Research Journal of Medical Sciences 1 (2): 110-112, 2007

Human Nematode Ova in Cyclorrhaphan Flies in Owerri, South Eastern Nigeria

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Abstract: A study was carried out to identify the intestinal nematode transmitted by *Cyclorrhaphan* files in a market environment. Three *cyclorrhaphan* species were identifies namely, *Musca domestica, Musca sorbens, Chrysomya megacephala*. Like wise, three nematode species eggs (*Ascaris lumbricoides, Trichuris trichiura* and *Ancyclostoma duodenale)* were isolated from the gut and surface of flies. *Ascaris lumbricoides* occurred more in and on all the flies *Chrysomya megacephala* recorded the highest prevalence of all the helminth eggs present. On gut content, *Chrysomya megacephala* recorded the highest number of the different helminth eggs isolated. Interestingly there was no correlation between the occurrence of the helminth eggs species and the three *cyclorrhaphan* flies identified.

Key words: Human nematode, cyclorrhaphan files eggs, isolated, eggs species, helminth eggs

INTRODUCTION

Human intestinal nematodes are one of the most common infections in human, especially in tropical and subtropical countries. More than one billion of the world population including at least 400 million school age children are chronically infected with the roundworm, *Ascaris lumbricoides*, the whipworm, *Trichiris trichuris*, *hookworm*, *Ancylostoma duodenale* and *Necator Americanus* (WHO, 1999).

Death is a rare consequence of these high morbidity infections but it's occurrence assumes substantial significance in communities with a very high prevalence of these infections. Intestinal obstruction, *anaemia*, *Trichuris Dysentery Syndrome* (TDS) are potentially fatal clinical problems which commonly complicate infection.

These soil-transmitted nematode, once excreted, most of the pathogen progeny usually die. However, some are transmitted through contaminated food and water and some unhealthy hygienic practices. *Cyclorrhaphan* flies are made up of four families viz., Glossinidae (Tsetse fly) Calliphoridae (Blow flies) Muscidae (House flies) and *Qestridae* (warble flies). The later three have been incriminated as mechanical and biological vectors of these infections (Greenberg, 1973; Sulaiman *et al*., 1988; Monzon, 1991). Transmission may take place via direct transfer of the pathogens/helminth eggs to food or surface that are used for food preparation, penetration of larvae through the body surface or via their vomit and faeces. During the life span of the flies which may last for a few days to two months, flies are likely to pick up and deposit enteric pathogens innumerable times.

Intestinal nematode infection implore a major constraint on the economy of nations, therefore, most efforts are now being launched by WHO, the World Bank and other agencies to control morbidity and mortality as a result of nematode infections. Detail studies had been carried out in the state on helminth infection, roles of environment and personal hygiene (Udonsi, 1981; Anosike *et al*., 2006; Ike, 2006). Unfortunately, specific reports on the role of flies as vectors of helminths are rare. This research will attempt to provide some epidemiological data necessary for the control and elimination of intestinal nematode infection. The objectives include: To identify *Cyclorrhaphan* species in the study are; to isolate the nematode ova/eggs on the surface and gut of the flies identified, thereby established them as vectors, determined the prevalence rate of the various nematodes in or on different fly species and lastly, make a statement on the predisposing factors to infection.

MATERIALS AND METHODS

Study sites: The study sites are at Owerri main Market. The cabbage points at the meat, fish and vegetable section of the market were sampled. The market is under poor sanitary condition with cabbage or refuse points in close proximity to trader's shops and eating joints.

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This research was carried out between January and March 2002. Adult flies were trapped using sweep net and the operation was carried out between 9-12 am twice a week.

All the trapped flies were killed by deep freezing at-20°C. The flies were sorted out, identified using morphological characteristics (Sulaiman *et al*., 1988) and pooled in groups according to species. Each batch/pool of flies was immersed in normal saline and stirred with an applicator stick for 5 min to wash off any helminth eggs.

The washed fly bodies were then removed with forceps. The suspension was centrifuges at 2000 rotation per minute for five minutes. The sediment was mixed with sugar solution of specific gravity 1.27 (Navin and Juranek, 1984) and again centrifuges at 2000 rotation per minute for 5 min. Direct smears from the top layer of the supernatant was thoroughly examined for the presence of parasite eggs and larvae.

After the washing procedure described above, the whole of each fly was carefully dissected out and split open to liberate the lumen contents. Pooled gut contents of each fly species were then mixed with sugar solution of specific gravity 1.27 and centrifuged at 2000 rotation per minute for 5 min. The top layers of the supernatant were thoroughly examined for the presence of parasite eggs and larvae in direct smears.

Identification of the eggs were done using morphological characteristics as size, shape, thickness of the egg shell, colour and presence of characteristics like operculum (lids), spines, plug, hooklets etc., (Suliaman *et al*., 1988).

