



## Prevalence and Associated Factors of Gastric and Intestinal Ulcers in Companion and Exotic Animal Patients at a University Veterinary Teaching Hospital in Nigeria – A Preliminary Report

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### SUMMARY

Gastric and intestinal ulceration with or without perforation poses a global health challenge in both human and animal populations. In animal species, it is often associated with patients presenting with hematemesis, abdominal pain, melena and anorexia, with erratic vomiting. The definitive diagnoses with imaging modalities are less feasible in poor resource settings due to lack of adequate facilities. This study investigated the prevalence and associated factors of gastric and intestinal ulcers in companion and exotic animal patients presented at the Veterinary Teaching Hospital, University of Ibadan, Nigeria, between 2009 and 2019 using hospital case records. Thirty-six cases of gastric and intestinal ulcer were recorded. They were mostly in canine (80.55%), few in exotic species [2 monkeys (5.55%), 1 lion (2.78%), 1 gazelle (2.78%), 1 dwarf crocodile (2.78%) and 1 fox (2.78%)] and one in an unspecified species (2.78%). Females (47.22%) and older animals (>1 year/69.45%) had higher occurrence than males (38.89%) and younger animals (<1 year/19.44%). All the patients were diagnosed with different pre-existing systemic conditions including: leptospirosis (19 cases/52.78%), chronic malnutrition (7 cases/19.44%), ehrlichiosis (2 cases/5.56%), trypanosomosis (2 cases/5.56%), babesiosis (2 cases/5.56%), hepatic tumor (1 case/2.78%), infectious canine hepatitis (1 case/2.78%), canine acute renal failure (1 case/2.78%) and granulomatous pneumonia (1 case/2.78%). There is therefore need to institute gastric and intestinal ulcer preventive and curative measures while treating predisposing primary disease conditions.

**Keywords:** anorexia, associated factors, ulcers, vomiting

## INTRODUCTION

Gastric and intestinal ulcers are defects in the mucosa and submucosa, which may extend through the muscularis and serosa (Zatorski *et al.*, 2017). They occur when there is a disequilibrium between gastric acid secretion and gastrointestinal mucosal defense systems (Lima *et al.*, 2006; Tulassay and Herszenyi, 2010; Zatorski *et al.*, 2017). Gastric and intestinal ulcers manifest clinically with varying signs including abdominal pain, melena, anorexia and hematemesis (Parrah *et al.*, 2013). Animals may present with acute or chronic anaemia, and shock may occur when there is perforation or copious bleeding (Stanton, 1993). Gastric ulcers have been associated with bacterial infections (*Helicobacter pylori*), hepatic disease, nutritional deficiencies, ingestion of irritant chemicals, prolonged administration of non-steroidal anti-inflammatory drugs (ibuprofen, vulturine, aspirin; steroids, bisphosphonates), stress, and age-related decline in prostaglandin levels (Stanton, 1993; Belaiche *et al.*, 2002). Prolonged and indiscriminate use of non-steroidal anti-inflammatory drugs (NSAIDs) is the most common and best-studied cause of gastric and intestinal ulcers in dogs which occurs principally through inhibition of prostaglandin synthesis, resulting in decreased mucosal blood flow and altered mucous production (Stanton, 1993). Clinical diagnosis of gastric and intestinal ulcers could be challenging especially in poor resource settings due to non-availability of modern diagnostic tools. Often, postmortem examination of tissue samples (gross inspection and histology), endoscopy and clinical biochemical diagnostic modalities have been used in the investigation of gastric and intestinal ulcers (Banerjee, *et al.*, 2010; Fitzgerald, *et al.*, 2017)

which are associated with systemic conditions (Brown *et al.*, 2007; Parrah *et al.*, 2013, Jankowski, *et al.*, 2015).

However, in management of these systemic conditions, clinicians focus less attention on prevention or treatment of associated gastric and intestinal ulcers with consequent severe morbidity and mortality of patients. This study therefore investigated the prevalence, associated factors and diagnostic challenges of gastric and intestinal ulcers in companion and exotic animal patients at the Veterinary Teaching Hospital, University of Ibadan (VTH, UI), Nigeria.

## MATERIALS AND METHODS

The study evaluated patient records at the VTH, UI between 2009 and 2019. Data on gastric and intestinal ulcers in companion, and exotic animal patients in captivity (UI Zoological garden) was recorded followed by grouping/categorization by species, breeds, age, sex as well as associated underlying primary disease conditions and analyzed with descriptive statistics using Microsoft Office Excel 2013 spreadsheet for Windows version 8.

## RESULTS

***Distribution of gastric and intestinal ulcers in companion and exotic animal patients:*** Within the 10-year period studied, 122 patient records were evaluated with gastric and intestinal ulcers' prevalence of 29.51% (36 cases) out of which 19 cases (52.78%) had gastric ulcers only, 11 cases (30.56%) had intestinal ulcers only and 6 cases (16.66) had gastrointestinal ulcers (Table 1).

