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SHORT COMMUNICATION

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Clinico-epidemiological study on canine toxicosis in Effurun/Warri Municipality region of Delta State, Nigeria

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ABSTRACT

The purpose of this study was to provide fundamental information on both the common toxicants and poisoning episodes in dogs within Effurun/Warri municipality region of Delta State of Nigeria from 2011 to 2014. The collected data were grouped according to age, sex, breed, year of occurrence, and toxicant type. The study revealed that a total of 76 dogs comprising 12 breeds were poisoned by several toxicants such as pesticides (69%; n=52/76), household products (12%; n=9/76), food–poisons (9%; n=7/76), and snakebite envenomation (3%; n=2/76). Mixed breeds (29%; n=22/76), Alsatian (25%; n=19/76), Rottweiler (16%; n=12/76) and indigenous breed (7%; n=5/76) ranked the topmost breeds accounted for most poison emergencies with human–related factors incriminated. This study provides useful information on episodes of poisoning in dogs in the studied region. The knowledge of agents involved can help veterinarians for accurate diagnosis, and pet owners to cautiously protect their pets from potentially poisonous substances.

Keywords

Dog, Epidemiology, Pesticides, Poison, Toxicosis

ARTICLE HISTORY

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INTRODUCTION

Poisoning is one of the major causes of morbidity and mortality in domesticated animals. Poisoning episodes in pets are occasionally encountered in veterinary practice with many toxic substances being suspected. Animals may be exposed to poisonous substances through ingestion, inhalation, topical application, or by injection into the body. Myriad numbers of toxicants with their varying toxic potencies are found in homes and around the environment, among which about 15 to 20 types of toxicants account for 90% of all small animal intoxications (Fitzgerald, 2006). Prior study ranked toxicosis as the second most serious cause of morbidity and mortality in dogs after Parvovirus enteritis (Shima et al., 2014). In Nigeria, there is inadequate documentation regarding poisoning in cats and dogs. The purpose of this study was to provide fundamental information on both the common toxicants and poisoning episodes in dogs at Effurun/Warri municipality region of Delta State in Nigeria from 2011 to 2014.

MATERIALS AND METHODS

Clinically diagnosed poisoning cases in dogs were carefully abstracted from hospital records from five purposively selected Veterinary Clinics over a period of four years (2011-2014). The studied location, Effurun/Warri municipality region of Delta State, Nigeria comprised an extended development of local government areas which include Warri, Uvwie, Udu, Ughelli, Sapele and Okpe. The area has substantial population of dogs, which are used as pets, for security and means of livelihood. The data of poisoning cases of dogs were collected from the dogs that were admitted in the selected veterinary hospitals and diagnosed of poisoning based on history, clinical signs, post-mortem lesions and in few cases laboratory analyses. The data

were grouped according to the class of toxicant, dog breed, sex, age and year of occurrence. Cases with no assertion for the possible cause were labeled as ''Unknown toxicants.'' The data obtained were then subjected to statistical analysis using statistical package for social sciences software (SPSS) version 20. Descriptive statistics using proportional incidence rate was employed to present the result.

RESULTS AND DISCUSSION

In the current epidemiological survey, nine toxicants were identified, and were grouped under four major categories which are, pesticides, household products, food poisons, and biotoxins (**Figure 1**).

Pesticides: Different pesticides (69%; n=52/76) such as insecticides (55%; n=42/76), rodenticides (11%; n=8/76) and herbicides (3%; n=2/76) were mostly involved in companion animal poisoning compared to other poison categories (**Figure 1**). Toxicity caused by pesticides reported herein was associated mostly with irrational application and poor handling or storage of unused materials. According to previous studies, pyrethrins and pyrethroids insecticides are considered as safe due to their low toxicity; however, recent studies found that these could also intoxicate dogs (Klainbart et al., 2014a, b).

Factors that may expose pets to highly toxic pesticides include licking empty bags or their body following application, attractive color, odor or sweetness of the insecticide, accidental ingestion of poisoned baits intended for targeted species, consumption of poisoned rodents, grooming, and malicious poisoning (Langford et al., 2013; Sanchez–Barbudo et al., 2013; Bautista et al. 2014; Gallocchio et al., 2014). Malicious exposures may happen due to criminal activities and disagreements between neighbors.

In this study, herbicide toxicity has been attributed to its improper use as a de-ticking chemical. Herbicides intoxication may be of little toxic consequences in animals as it may become inactivated by soil after use; however, ingestion of concentrated chemical may cause serious intoxication. Among other factors, exposure of animals to excessive quantities of herbicides may occur through ingestion of herbicide–contaminated vegetation or foods (Talcott, 2013; Knapp et al., 2013; Forster et al., 2014).

