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PREVALENCE OF GASTROINTESTINAL PARASITES OF LABORATORY ANIMALS IN IBADAN, NIGERIA

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Introduction

From the dawn of time, man has depended on animals for his survival, either as food (cattle, sheep, pigs, poultry etc.) or for competition and companionship (horse, dog, cat, parrots etc.). As he knew more about his surroundings, he extended this dependence to acquisition of knowledge, dating back to the days of the great physician Galen (129-200 AD), who used animals to demonstrate that arteries contained blood and not air. Man has come a long way since then and specially bred laboratory animals consisting of mice, rats, hamsters, guinea pigs, rabbits, cats, dogs and monkeys. Higher farm animals and a variety of birds and other lower forms are now integral part of biomedical research.

Animals and humans get similar diseases. Certain types of animals can stand in for humans with particular diseases. The information we obtain from studies about how we are alike and how we differ benefits people and animals. Animal research usually involves vertebrates, such as cats, mice, frogs, pigs, and primates, and most animals used in research are specifically bred. Laboratory animals have contributed greatly to our knowledge of biological structure and function (Clark *et al.*, 1997) and are essential tools in biomedical research and training (Tsegaye and Shiferaw, 1999). The results from animal studies are crucial for closing the knowledge gaps about health and disease in both humans and animals. Laboratory animals are used extensively in the safety evaluation of therapeutic drugs, foods, chemicals and in a broad variety of biological investigations (Clark *et al.*, 1997), for the diagnosis of infectious diseases, in the production of vaccines, sera and other biological substances of public health and veterinary importance (Tsegaye and Shiferaw, 1999; Tanideh *et al.*, 2010). The use of disease free animals can often lead to a substantial reduction in the number needed for any given experiment (John and Festing, 1976; Fox *et al.*, 2002). Therefore, in order to obtain the optimum benefit from them, laboratory animals

must be of good quality (Tsegaye and Shiferaw, 1999). Laboratory animals of poor quality due to disease can lead to loss of time, money and research effort. Like all animals kept in captivity, laboratory animals become a prime target for parasite infection if appropriate preventive measures are not practiced (Baker, 2007; Tanideh *et al.*, 2010). It has been most useful to verify if, among the commonly used laboratory animals from several supplying animal houses; some are heavily parasitized with helminths and protozoa at the time of delivery, or become infected in the laboratories of destination, where they are sometimes kept for long periods (Hugot, 1980). There is no information available on parasites of laboratory animal in Nigeria. In this regard, the required standard of animals housing and health conditions are often not met, systemic assessment of the problems and evaluating its magnitude are essential steps to improve the situation. Therefore, this study was carried out to identify and determine the prevalence and associated risk factors of gastrointestinal parasites of laboratory animals in Ibadan, Nigeria.

Materials and methods

The study was conducted on laboratory animals; mice (Swiss albino), hare (*Lepus* sp.) and rat (Wistar) of both sexes and different age groups kept for research in various animal houses at the University of Ibadan. The laboratory animals were kept in cages in all the animal houses. They were fed *ad libitum* with concentrate pellets and potable water was provided *ad libitum*.

This study was a cross-sectional study with a purposive sampling of all laboratory animals in the three animal houses in the University of Ibadan. Faecal samples were collected from 35 of 218 animals from Institute of Advanced Medical Research and Training (IMRAT) animal house, 129 of 846 animals from Central and General (CAG) animal houses, College of Medicine and 75 of 452 animals from the Faculty of Veterinary Medicine (FVM). The explanatory variables considered were the species of animals. Three grammes of faecal samples were collected from each group using clean universal bottles. The samples were transported to the Veterinary Parasitology laboratory, University of Ibadan for coproscopic examination.

Faecal samples were examined for presence of helminth eggs and/or protozoan oocysts by sodium chloride floatation methods and evaluated by the modified McMaster slide technique as described by Foryet (2001). Briefly, 2 grammes of faeces was mixed with 60 ml of supersaturated sodium chloride salt solution, the sample was strained through a tea strainer and transferred into the McMaster slide with a pipette. The eggs or protozoa were identified and counted after letting the suspension stand for 5 min (Kahn, 2005). Identification of parasitic eggs and oocysts was carried out as described by Kassai (1999) and Charles and Hendrix (2006).