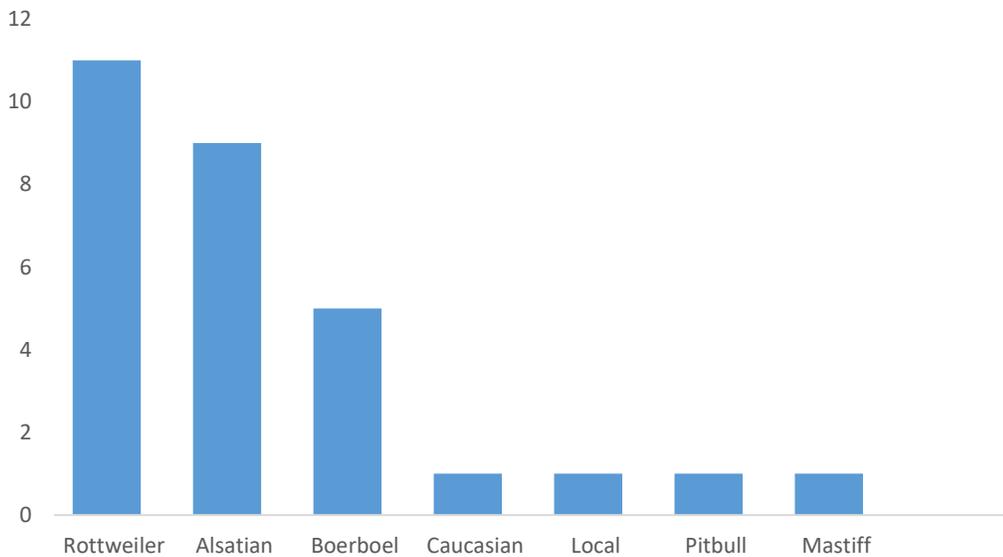
**TABLE I: Distribution of gastric and intestinal ulcers in companion and exotic animal patients**

Gastrointestinal lesion	Frequency	Percentage (%)
Gastric ulcers	19	52.78
Intestinal ulcers	11	30.56
Gastrointestinal ulcers	6	16.66
<b>Total</b>	<b>36</b>	<b>100.0</b>

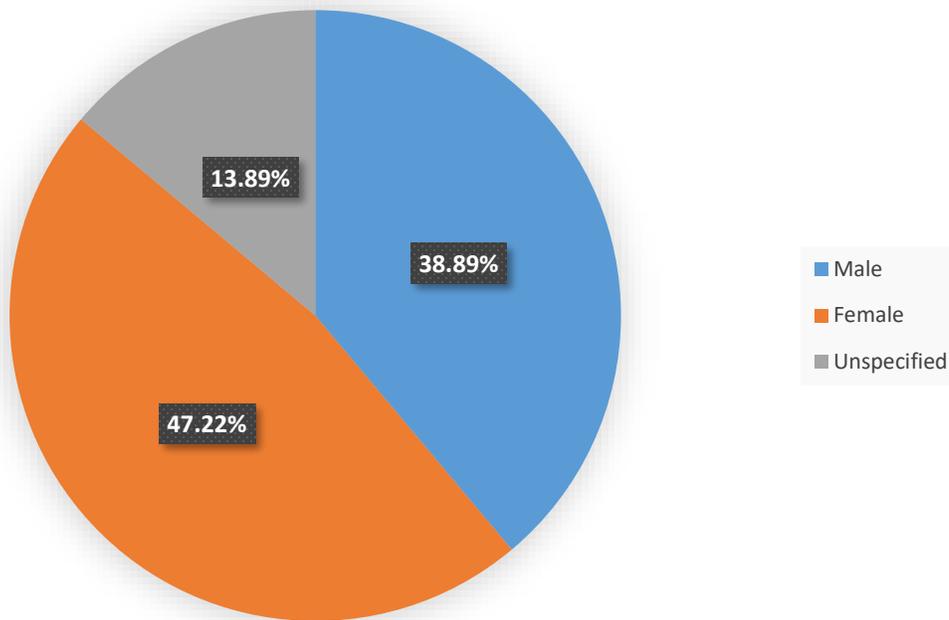
**TABLE II: Species distribution of gastric and intestinal ulcers in companion and exotic animal patients**

Species	Frequency	Percentage (%)
Canine	29	80.55
Monkey	2	5.55
Lion	1	2.78
Gazelle	1	2.78
Dwarf Crocodile	1	2.78
Fox	1	2.78
Unspecified	1	2.78
<b>Total</b>	<b>36</b>	<b>100.0</b>

**Distribution of gastric and intestinal ulcers across species and breeds:** Patients with gastric or intestinal ulcers were mostly canine (29 dogs/80.55%), few exotic species [2 monkeys (5.55%), 1 lion (2.78%), 1 gazelle (2.78%), 1 dwarf crocodile (2.78%) and 1 fox (2.78%)] and 1 unspecified species (2.78%) (Table II). Among the Canine species, the Rottweiler breed had the highest prevalence (37.93%), followed by Alsatian (31.03%), Boerboel (17.24%), Local (3.45%), Pitbull (3.45%), Mastiff (3.45%) and Caucasian (3.45%) (Fig. 1).