Household products: Overall, 12% (n=9/76) cases of toxicosis were attributed to household products (**Figure 1**). The household products include cleaning agents (soaps, detergents and disinfectants) (8%; n=6/76), paints (3%; n=2/76), and kerosene (1%; n=1/76). Pets are more easily intoxicated with these agents compared to any other animals because they are more likely to come in contact with household items. Most common adverse effect of these products is hypersensitivity reactions. Two cases of paint intoxication were recorded in this study and were caused by drinking of contaminated water from an improperly disposed empty paint containers. Lead–based paints (Pb) are the common cause of paint intoxication in animals with no age limitation (Abadin and Llados, 1999). Puppies and younger dogs are more likely to chew on foreign objects; hence they are more vulnerable to Pb poisoning compared to older dogs (Lundgren, 2015). Kerosene intoxication reported in the study might not be unrelated to curiosity of puppies. In addition, pets may be exposed by ingestion during grooming, skin absorption after topical exposure, intentional use of gasoline or kerosene to remove sticky materials from an animal's coat, and access to spills, with aspiration pneumonia being the paramount toxic effect (Cope and Dalefield, 2014; Reuben, 2014).

Foodborne intoxication and infection: Foodborne intoxication in dogs accounted for 9% (n=7/76) and occurred secondary to the affected dogs being fed on rancid or over stayed foods, excess raw fish and meat, garbage and chocolate containing foods. Such foods may contain *Salmonella* spp., *Staphylococcus* spp., *E. coli*, *Botulinum* toxin, aflatoxin, salmon toxin or mycotoxins which consequentially affect animals that feed on it (Moeller et al., 2003; Wouters et al., 2013; Gazzotti et al., 2015). Chocolate is intoxicating to animals of all ages. Dogs unlike other animals are intoxicated by ingestion of even smaller quantities of chocolate (Ahlawat et al., 2014). Alcohol and alcohol containing foods like alcoholic beverages, bread dough, rotten apples, sour dough bread etc. if ingested cause toxicosis in dogs (Kammerer et al., 2003; Means, 2003; Riemann and Cliver, 2006; Keno and Langston, 2011). In summary, foodborne poisoning occurs in dogs due to indiscriminate eating habits and freely availability of the toxic foods.

Biotoxins: In the present study, snake envenomed dogs accounted for 3% (n=2/76) of the total cases. However, detail information on the specific snakes has not been documented. Diagnosis of snake bite in most cases is restricted to the presence of fangs or bite wounds plus other clinical manifestations, and it requires expertise to identify the snake type. In Nigeria, four families of venomous snakes are documented- *Viperidae, Elapidae,*

Table 1: Profile of Incidence rates of intoxication based on sex and age of the dogs.

Category	Sub-Category	Frequency	Percent (%)	95% CI
Sex	Female	27	35.5	24.9–47.3
	Male	49	64.5	52.7–75.1
Age	Adolescent	16	21.1	12.5–31.9
	Puppy	29	38.2	27.2–50.0
	Senior	31	40.8	29.6–52.7
	Total	**76**	**100.0**	

CI = Confidence interval

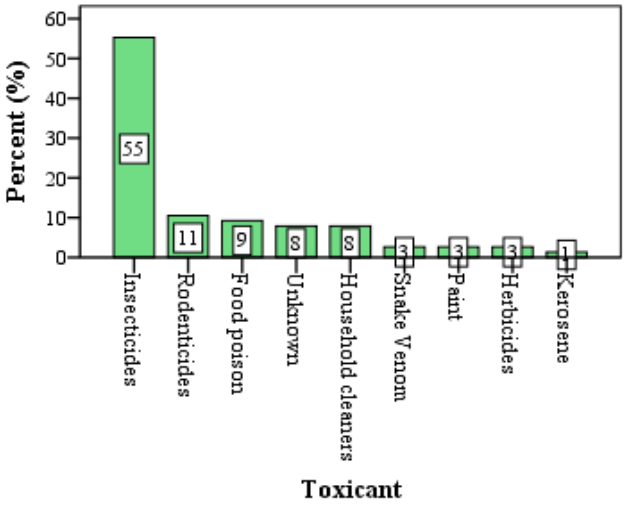

Figure 1: Profile of toxicants associated with toxicosis in the dogs.

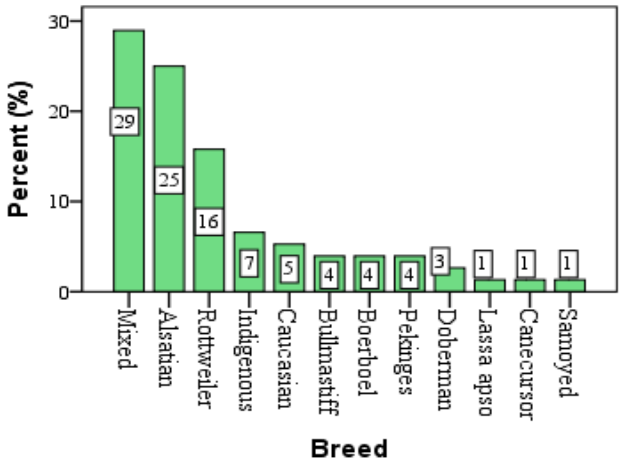

Figure 2: Profile of Incidence rates of intoxication based on dog breeds.

