bodies (51.5%) was observed in cattle with poor body condition.

Conclusion: Foreign body ingestion in cattle can cause serious health risks, including obstruction, infection, perforation, and death. To protect cattle health, clean feed, proper waste disposal, and foreign body removal are essential.

Keywords: Foreign bodies, Herat province, Rumen and Reticulum, Slaughterhouse,

INTRODUCTION

Foreign body syndrome is one of the most commonly encountered clinical complaints in ruminants caused by ingested foreign body and their migration to the rumen and reticulum. Furthermore, these disorders cause huge economic losses to farmers in the form of animal mortality and loss of production (Hussain & Uppal, 2015). Various problems in different organs of the cattle related to foreign body ingestion are mainly related to nutritional deficiencies and feeding management, mostly in the rumen and reticulum (Jones et al., 1997).

The rumen and reticulum are two compartments of the cow's stomach that play a crucial in the digestion process. Cattle can't differentiate between metallic materials in feed; first, they do not completely masticate the food before swallowing because they are indiscriminate feeders (Aiello et al., 2016). Unbalanced eating habits and malnutrition cause the consumption of more materials, including waste, than regular food (Otsyina et al., 2015).

Cattle foreign bodies are divided into two main groups: nonmetallic foreign bodies and metallic foreign bodies. The foreign body types found in the rumen and reticulum of cattle included wires, needles, clothes, ropes, nails, and plastics (Bassa &Tesfaye, 2017). Metallic wire, needles, nails, and stones are the most common penetrating foreign bodies (Nugusu et al., 2013; Ramaswamy & Sharma, 2011; Kahn & Line, 2010). Throughout the reticulum, heavy foreign materials (nails, wires) may persist for the life of the animals. Suddenly, death occurs if foreign objects puncture the heart, which is close to the reticulum (Bath et al., 1995). Environmental pollution is one of the growing problems for grazing animals due to the lack of recycling industries, Cleaning of the environment cultures and inappropriate disposal of plastic bags are the reasons why free grazing animals ingest plastic bags, particularly in towns and villages (Reuters, 2019; Bhaskara & Sasikala, 2012).

The ingestion of foreign bodies by cattle can cause possible health problems that are impaction of the rumen, ruminitis, traumatic pericarditis, traumatic reticulo peritonitis, esophagitis, and glossitis. This problem is caused by the foreign body duration, the foreign body location, and the material of the foreign body with the degree of obstruction (Desiye & Mersha, 2012). Severe loss of production and high mortality rates were reported by the ingestion of foreign bodies in the cattle, which caused a condition of great economic importance (Radostitis et al., 2000). The important pathological condition in the cattle is ingestion of indigestible foreign bodies from both economic and health points of view. The reasons for food scarcity have been mostly reported in this cause (Narote et al., 2019).

MATERIALS AND METHODS

Study Animals

Random research was done in cattle slaughtered at Herat, Afghanistan to determine the prevalence of indigestible foreign bodies in the rumen and reticulum by using both antemortem and post-mortem examinations. Sex, breed, age, and body condition score before slaughter identified cattle presented for slaughter. According to Otesile & Obasaju described age based on dental eruption (Otesile & Obasaju, 1982). The animal health was evaluated through a four-point body condition scoring system, combining visual and physical examinations. They noted the visibility of ribs and prominences like shoulder and hip bones and palpated the spine and transverse processes to gauge fat deposit thickness. Based on these observations, animals were assigned scores of poor (clearly visible ribs and spine), acceptable (some fat covering bones), fat (no visible ribs), or obese (thick fat deposits and body lumps). This comprehensive approach allowed for a detailed assessment of each animal's physical condition (Roche et al., 2004). 400 healthy cattle of local breeds were slaughtered from April to September 2017 to identify the types and prevalence of foreign bodies in the rumen and reticulum. Out of 400 cattle, 115 were female and 285 cases were male. The age of the cattle has been 1-5 years. Cattle ages were assessed before and after slaughter by examining tooth eruptions. The rumen and reticulum were carefully removed after slaughter from the abdomen cavity, individually opened by incision, and macroscopic examination was done by visual inspection and palpation for the presence of foreign bodies. The

foreign bodies found after the inspection have been washed by water to remove adhering ingesta and then identified. The location and type of the foreign bodies were recorded in the data recording sheet when the finding was positive.