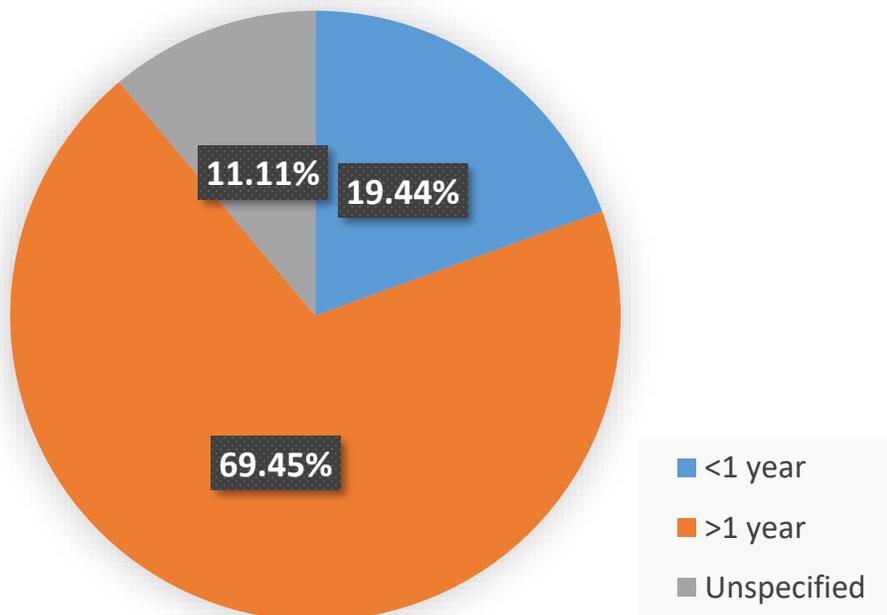


**Figure 1: Breed distribution of dogs with gastric and intestinal ulcers**



**Figure 2: Sex distribution of companion and exotic animal patients with gastric and intestinal ulcers**

*Sex distribution of gastric and intestinal ulcer patients:* Female animals had higher occurrence (17 cases/47.22%) than males (14 cases/38.89%). The sex of 5 animals (13.89%) was unspecified (Fig. 2).

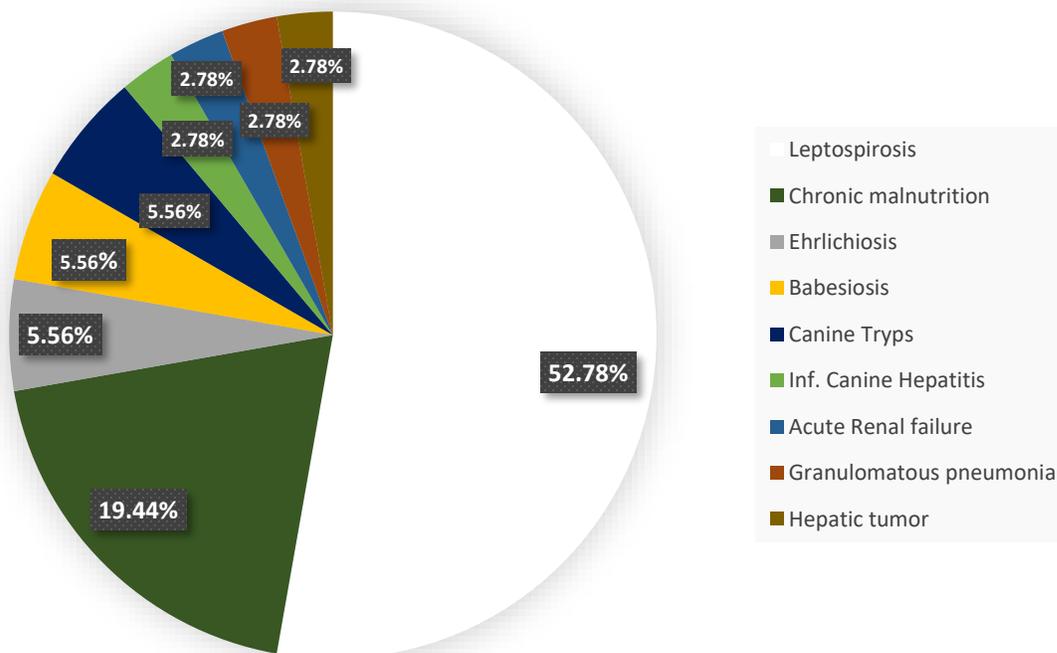


**Figure 3: Age distribution of companion and exotic animal patients with gastric and intestinal ulcers**

**Age distribution of gastric and intestinal ulcer patients:** Patients above 1 year had the highest number of gastric and intestinal ulcers (25cases/69.45%), followed by patients less than 1 year (7cases/19.44%). The ages of 4 patients (11.11%) were unspecified (Fig. 3).