Data obtained were analysed using percentages to evaluate the prevalence of gastrointestinal parasites among the study animals.

Results

Out of a total of 239 laboratory animals of which are 33 swiss albino, 176 Wistar rats, and 30 hares (*Lepus sp.*) were used. Out of the 239 faecal samples examined, 135 (56.48%) were found positive for gastrointestinal parasites. The highest prevalence was recorded in rats with a prevalence of 61.36% followed by hare 56% and mice 30.30%. The highest prevalence of

nematode was found in mice (66.67%) followed by rats (40.34%). The most prevalent nematode in rats was *Nipostrongylus brasiliensis* (31.25%) followed by *Trichuris* sp. (5.11%). The mice was *Aspiculuris tetraptera* followed by *Syphacia obvelata* with prevalence of 48.49% and 18.18% respectively (Table 1 and Fig. 1). On the other hand, the highest prevalence of cestode was found in rats (27.84%) followed by mice (6.06%). The only cestode identified in mice and rats was *Hymenolepis nana*. The highest prevalence of *Eimeria caviae* was detected in mice followed by hare and rats (39.39%), (13.33%) and (11.36%) respectively. There was no cestode identified in the hare.

At the IMRAT animal house 21 (72.41%) of mice were infected with gastrointestinal parasites. The most prevalent parasite was *Apicularis tetraptera* followed by *Eimeria caviae*, *Syphasia obvelata,* and *Hymenolepis nana* with the prevalence of 55.17%, 44.83%, 20.69% and 6.9% respectively. However 2 (33.33%) of rats were infected with gastrointestinal parasites and only *Nipostrongylus braziliensis* and *Hymenolepis nana* were detected with a prevalence of 33.33% and 16.77% respectively (Table 2). The oocyst per gramme (opg) of faeces was high (2,185 oocyst/gramme) in mice infected with *Eimeia caviae*. However oocysts were not recovered from the faeces of rats (Table 3).

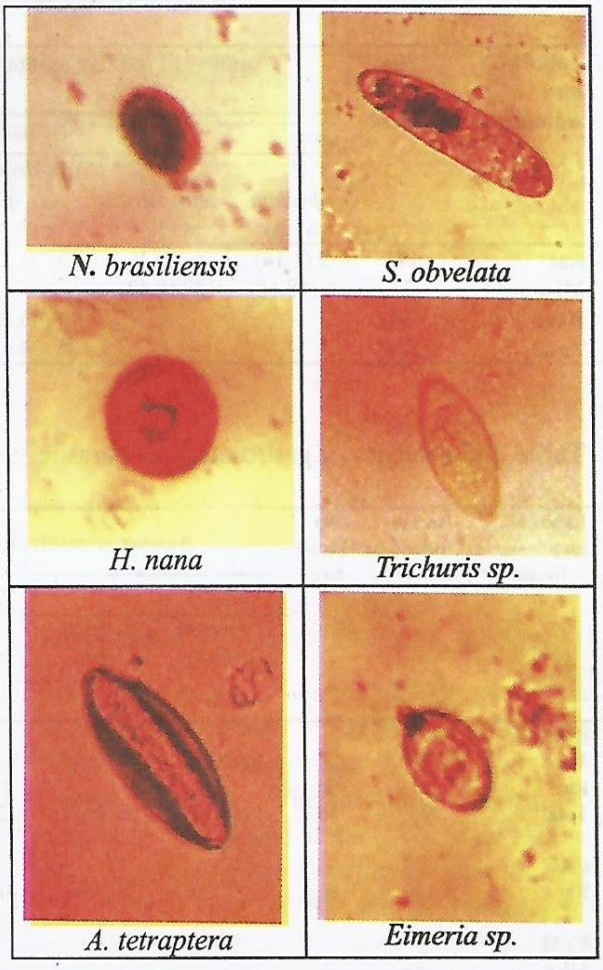

Fig. 1: Helminth ova and protozoan oocysts recovered from laboratory animals.