Statistical Analysis

The data was collected and organized in a Microsoft Excel spreadsheet and then summarized using descriptive statistics. Statistical analysis was performed using the IBM SPSS version 26 software package. Descriptive statistics were used to summarize and present the collected data. The prevalence of foreign bodies in the rumen and reticulum was calculated as a percentage, by dividing the number of cattle that tested positive for foreign bodies by the total number of cattle examined. T-tests and Pearson's chi-square tests were conducted to determine the statistical significance of the findings.

RESULTS

The rumen and reticulum of 400 cattle were examined for the presence of indigestible foreign bodies, and 97 (24.25%) were determined to be positive. The rumen, reticulum, and both 70.1%, 19.5%, and 10.3% positive cases of foreign bodies occurred respectively of 24.25%. Between rumen, reticulum, and both there was no statistically significant difference (Table 1). The foreign bodies types were made of plastic, cloth, thread, leather, metal, bone, wood, and glasses with prevalence of 78%, 76%, 76%, 25.7%, 18.5%, 41.2%, 72.1%, 8.2% respectively (Figure 1). From this results, plastics 76(78%) were the most observed foreign body; followed by clothes 74(76%) and thread 74(76%). From 285 male and 115 female animals examined, foreign body was found in the rumen and reticulum of 27(23.43%) females and 70(24.56%) males. There was no statistical difference between male and female positive causes (Figure 2). The high prevalence rate of foreign bodies was recorded in male animals. In this study, examining the prevalence of foreign bodies in the rumen and reticulum of cattle found that animals with poor body conditions were more likely to have foreign bodies than animals with acceptable, fat, or obese body conditions. 45(46.39%) of the cattle with poor body condition had foreign bodies, compared to 36(37.1%) with acceptable body condition, 9(9.27%) with fat body condition, and 7(7.2%) with obese body condition. There was no statistically significant difference between body conditions poor, acceptable, fat, obese, and poor and obese (Figure 3). The highest prevalence rate of foreign body (46.39%) was recorded in poor body conditioned animals and followed by medium body condition animals.

Table 1. The cattle prevalence of foreign bodies in the rumen, reticulum, and both.

Location	Total sample	Positive	Negative	Average	Prevalence
Rumen	400	68	332	32.3	68/97(70.1%)
Reticulum	400	19	381	32.3	19/97(19.58%)
Both	400	10	390	32.3	10/97(10.3%)
Total	400	97	303		97/400(24.25%)

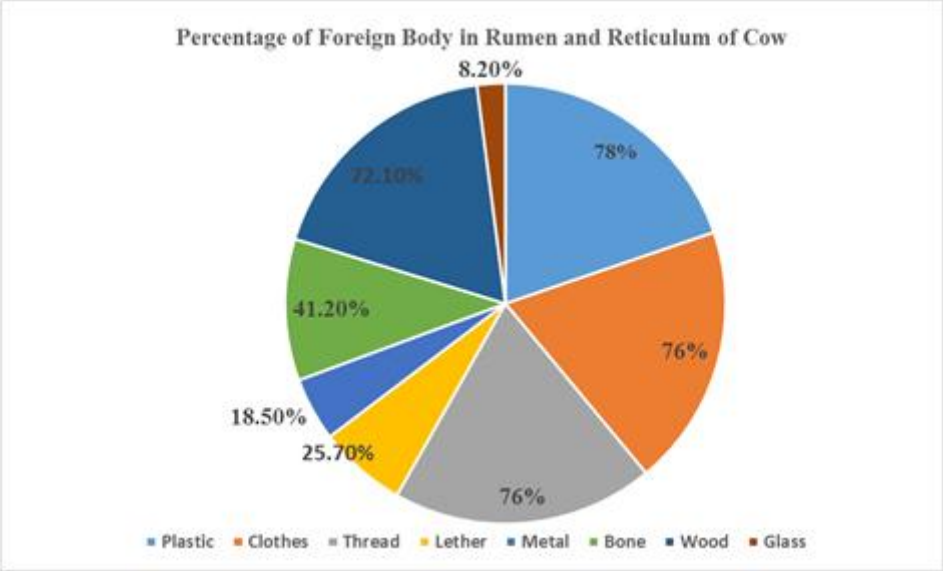

Figure 1. The foreign bodies discovered included a variety of materials such as plastic, cloth, thread, leather, metal, bone, wood, and glass, and their prevalence was found to be 78%, 76%, 76%, 25.7%, 18.5%, 41.2%, 72.1%, and 8.2% respectively. Among all the foreign bodies, plastic was observed to be the most frequent.

