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Epidemiology of gastrointestinal parasites of one- humped camel (*Camelus dromedarius*) slaughtered in Sokoto central abattoir, Sokoto state, Nigeria

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ABSTRACT

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A parasitological examination was conducted using a Zinc Sulphate floatation technique which employed on the faecal samples of one hundred and fifty (150) camels comprising of both male and female. The camels were managed extensively together with other livestock. A total of 131 (87.3%) samples were found to be positive for the three genera of helminthes, namely; Nematodes (77.8%), Trematodes (5.6%) and Cestodes (5.6%) and 19 (12.8%) of the samples were found to be negative for any parasite. Out of 85 (56.7%) number of male sample collected, 80 (53.3%) were found to be positive and out of the 65 (43.3%) of the female samples collected, 51 (34.0%) was found to be positive. Sixteen (16) different types of parasites were found to be infecting the animals examined. Mixed infection with more than one genus of helminthes was also observed. The parasites encountered in this study have economic and public health significance, thus, there is a need for the enlightenment of camel owners for the need to deworm their animals in respect to it's zoonotic potentials in countries with significant population of camels.

1. Introduction

Camel is an ancient animal well known in the history of human civilization. It belongs to the class Mammalia; the order Artiodactyla; sub-order Tylopoda; and family Camelidae (Al Haj and Al Kanhal, 2010). It has been domesticated for transportation, meat, clothing and milk over 4000 years ago (Wilson, 1984). The meat is of good quality especially in areas where other meat animals find it difficult to thrive (Kadim *et al.*, 2008) and the milk quality is of comparable quality to cattle and it provides milk for longer duration compared to other similarly domesticated animals (Mehala *et al.*, 1995). There are two known species of camels, namely; *Camelus bactrianus* (the two humped camels), *Camelus dromedarius* (the one humped camel) which is also called the trade camel or Arabian camels (Dorman, 1986).

The population of dromedary camels in the world is estimated to be 20 million (FAO, 2008). Camel produced 57 million tons of milk, 0.38 million tons of meat, 0.03 million tons of hides and 0.023 million tons of fibers annually. In Nigeria, most camels are concentrated around arid zones and their population is put at 87000 (Ghaji and Adogwa, 1986). Camel is known to tolerate a lot of parasitic infections of economic importance among many animals with minimal economic losses (Jackson, 1987), but it is also known to be infected with various helminth parasites which can cause diarrhea and other clinical signs and lead to a decrease in productivity of the camels (Tembely *et al.*, 1992). Some of these helminth parasites also have zoonotic implication for those who work closely with camels (McCarthy and Moore, 2000).

Camels are almost certainly the domestic animal best adapted to the harsh environments and fluctuating nutritional conditions of the arid and extremely arid zones. Internal parasites such as trematodes, cestodes and nematodes are generally known to contribute to a great loss in animal production (Schmindz, 1989). The major clinical signs of parasitic gastroenteritis due to internal parasitism which include; severe diarrhea, stomach pain, weight loss, reduce production rate, decrease feed intake and subsequent death in more severe cases. The zoonotic aspects of these parasites are of public health significance (Allen, 1992).

This research was carried out to determine the epidemiology of gastrointestinal parasites in camels slaughtered at Sokoto central abattoir, Sokoto state, Nigeria and its implication on the general health of the camels and public especially in countries with significant camel populations.

2. Materials and methods

2.1. Study area

The study area is Sokoto Central abattoir, which is located in Sokoto North local government area of Sokoto State, Nigeria. Sokoto State is geographically located at the North Western part of Nigeria, between longitudes 4°8'E and 6°54' E and latitudes 12° N and 13°58'N. The State share boundaries with Niger Republic to the North, Kebbi State to the West and Zamfara State to the East. Sokoto State covers a total land area of about 32,000 square kilometres with an estimated human population of 3,696,999 (NPC, 2006). The State rank second in the Nigerian livestock population with an estimated 3 million cattle, 3 million sheep, 5 million goats, 4,600 camels, 52,000 donkeys and host of other species of local and exotic poultry species (MOCIT, 2002; Mamman, 2005). Most of the camels were brought in from North Africa via Chad and Niger republics where they serve useful purposes of transportation, milk and meat production, the textile industry raw materials, recreation and prestige (Ghaji and Adogwa, 1986).

2.2. Sample collection

Samples were collected from Sokoto Central abattoir, Sokoto state, Nigeria. The sampling method was sampling by convenience of which a total of 150 samples were collected for analysis. The samples were collected in a well labeled sterile universal plastic bottle following evisceration of the gastrointestinal tracts of the slaughtered camels. The collected samples always reached the Department of Veterinary Public Health and

Preventive Medicine laboratory at most 12 hours after collection and were either examined immediately or refrigerated at 4°C.

The samples were collected between the period of May and September, 2006.

2.3. Parasitological Examination

2.3.1. Zinc sulphate centrifugal floatation technique

An approximate 1gm of faeces was mixed in 5ml of water in a test tube, the mixture was sieved through a tea strainer into a 15ml centrifuge tube and the floatation solution was added until almost full. The Zn₂SO₄-faecal mixture was then centrifuged at 2000 rpm for 4 minutes, the tube was then removed from the centrifuge and more floatation solution was added until a convex meniscus was visible at the top of the tube (WHO, 1991). A cover slip was gently placed on the top of the tube and was left for ten minutes, the cover slip was then removed and then transferred to a light microscope slide and examined under X10 objective first and X40 objective for magnification.