**Distribution of disease conditions in patients with gastric and intestinal ulcers:** Pre-existing disease conditions in patients with gastric and/or

intestinal ulcers included leptospirosis (19 cases/52.78%), chronic malnutrition (7 cases/19.44%), ehrlichiosis (2 cases/5.56%), trypanosomosis (2 cases/5.56%), babesiosis (2 cases/5.56%), hepatic tumor (1 case/2.78%), infectious canine hepatitis (1 case/2.78%), canine acute renal failure (1 case/2.78%) and granulomatous pneumonia (1 case/2.78%) (Fig. 4).



**Figure 4: Distribution of disease conditions in companion and exotic animal patients with gastric and intestinal ulcers**

**DISCUSSION**

The result of this study reveals a high prevalence of gastric and intestinal ulcers among patients with systemic conditions at the VTH, UI, Nigeria. Survey of clinical case records serves for understanding of facility’s disease burden, diagnosis and management challenges as well as personnel training (Friedman *et al.*, 2010; Noteboom and Qureshi, 2014). The cases of gastric and intestinal ulcers recorded were diagnosed by physical and clinical examination, as well as at necropsy.

The highest incidence of gastric and intestinal ulcers was recorded in canine species especially the Rottweiler breed (37.93%), Alsatian (31.03%), Boerboel (17.24%), Local (3.45%), Pitbull (3.45%), Mastiff (3.45%) and Caucasian (3.45%). This trend may be associated with the security concerns in cities influencing the acquisition of exotic breeds of dog in Nigeria (Fielding and Plumridge, 2004, Eyarefe and Dei, 2014) especially for the Rottweiler and German shepherd (Alsatian) breeds (Eyarefe and Adetunji, 2018).

Although more gastric and intestinal ulcer cases were observed in females, there does not seem to be a sex predisposition of occurrence in dogs since Jankowski, *et al.*, (2015) reported higher occurrence in males than females, contrary to this study. The trend observed here may be connected with female dogs being mostly acquired for breeding purposes and preferred for selected aggressive traits (Eyarefe and Dei, 2014).

Most animal owners in Nigeria feed their animals once a day which makes it relatively harder for the owners to notice apparent anorexia associated with the onset of systemic disease conditions. Persistent disease-associated episodes (anorexia and vomiting) may therefore result in the formation of gastric and/or intestinal ulcers. This may have accounted for the higher preponderance of gastric and intestinal ulcer cases in animals older than 1 year.

In this study, gastric and intestinal ulcer diagnosis at autopsy was a secondary finding associated with various primary disease conditions. Previous studies have reported the increased occurrence of gastric and intestinal ulcer disease among animals with pre-existing systemic conditions (Brown *et al.*, 2007; Parrah *et al.*, 2013; Jankowski. *et al.*, 2015). The pathogenesis of ulcer in systemic disease conditions is associated with reduced blood flow to the gastric mucosa layer leading to ischemia and epithelial cell damage due to hypoxia. This in turn triggers an increase in secretion of gastric hydrochloric acid associated with a disturbed feedback between hydrochloric acid, gastrin and histamine, caused by a reduced withdrawal of gastrin and histamine from circulation resulting in ulcers (Duerr, *et al.*, 2004; Wasińska-Krawczyk, *et al.*, 2006). Gastric and intestinal ulcers can also result from the indiscriminate use of certain drugs, including corticosteroids, used in the management of some of these systemic conditions. Corticosteroids promote the development of gastric and intestinal ulcers by increasing gastric acid production and reducing prostaglandin formation, with resultant depletion of mucous and bicarbonate production (Parrah *et al.*, 2013; Jankowski, *et al.*, 2015).

## CONCLUSION

Gastric and intestinal ulcers had a high prevalence among patients with systemic conditions in the study area. It is, however, noteworthy that most clinicians tend to focus more on the management of the primary systemic conditions without instituting necessary preventive measures to mitigate gastric and/or intestinal ulcer development. We therefore recommend that preventive and curative measures be instituted for gastric and intestinal ulcer management while treating predisposing primary disease conditions more in dogs.

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