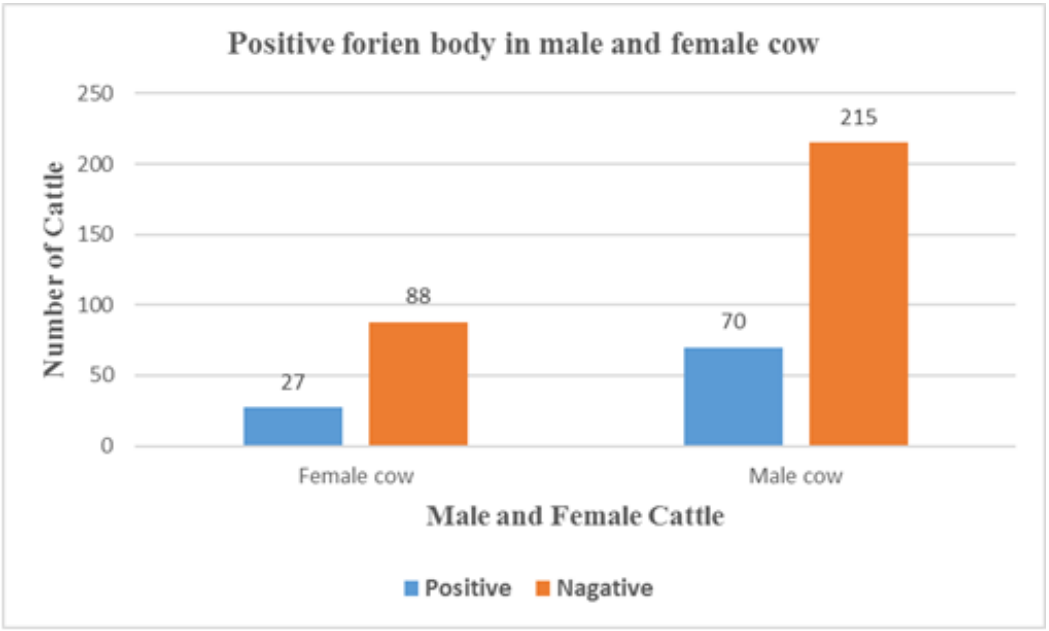

Figure 2. Presence of indigestible materials in the rumens and reticulum of both male and female cows. Out of the 285 males and 115 females examined, foreign bodies were found in the rumens and reticula of 23.43% of females and 24.56% of males. It was found that the difference between the prevalence of positive cases in males and females was not statistically significant (P>0.05).

