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Prevalence of hydatidosis among food animals in semi-arid North-Eastern Nigeria

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ABSTRACT: The prevalence of hydatidosis in slaughter food animals was investigated in Maiduguri between February and June, 1998. Out of 15,155 animals examined at the Maiduguri metropolitan abattoir, 547 (3.6%) were harbouring hydatid cysts. More camels (9.4%) were infected followed respectively by goats (2.1%), sheep (1.4%) and cattle (1.1%). The study also revealed that female (4.6%) and adult (4.2%) animals respectively had significantly more ($P<0.05$) infection than the males (2.6%) and young (1.1%) ones. The prevalence of the infection was significantly higher in extensively reared (4.3%) than intensively (0.8%) managed animals ($P<0.05$). Although infection was encountered in the animals during all months of the study, they were generally highest in June (5.1%) and lowest in March (2.8%).

A total of 1,017 cysts were recovered from the various organs of the animals examined during the study with the lungs showing the highest cyst burden (73.9%), followed respectively by the liver (25.1%) and the spleen (1.0%). Also, cyst counts were higher in camels (695) compared to cattle (149), goats (108) and sheep (65). The mean size of cysts encountered were largest for those recovered from the lungs (4cm) compared to those from the liver (3.3cm) and spleen (3cm). Most of the cysts recovered were sterile (36.3%), followed respectively by fertile (25.8%), immature (16.9%), calcified (14.7%) and suppurative (6.4%) forms.

Key words: Zoonotic diseases; Hydatid cysts; Hydatidosis; Slaughter food animals.

Introduction

Hydatidosis is one of the zoonotic helminthic diseases of world wide significance and constitutes a major economic problem by lowering livestock productivity and engendering the condemnation of edible offal (Admu and Ajogi, 1996). High incidence of the disease in food animals have been reported from the forest (Arene, 1985), guinea Savannah (Dada and Bellino, 1978) and Sudan Savannah (Dada and Bellino, 1979) zones of Nigeria, information on the disease in food animals in the semi-arid northeastern part of Nigeria is scarce hence the need for this study.

Materials and Methods

Visits were made to the Maiduguri Metropolitan abattoir between February and June 1998. Various organs including the liver, lungs, spleen etc. from camels, cattle, sheep and goats were grossly examined during slaughter and evisceration for the presence of hydatid cysts. In all cases, the sex, age and management histories of the animals were determined and recorded. Sheep and goats aged one year or less and cattle and camels aged two years or less were regarded as young compared to adults, which were above these ages. On the whole, a total of 15,155 animals made up of 4,059 camels, 3,506 cattle, 3,643 sheep and 3,947 goats were examined during the study.

In all cases, where cysts were identified, the total number recovered for each animal specific organ were recorded for each month. The size of each cyst was measured using a metre rule. The various cysts collected were taken to the laboratory and examined further under light microscope to determine whether they were fertile or infertile after rupturing and observing for the presence or absence of protoscolices and mortality of rostellar hooks. Subsequently, the cysts were classified as either suppurative, calcified, sterile, immature or fertile based on the descriptions of Srivastava et al (1982).

The various data obtained were analyzed statistically with 'P' values less than 0.05 being regarded as significant (Mead and Curnow, 1983).

Results

The results of this study revealed that out of the 15,155 slaughter animals examined at Maiduguri during the period, 547 (3.6%) were harbouring hydatid cysts. As shown in table 1, camels were generally more commonly parasitized (9.4%), followed respectively by goats (2.1%), sheep (1.4%) and cattle (1.1%). Infection was also significantly more common among female than male ($P < 0.05$) animals except in sheep where it was equally distributed among the sexes ($P > 0.05$). Similarly, in all cases, infection was significantly greater ($P < 0.05$) among either adult or extensively managed animals than young or intensively reared animals. Although infection was common during all months of the study, it was generally highest in June and lowest during March.

As shown in table 2, a total of 1,017 cysts were recovered from all the animals examined during the study. A significantly greater number of cysts were recovered from camels (695) than cattle (149), goats (108) or sheep (65). In terms of organ predilection, cyst were recovered from the liver and lungs of all the animals examined except in camels where they also occurred in the spleen. In general, the lungs had a significantly greater proportion ($P < 0.05$) of the cyst (73.9%) than either the liver (25.1%) or the spleen (1.0%). This was also the case in cattle and camels but not in sheep and goats which had more cysts in the liver than the lungs. Similarly, cysts recovered from the lungs were generally larger than those recovered from either the liver or the spleen but not significantly so ($P > 0.05$). Among the cysts recovered, most were sterile (36.3%) followed respectively by fertile (25.8%), immature (16.9%), calcified (14.7%) and suppurative (6.4%) forms (table 3). A similar trend was recorded in camels and cattle but not in sheep and goats where most cysts encountered were either immature or fertile rather than sterile forms.

Discussion

The results of this show that hydatidosis is a common disease of food animals in this semi-arid region of Nigeria. However, the prevalence of the disease recorded during this study is lower than those reported for other geographical regions of Nigeria (Dada and Bellino, 1978; Arene, 1985; Baba et al, 1994; Ajogi et al, 1995) or elsewhere in the world (Islam and Rahman, 1977; Srivastava et al, 1983). The lower prevalence recorded in the present study may be associated with the semi-arid nature of the environment of the study area since the other studies were carried out in generally more humid environments which are more favourable to the development and survival of the preparasitic stages of the parasite.