Colubridae, and *Actraspidae* (Habib et al., 2001). Worldwide, *Viperidae* are the major cause of envenomation in human and domestic animals alike (Peterson, 2006; Pritchard et al. 2014; Hadar et al., 2014). Snakes often bite as a defense mechanism against predators or as a mode of hunting preys. Dogs and cats may be exposed to snake bites following preying, fighting and inquisitiveness, but the latter is least susceptible to envenomation (Lenchner et al., 2014). Previous study in dogs estimated snake envenomation prevalence at 0.31% of clinical cases in veterinary practice in New South Wales (Heller et al., 2005).

Sex, age, breed and temporal distribution considerations: Table 1 depicts the distribution of the toxicosis cases by sex and age of the dog. The incidence rate was highest in male dogs (64.5%; n=49/76) as compared to 35.5% (n=27/76) in females. This could be attributed to the population distribution by sex and the straying nature of male dogs which may predispose them to criminal and malicious poisoning. However, there are few instances of sex difference in response to poisons in animals (Tiwari and Sinha, 2010). Furthermore, incidence rates were relatively highest in senior dogs (40.8%; n=32/76) and puppies (38.2%; n=29/76). Very young and very old animals are usually more susceptible to poisons (Tiwari and Sinha, 2010). Senior dogs due to their straying nature are more vulnerable to both malicious and criminal poisoning. Nonetheless, higher incidence in younger dogs could be possible because they tend to be more active, and could be easily poisoned by lower doses of toxicants due to immature neutralizing enzyme systems. Similarly, the amount of a poison required to produce toxic symptoms is related to the body weight of the animals (Osweiler, 2006; Tiwari and Sinha, 2010).

In this study, incidence rates of poisoning in dogs were highest in mixed breeds (29%; n=22/76) followed by Alsatian (25%; n=19/76), Rottweiler (16%; n=12/76), indigenous breed (7%; n=5/76,), Caucasian (5%; n=4/76), Bullmastiff, Boerboel and Pekingese (4%; n=3/76 each), Doberman (3%; n=2/76), and lowest in Cane cursor, Lassa Apso and Samoyed (1%; n=1/76 each) (**Figure 2**).

Mixed breeds, Alsatian and Rottweiler were the most intoxicated breeds. This may not be unrelated to their use as guard dogs and presenting protector behaviors which risk them as targets to criminal poisoning. It may also be related to population distribution. In **Figure 3,** incidence rates were relatively high with little deviations over the analyzed period with 21%

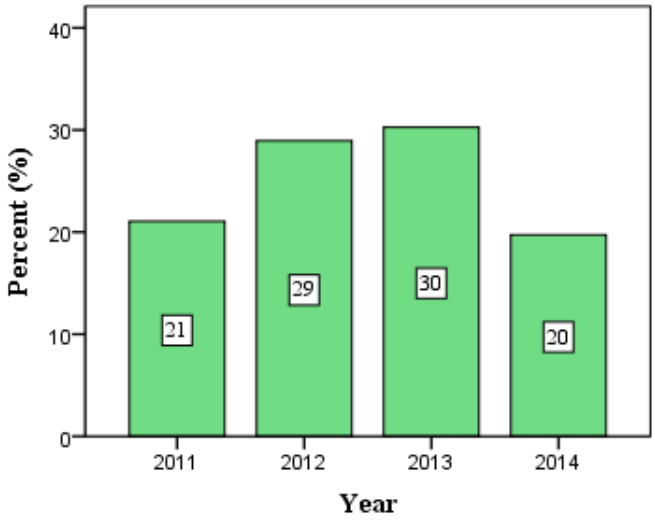

Figure 3: Distribution of the poisoning cases based on the year of diagnosis.

(n=16/76) of the cases occurring in 2011, 29% (n=22/76) in 2012, 30% (n=23/76) in 2013, and 20% (n=15/76) in 2014. The reduction in incidence rate in the year 2014 might be due to improved care given to dogs.

CONCLUSION

The current epidemiological data demonstrate episodes and common causes of poisoning in dogs in Effurun/Warri Municipality region of Delta State, Nigeria. This information may help veterinarians and pet owners especially for the management and prevention of toxicosis in dogs. Furthermore, most intoxications reported in this study are linked to human-related factors, hence owners should read guidelines and safety instructions on pesticides before attempting their use on pets.

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