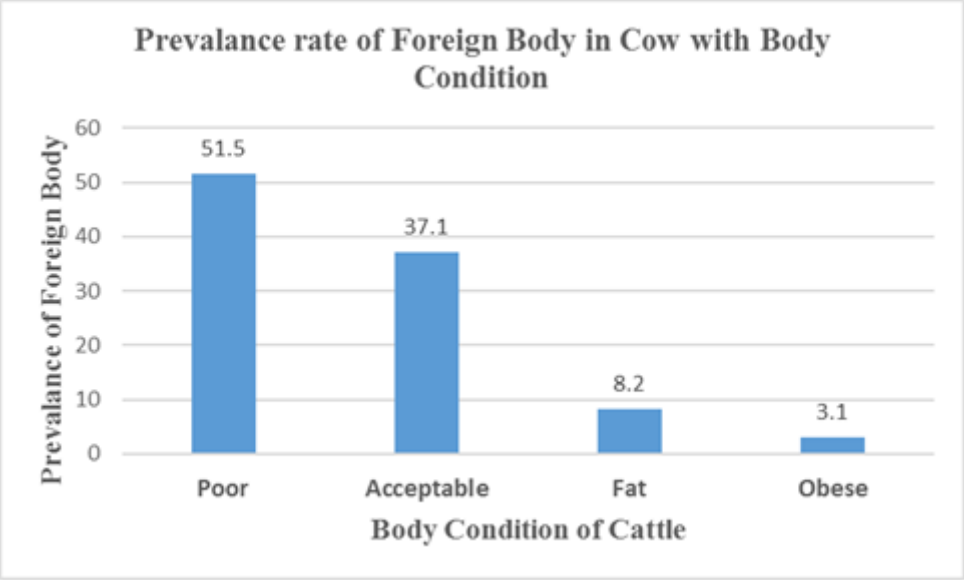

Figure 3. The body condition of cows was examined concerning the prevalence rate of indigestible materials. Among animals classified as poor, acceptable, fat, and obese, 45 (46.39%), 36 (37.1%), 9 (9.27%), and 7 (7.2%) were found to be positive for foreign bodies. However, statistical analysis showed that the difference between the body conditions with positive cases was not significant ($P > 0.05$).

DISCUSSION

Foreign body ingestion is a serious issue and commonest in ruminants, resulting in serious consequences for animal health that subsequently decrease animal production and reproduction (Mahadappa et al., 2020; Ramadan, 2016). The present study showed an overall prevalence of 24.25% of rumen and reticulum foreign bodies in slaughtered cattle at the Herat slaughterhouse. Accordingly Tesfaye et al., a similar finding was reported 23.9% (Tesfaye et al., 2012). According to Bwatota et al., 24.03% of the slaughtered cattle had indigestible foreign bodies (Bwatota et al., 2018). This research occurrence of foreign bodies is almost similar to the Dawit et al. (2012), 23.9%. However, the result of this research is higher than the 20.4% (Jebessa et al., 2018). Indeed, a lower prevalence rate of 21.1% was reported by (Gurara et al., 2020). However, higher prevalence rates of 35.40% were reported than in the current study (Mussa, 2022).

The current study found wood, cloth, thread, leather, metal, bone, plastic, and glass types of foreign bodies. Accordingly, Amin & and Fentahun found the same thing (Amin & Fentahun, 2020). Berrie et al. (2015), reported similar findings. The majority of foreign bodies observed in the current study were plastic. Accordingly, the majority of foreign bodies were plastic (Jebessa et al., 2018). In the current study, the difference between female and male positive causes was statistically not significant. Indeed, Mekuanint et al. reported that indigestible foreign bodies were not similar between males and females, and the difference was statistically not significant (Mekuanint et al., 2017). According to current research, the frequent occurrence of plastic, fabrics, leather, and threads in the rumen and reticulum of cattle is due to feeding management. The reason for the low incidence of ingestable materials in the rumen and reticulum of female cows in the slaughterhouse of Herat province is the low slaughter of female cows due to the lack of interest in female cow meat in this research.

CONCLUSION

The ingestion of metallic and non-metallic foreign objects is a widespread issue in cattle, causing significant health and economic problems, particularly in developing countries with inadequate animal husbandry practices. A study conducted in Herat Slaughterhouse revealed an overall prevalence of 24.25% of foreign bodies in the rumen and reticulum of cattle.

The most common foreign bodies found were plastic, clothes, and thread. According to our findings, foreign bodies were observed higher in male cattle compared to females, and this difference was more pronounced in poor body conditions. The low incidence of indigestible materials in female cattle suggests that the meat of female cows is less appealing to cattle. The high prevalence of foreign bodies in this study highlights the importance of proper cattle feeding management. Farmers should carefully select and prepare food for their cattle to prevent the ingestion of foreign objects, which can lead to reduced productivity, reproductive issues, and even death.

Limitation: The study's findings may not be generalizable to cattle outside of Herat, Afghanistan, as slaughterhouses primarily handle healthy or male cattle for meat production. A broader survey encompassing non-slaughtered cattle is needed to fully assess the prevalence of foreign bodies in the cattle population of Herat province.

Conflict of Interest: The authors have disclosed that they have no competing interests to declare.

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Authors Contributions: TA, Conceptualization design: TA, MNA, analysis: TA, SME, resources: TA, SME, and PAQ, original draft preparation: TA, MNA, review and editing: MNA, visualization: MNA, PAQ and SME, supervision: TA, PAQ, data collection and entry: TA, PAQ, and AT.

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