Table 1: Prevalence of gastrointestinal parasites in different species of laboratory animals

Laboratory Animals	No examined	Number of positive animals and Prevalence (%) of gastrointestinal Parasite						
		Nematode					Cestode	Protozoa
		S. obvelata n (%)	*A. tetraptera* n (%)	*Nipostrongylus sp* n (%)	*Trichuris sp.* n (%)	Sub total n (%)	*H. nana* n (%)	*E. cerviae* n (%)
Rat	176	2 (1.14)	5 (2.84)	55 (31.25)	9 (5.11)	71 (40.34)	49 (27.84)	20 (11.36)
Mice	33	6 (18.18)	16 (48.49)	-	-	22 (66.66)	2 (6.06)	13 (39.39)
Hare	30	-	-	14 (46.67)	-	14 (46.67)	-	4 (13.33)
Total	239	-	-	26 (34.67)	-	26 (34.67)	51 (21.34)	37 (15.48)

Table 2: Prevalence of gastrointestinal parasites in different laboratory animal houses

Laboratory Animals	No examined	No Positive	Number of positive animals and Prevalence (%) of gastrointestinal Parasite						
			Nematode					Cestode	Protozoa
			S. obvelata n (%)	*A. tetraptera* n (%)	*Nipostrongylus sp* n (%)	*Trichuris sp.* n (%)	Sub total n (%)	*H. nana* n (%)	*E. cerviae* n (%)
IMRAT									
Mice	29	8	6 (20.68)	16 (55.17)	-	-	22 (75.86)	2 (6.9)	13 (44.83)
Rat	6	2	-	-	2 (33.33)	-	2 (33.33)	1 (16.67)	-
Total	35	10	6 (17.14)	16 (45.71)	2 (5,71)	-	24 (68.57)	3 (8.57)	13 (37.14)
CAG									
Rat	129	81	2 (1.55)	5 (3.88)	41 (31.78)	9 (6.98)	57 (44.19)	40 (31.01)	16 (12.40)
FVM									
Mice	4	2	-	-	-	-	-	-	2 (50)
Rat	41	25	-	-	12 (29.27)	-	12 (29.27)	8 (19.51)	4 (9.76)
Hare	30	17	-	-	14 (46.67)	-	14 (46.67)	-	4 (13.33)
Total	75	44	-	-	26 (34.67)	-	26 (34.67)	8 (10.67)	10 (13.33)

Table 3: Gastrointestinal parasite load in different laboratory animals

Laboratory Animals	Average Egg/oocycyst per gramme of faeces					
	Nematode				Cestode	Protozoa
	S. obvelata x10^2	*A. tetraptera* x10^2	*Nipostrongylus sp* x10^2	*Trichuris sp.* x10^2	*H. nana* x10^2	*E. cerviae* x10^2
IMRAT						
Mice	2.83	1	-	-	1.75	21.85
Rat	-	-	1.5	-	2	-
CAG						
Rat	1	2.2	6.23	1.33	12.86	13.25
FVM						
Mice	-	-	-	-	-	15.5
Rat	-	-	283.26		11.78	3.5
Hare	-	-	34.79	-	-	135.00

At the FVM animal house, 2 out of 69 mice were infected with *Eimeria caviae* and nematode, but cestode parasites were not found. However out of the 336 rats 25 (60.98%) were infected with gastrointestinal parasites. The most prevalent parasite was *Nipostrongylus brasiliensis,* followed by *Hymenolepis nana* and *Eimeria caviae* with the prevalence of 29.27%, 19.51% and 9.76% respectively. Out of the 47 hares examined, 14 (46%) were infected with *Nipostrongylus brasiliensis* while 4 (13.33%) were infected with *Eimeria caviae* (Table 2). The oocyst count in mice and hares was high with an opg of 1,550 and 13,500 respectively. Rats were also heavily infected with *Nipostrongylus brasiliensis* with an average of 28,326 epg (Table 3).