Table 1: Prevalence of hydatidosis according to month of examination, sex, age and management history of slaughter animals examined at Maiduguri, Nigeria

	Number examined (% infected)			
	Camels	Cattle	Sheep	Goats
				Total
All	4059 (9.4)	3506 (1.1)	3643 (1.4)	3947 (2.1)
				15155 (3.6)
<u>Sex</u>				
Male	1856 (6.6)	1699 (0.8)	1751 (1.4)	1917 (2.1)
				7223 (2.6)
Female	2203 (11.6)	1807 (1.3)	1892 (1.4)	2030 (2.8)
				7932 (4.6)
<u>Age</u>				
Young	760 (2.9)	680 (0.3)	630 (0.6)	640 (0.5)
				2710 (1.1)
Adult	3299 (11.2)	2826 (1.2)	3013 (1.5)	3307 (2.4)
				12445 (4.2)
<u>Mgt. system</u>				
Extensive	3259 (11.4)	3000 (1.1)	3000 (1.5)	3020 (2.5)
				12279 (4.3)
Intensive	800 (1.3)	506 (0.8)	643 (0.8)	927 (0.5)
				2876 (0.8)
<u>Month</u>				
February	991 (9.9)	875 (0.9)	819 (0.6)	1003 (1.4)
				3688 (3.4)
March	865 (8.1)	779 (0.6)	865 (0.7)	954 (1.7)
				3463 (2.9)
April	577 (9.5)	478 (0.6)	515 (1.7)	567 (3.0)
				2137 (3.9)
May	898 (8.4)	768 (1.2)	780 (1.0)	854 (2.1)
				3300 (3.3)
June	728 (11.3)	606 (1.8)	664 (3.2)	569 (2.8)
				2567 (5.1)

Table 2: Organ distribution of hydatid cysts in slaughter animals examined at Maiduguri, Nigeria.

Animal	All organs	Number (%) cyst recovery/organ			Mean (range) size of cyst (cm)		
		Lungs	Liver	Spleen	Lungs	Liver	Spleen
Camel	695	583 (83.9)	102 (14.7)	10 (1.4)	4.9 (1-8)	3 (1-9)	3 (2-8)
Cattle	149	106 (71.1)	43 (28.9)	0	4 (2-6)	3 (2-9)	0
Sheep	65	26 (40.0)	39 (60.0)	0	5 (1-7)	4 (1-5)	0
Goats	108	37 (34.3)	71 (65.7)	0	3 (1-6)	3 (1-6)	0
All	1017	752 (73.9)	255 (25.1)	10 (1.0)	4 (1-8)	3.3 (1-9)	3 (2-8)

That the infection was most prevalent in camels and least in cattle agrees with the reported observation (1982) and Adamu and Ajogi (1996) who also associated the higher prevalence in camels to their indigestion of grazing contaminated with dog faeces or the ingestion of infective eggs in drinking water. On the other hand, Soulsby (1982) associated the low prevalence recorded in cattle to the very low fertility of cysts recovered from them.

As observed by Islam (1981) and Srivastava et al (1982), higher prevalence of infection was recorded for female than male animals during the present study. These findings have been associated with the fact that female animals being usually kept for longer periods for breeding purposes than males thus have greater exposure to infection. On the other hand, Islam (1981) and Srivastava et al (1982) reported that the source of infection. Extended periods of exposure to contaminated environments may explain the higher prevalence recorded in adults and extensively managed animals in comparison to young and intensively managed animals. Afsher et al (1971) and Dixon et al (1973) reported similar observations in Iran and India respectively.

Although the effect of season on the prevalence of the infection in animals could be investigated for the short duration of the study, infection was noted to be most common in June and least in March during the study. However, earlier reports elsewhere have suggested that the season of the year had no significant effect on the epidemiology of the infection (Nnochiri, 1975; Soulsby, 1982; Lawson and Gemmel, 1985). Therefore there is need for further studies to clarify the role of climatic conditions on the epidemiology of the parasite in the study area.

The greater prevalence of infection in camels was also reflected in their containing significantly more cysts than any of the other animals examined during the study. Similarly, the finding that a greater proportion of cyst in camels and cattle occurred in the lungs as against the liver or spleen agrees with previous studies. For instance, while Galloway (1974) agrees that cysts occur more commonly in the lungs than the liver of ruminants, Islam (1981) described the lungs as the preferred site for the parasite. However, in contrast to the above, the results of the present study further showed that in sheep and goats, significantly more cysts occurred in the liver rather than the lungs. The size of the cysts recovered from the animals during this study generally conforms to those reported by Soulsby (1982) and Georgi (1990) who noted that hydatid cysts commonly measure about 5 – 10 cm in diameter. The reasons for the larger sizes of the cyst recovered from the lungs in comparison to those from the liver or spleen are not immediately evident.

The cysts recovered during the study were at various stages of development or decay ranging from the immature, fertile, sterile or suppurative to calcified forms. The higher prevalence of sterile cysts in cattle and camels observed during this study agrees with the observations of Soulsby (1982) and Thompson (1977) who noted that about 50% of the hydrated cysts recovered from cattle and buffaloes are usually sterile and associated with the age of the host upon infection. However, the finding of mostly immature fertile cysts in sheep and goats during this study is of serious epidemiological significance since the small ruminants are more commonly slaughtered in private homes and their offal more frequently available to dogs. This observation may serve as a key factor for consideration in the epidemiology and control of the disease and especially as it relates to public health and zoonosis.

In conclusion therefore, although the prevalence of hydatidosis as recorded in food animals examined in Maiduguri is low, it is of high animal and public health significance. Therefore, there is need to adequately control the infection through regular screening and deworming of dogs, restriction of dogs from straying especially into abattoir environments and access to offal of slaughtered animals, improved management of livestock in order to deny them access to grazing contaminated with dog faeces and public enlightenment campaigns on the methods of prevention and control of the disease.

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