RESULTS

Three *cyclorrhaphan* species were caught in the course of the research, namely *Musca domestica*, *Musca sorbens*, *Chrysomya megacephala*. Like wise, three nematode species eggs (*Ascaris lumbricoides*, *Trichuris trichiura* and *Ancyclostoma duodenale*) were isolated from the gut and surface of flies. In a pool of 50 flies of different species, *Ascaris lumbricoides* occurred more than any other helmnth while *Chrysomya megacephala* carries the highest number of helminth mean of 0.76 of *Ascaris lumbricoides* egg (Table 1). However, no correlation was observed on the presence of the helminth eggs on the different *cyclorrhaphan* flies (r = 0).

Each of the 50 flies of the *cyclorrhaphan* species identified were dissected to examine the presence of human helminth eggs. The highest prevalence rate of 52%

Table 1: Distribution of nematode ova on the flies in Owerri market

Number of flies	Types of flies	*Ascaris lumbricoides*	*Trichuris trichiura*	*Ancyclostoma duodenale*
50	*Musca domestica*	32 (0.64)	20 (0.40)	14 (0.28)
50	*Musca sorben*	21 (0.42)	14 (0.28)	5 (0.10)
50	*Chrysomya megacephala*	38 (0.76)	22 (0.44)	15 (0.30)
150		91 (0.66)	56 (0.33)	34 (0.22)

Mean in parenthesis

Table 2: Distribution of nematode over in the gut of flies in Owerri main market

Number of flies	Types of flies	*Ascaris lumbricoides*	*Trichuris trichiura*	*Ancyclostoma duodenale*
50	*Musca domestica*	14 (28)	8 (16)	25 (50)
50	*Musca sorben*	10 (20)	6 (12)	20 (40)
50	*Chrysomya megacephala*	15 (30)	4 (8)	26 (52)
Total 150		39(26)	18 (12)	71 (41.3)

Percentage in parenthesis

Table 3: Distribution of infection

	Degree of infection		
Type of flies	Single	Double	Triple
M domestica	5	15	30
M sorben	6	8	36
C megacephala	4	6	40
	15 (10.00%)	29 (19.30%)	106 (70.70%)

was recorded in the case of *A. duodenale* occurrence in *Chrysomya megacephala* while the least prevalence was recorded in the presence of *Trichuris trichura* also in *C. megacephala* (Table 2). 15 (10%) of the flies dissected recorded single helminth infection, 29 (9.3%) double infection while 106 (70.70%) recorded triple/multiple infection (Table 3). The occurrence of the helminth species in the gut of *cyclorrhaphan* flies was independent of the species of fly ($X^2 = 10.2$, $p = 0.05$).

DISCUSSION

The fly species (*Musca domestica*, *M sorbens*, *Chrysomya megacephala*) identified are common occurrence in the tropical area of which the study area is inclusive. The ova of helminth parasite isolated and the flies from which they are gotten are in agreement with the research of Greenberg (1973), Dipeolu (1977), Sulaiman *et al*. (1988). This observation could appear to be the form of fly gut ecology in tropical countries. It is of epidemiological interest because flies are not commonly thought as a source of helminth infections. The implication of status on flies in the transmission of helminth egg is alarming since *Musca* species for instance are known to live in close association with human beings.

Chrysomya megacephala carried the highest number of eggs. This correlates with the observation of Charasse (1997) that *C. megacephala* carry more intestinal worn eggs than housefly. The fly species breed in latrines unlike the houseflies thereby predisposing it to more infection.

Ascaris lumbricoides was more prevalent than other helminths. Epidemiological implication of this observation could be appreciated when one considers the fact that several authors (Sulaimen *et al*., 1988) have reported more *Ascaris* infection than any other helminth infection. Dipeolu (1977) observed that helminth eggs found in the gut of *Musca* sp. were the same as those seen in the faeces of people living in the area. Hence, the occurrence of the eggs in or on the flies can be used as a diagnostic index to determine the disease status in human population. The observation that all the fly species habor at least one of the human intestinal helminth with preponderance of multiple infections could portray the poor sanitary or hygienic conditions prevalent in the market. The ever-increasing human/economic activities in the market without a corresponding development of waste disposal and management facilities has provided conducive environment for the thriving of flies and helminth acquisition.

CONCLUSION

In conclusion, however, there are many aspects of intestinal nematode infection, which we can do little about because the basic knowledge and weapon for dealing with the disease are not available. The gap in our knowledge and deficiencies in our armoury against helminth infection can only be made good as a result of intensive research on the vectorial capacity of flies. Meanwhile, besides providing the sanitary condition and hygienic practices, a health education elucidating the role of flies as vectors of helminth infection and health implication of helminth diseases should be embarked on.

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