At the CAG animal house, out of 846 rats, 81 (9.57%) were infected with gastrointestinal parasites. *Nipostrongylus brasiliensis* and *Hymenolepis nana* were the most prevalent with the prevalence of 31.78% and 31.01% (Table 2). The infection of rats with *Eimeria caviae* and *Hymenolepis nana* was moderate, while infection with other nematodes was low (Table 3).

Discussion

The prevalence of nematode parasites was higher in rats at the Central and general animal house than the one at the IMRAT and FVM animal houses. Whereas four genera of nematode were found at the CAG animal house, only *Nipostrongylus brasiliensis* was found at the IMRAT and FVM animal houses. The prevalence of the only cestode found in rats at the CAG animal house was higher than that IMRAT and FVM animal houses. Eimeria oocyst was detected in rats at the CAG and FVM animal houses, but was absent at the IMRAT animal house. It was not possible to determine the level of the differences because the sample size was not the same. It is therefore important to note that rats at the CAG animal house were infected with a wider spectrum of parasites compared to the other two animal houses.

Nematode and cestode were detected in mice at the IMRAT animal house, while these parasites were not detected at the FVM animal house.

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SHORT COMMUNICATION

HELMINTH PARASITES OF DOMESTIC PIGEONS (*COLUMBIA LIVIA*) IN IBADAN, NIGERIA.

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Although reports have been published on the helminthes of pigeons in Africa[1] there is no information about these parasites in pigeons in Nigeria. The birds are used mainly as a source of protein and traditional festivals. They are kept in wooden nest enclosures from which they manage to escape readily and may thus be considered as free-range birds. They are fed on the leftover human food and occasionally some grains. Internal and external parasites are very common as these pigeons are usually not treated for parasites[2, 3]. As information was unavailable on the occurrence of helminth infections of domestic pigeons in Nigeria, necrospy examinations were carried out on some pigeons. The present paper reports the helminth parasites recovered from these birds.

Eighty domestic pigeons from different markets during the rainy months of June and July 2002 were examined. The birds were housed in a wire mesh enclosure. The pigeons were starved for one day before they were sacrificed by ether inhalation and necropsy performed. The respiratory and digestive tracts were separated. The digestive tract was separated into oesophagus, crop, proventiculus, gizzard, small intestine, caecum and large intestine. The contents of each were empted into petri dish and the mucosae were washed thoroughly with tap

Table 1: Helminths recovered from 80 domestic pigeons in Nigeria.

Organ	*Species*	*Pigeons Infected (percent)*
Proventriculus	*Dispharynx spiralis*	10
Small Intestine	*Ascaridia columbae*	65
Small Intestine	*Raillietina spp*	91
Large Intestine	*Ascaridia columbae*	30
Large Intestine	*Raillietina spp*	50

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The prevalence of gastrointestinal parasites was higher in rats than mice. However a study in Brazil showed a higher degree of parasitism (96 to 100%) in mice compared to rat (Hayunga, 1991). The prevalence of helminthiasis was higher in rats (35.80%) than mice (9.34%). More recently, Tanideh *et al.* (2010) reported higher prevalence of helminthiasis (50 to 100%) in laboratory animals at the Shiraz University of Medical Sciences of Iran. Rafique *et al.* (2009) reported similar results that, the prevalence of all the helminths in mice was 60% in samples collected from Kachiabadies in Pakistan. The prevalence of cestode was higher in rats than mice and the only cestode identified was *H. nana*. From our study these findings are lower than those reported for mice by Pinto *et al.* (1994), who reported a prevalence of 32% *H. nana*. The present study indicated that laboratory animals in the University of Ibadan were infected with helminth parasites and Eimeria oocysts. Therefore, the animal houses should improve on the handling of laboratory animals and maintain a high level of hygiene. This is necessary to avoid experimental research results, involving the use of animals, from being confounded with the problem of unclean animals complicating the results.

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