2.3.2. Identification of the parasite eggs

This was based on the microscopic and morphological appearance of the eggs encountered during examination of each sample under magnification X10 and X40 objectives. Microscopic appearance of the eggs was then carefully compared with those in standard texts, literature and micrographs for proper identification.

3. Results

One thirty one (87.3%) out of 150 examined camel faecal samples by floatation technique are positive for a range of helminthes. Sixteen different types of helminthes were identified with the nematode, *Haemonchus specie* (17.3%) showing the highest prevalence among all other species found. The other genera found are seen in table 1 below.

Table 1

Overall prevalence of helminthes parasites found in camels slaughtered at Sokoto Central Abattoir, Sokoto state, Nigeria.

| Identified helminthes | Prevalence (%) |
|--------------------------------|----------------|
| <i>Haemonchus specie</i> | 17.3 |
| <i>Strongyloid specie</i> | 10.0 |
| <i>Trichuris specie</i> | 4.3 |
| <i>Trichostrongylus specie</i> | 4.6 |
| <i>Ascaris specie</i> | 6.4 |
| <i>Paraphistomum specie</i> | 7.4 |
| <i>Ostertagia specie</i> | 11.8 |
| <i>Moniezia specie</i> | 6.4 |
| <i>Nematodirus specie</i> | 2.7 |
| <i>Capillaria specie</i> | 2.7 |
| <i>Oesophagostomum specie</i> | 1.5 |
| <i>Dictyocaulus specie</i> | 2.0 |
| <i>Bunostomum specie</i> | 4.2 |
| <i>Ancylostoma specie</i> | 3.3 |
| <i>Parascaris specie</i> | 1.4 |
| <i>Toxocara specie</i> | 1.3 |
| Total | 87.3% |

Table 2 shows the prevalence of the parasites found in male (53.3%) and female (34.0%) camels within the study area, so also table 3 showing the prevalence of each genera of the helminthes found within the slaughtered camels, namely; Nematode (87.5%), trematodes (6.25%) and cestodes (6.25%).

Table 2

Helminthes infection between male female camels slaughtered at Sokoto Central abattoir, Sokoto state, Nigeria.

| | Infected | Non-infected | Total |
|--------|-------------|--------------|------------|
| Male | 80 (53.3%) | 5 (5.9%) | 85 (56.7%) |
| Female | 51 (34.0%) | 14 (21.5%) | 65 (43.3%) |
| Total | 131 (87.3%) | 19 (27.4%) | 150 (100%) |

Table 3

Overall prevalence of the helminthes genera found in camels slaughtered at Sokoto Central abattoir, Sokoto state, Nigeria.

| Helminthes genera found | No. of genera found | Prevalence (%) |
|-------------------------|---------------------|----------------|
| Trematodes | 1 | 6.25 |
| Nematodes | 14 | 87.5 |
| Cestodes | 1 | 6.25 |
| Total | 16 | 100% |

4. Discussion

A total of 131 (87.3%) samples out of the total of 151 showed the presence of strongyle eggs, which is a finding that agrees with a studies conducted by El-Bilari and Kawasmeh, (1980) at Saudi Arabia on slaughtered camels and also a prevalence of 92.4% was reported in a similar studies carried out by Bamaiyi and Kalu (2011) on camels slaughtered at Maiduguri Central abattoir, Borno state of Nigeria. The high prevalence of helminthes reported in this study was due to the fact that the study was carried out during the rainy season (May to September) and worm burdens are known to be high during this period (Nwosu *et al.*, 2007). Similar reports have been documented in Camels at Zaria (Mohammed *et al.*, 2007). The high prevalence rate for *Haemonchus specie* is consistent with previous findings of other studies (Abdul-Salam and Farah, 1988; Kamani *et al.*, 2008). This study supports previous findings that nematodes are the commonest helminths in camels (Table 3) (Abdul-Salam and Farah, 1988; Mohammed *et al.*, 2007; Kamani *et al.*, 2008).

The most prevalent species of the parasites in this study were *Haemonchus* spp, *Strongyloides* spp and *Trichuris* spp (Table 1), other nematode species encountered were; *Trichostongylus* spp, *Ascaris* spp, *Ostertagia* spp, *Nematodirus* spp, *Capillaria* spp, *Oesophagostomum* spp, *Dictyocaulus* spp, *Bunostomum* spp, *Ancylostoma* spp, *Parascaris* spp and *Toxocara* spp (Table 1). So also male camels were found to be harbouring the parasite more than the female camels as reported by the studies (Table 2), even though the number of males slaughtered are higher than in females. The variation could be attributed to the difference in the management system. More so, in this part of the tropics, Sokoto to be precise, camels always grazed together with other animals species such as dogs, donkeys, goats, sheep, cattle and birds which are reservoirs of some of these worms. Thereby increasing the chances of parasite infection and also the camels have no history of previous deworming or medication.

5. Conclusion

This study shows that camels are infected with a range of helminthes parasite in Sokoto state especially among the ones slaughtered at Sokoto Central abattoir. The parasite encountered in this study have economic and public health significance, thus, there is a need for the enlightenment of camel owners for the need to deworm their animals in respect to it's zoonotic potentials in countries with significant population of camels and also there is a need to further the research across the state and the Nation at large.

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