

CURRENT STATUS OF PARAGONIMIASIS IN OLD NETIM 1 AKAMKPA LOCAL GOVERNMENT AREA OF CROSS RIVER STATE-NIGERIA

J. T. ABRAHAM AND P. A. AKPAN

ABSTRACT

Recent outbreak of Paragonimiasis in Old Netim 1. Akpamkpa Local Government Area of Cross River State-Nigeria informed investigation to ascertain the status of the infection. Faecal and sputum samples collected were examined using double wet smear technique and centrifugal floatation techniques. Eighty-three (20.75%) of the four hundred (400) samples collected were positive with *Paragonimus* eggs. 34 (8.5%) and 47 (12.25%) of the 83 positive samples were from male and female victims respectively. Positive samples had characteristic red colour due to blood stain. Infected person were between ages 9 and 65 years. Persons between 15 and 44 years had the highest number of victims. 9 (10.84%) of those infected were incapacitated. Among those incapacitated 3 (33.3%) and 6 (66.3%) were males and females respectively. Incapacitation was in the form of weakness, lameness and protracted chest cavity. In addition mental retardation was reported by infected primary pupil's class teachers. Health education on food habit was conducted to enhance control of the infection.

KEY WORDS: Paragonimiasis, *Paragonimus*, Investigation, Victims, Incapacitated.

INTRODUCTION

Paragonimiasis in Old Netim 1 area of Akamkpa local government Area of Cross River State-Nigeria was investigated about fourteen years ago (Ikpe et al, 1991). However, the status of the infection after fourteen years was encouraged by recent attention drawn to the area because of the infection.

Paragonimiasis is infection of the lungs caused by the oriental lung fluke *Paragonimus*. About fifty species of *Paragonim* have been reported and only about ten species are known to infect man in different places. An estimated 2.5 million peoples are infected worldwide (Rosenbaun and Robolic (2006). Volker and Vogel (1965) reported *Paragonimus africana* in West Africa. Udonsi (1987) reported Paragonimiasis caused by *Paragonimus uterobilateralis* in Igun River Basin in Imo State-Nigeria.

The life cycle of *Paragonimus* involves periwinkle, water snail, crayfish and crab as intermediate host. Periwinkle or water snails serve as first intermediate host while crab or crayfish serve as second intermediate host and man as definitive hosts. Mode of the human infection by the lung fluke, (*Paragonimus*) is widely discussed. But all centered on ingestion of raw or poorly cooked fresh water or land crabs infested by the larvae of the fluke. Metacercarie can be accidentally ingested during crab preparation for food. Crab and crayfish in the affected area have been investigated and found to carry larvae of *Paragonimus*.

This paper studies the current status of the infection and to reeducate the inhabitants of the area on possible control strategies. It will also serve as a source of information on the status of Paragonimiasis in Akamkpa Local Government Area for effective government intervention.

J. T. Abraham, Department of Biological Sciences, Cross River State University of Technology Calabar, Nigeria.

P. A. Akpan, Department of Biological Sciences, Cross River State University of Technology Calabar, Nigeria.

MATERIALS AND METHODS

Four hundred (400) sample of fresh morning stool and sputum were collected from inhabitants of Old Netim 1 in Akamkpa Local Government Area of Cross River State-Nigeria. To avoid biased sampling the village was divided into four zones (A, B, C, & D). 100 samples were collected from each zone. Of the 100 samples, 50 samples were from male victims and 50 samples were from females victims. All samples collected were examined by method described below. Samples were initially examined for blood stain and mucus. Specimen were prepared from spots containing blood stain.

DOUBLE WET SMEAR TECHNIQUE

A drop of saturate saline was placed in the centre of one half of a microscope slide, and a drop of iodine stain was placed on the other half.

A small faecal sample was then spread evenly through the drops of iodine stain and saturated saline. It was then carefully cover-slipped and viewed under 100 magnification (10x) and 400 magnification (40x), Hunter (1976).

CENTRIFUGAL FLOATATION TECHNIQUE

A small portion (4 grams) of the faeces was placed in a 250ml beaker. The beaker was one fourth ($\frac{1}{4}$) filled with tap water and mixed thoroughly. The suspension was strained through a wire gauge into 50ml centrifuge tube and centrifuged at 1,500 revolutions per minute (rpm) for one minute. The supernatant was carefully removed. With a capillary tube, a portion of the top layer of sediment as well as from bottom

layer were removed to a 3 x 2 inch microscope slide, covered with a 22mm square cover slip, sealed and examined.

RESULTS

Eggs of *Paragonimus* were isolated from faeces and sputum collected from inhabitants of Old Netim 1. The eggs were more or less cylindrical in shape with a more blunt anterior end. The posterior end is separated from the anterior end by a neck like constriction (Plates 1 and 2).

All samples with eggs were red in colour due to blood stain. Eighty three (83) samples out of the 400 samples collected from male and female victims in the four zones were positive with *Paragonimus* eggs. (Table 1. Figure 1) this represents 20-75% of all sample collected. Thirty-four samples (8.5%) and forty-nine samples (12.25 %) were from male and female respectively. Only nine victims were incapacitated. Incapacitation was in the form of weakness, inability to move and protracted chest cavity. A single chronic case was observed among primary pupils. The victims were reported to have repeated primary 6 for 3 years indicating metal retardation.

Positive samples were observed in ages between 9 and 65. Ages 15 to 44 years were most infected. Infected person agreed to have eaten crab and crayfish meals boiled or roasted with carapace. Crab and crayfish screen were found to carry sporocysts and mature second generation radia (plates 3 and 4). These larvae carried cercaria and metacercaria of *Paragonimus* respectively.

TABLE 1: SUMMARY OF RESULTS OBTAINED DURING EXAMINATION OF STOOL AND SPUTUM OF INFECTED PERSON

Zone	No of samples collected			No of positive sample			Percentage (%)		No of persons incapacitated	
	M	F	TOTAL	M	F	TOTAL	M	F	M	F
A	50	50	100	10	19	29	20	38	2	1
B	50	50	100	9	7	16	18	14	-	3
C	50	50	100	11	20	31	40	62	-	2
D	50	50	100	4	3	7	8	6	1	-
TOTAL	200	200	400	34	49	83			3	6
% sex sample				17	24.5				33	66
% all sample				8.5	12.25	20.75			0.75	1.5
% all positive sample				41	59				3.6	7.2

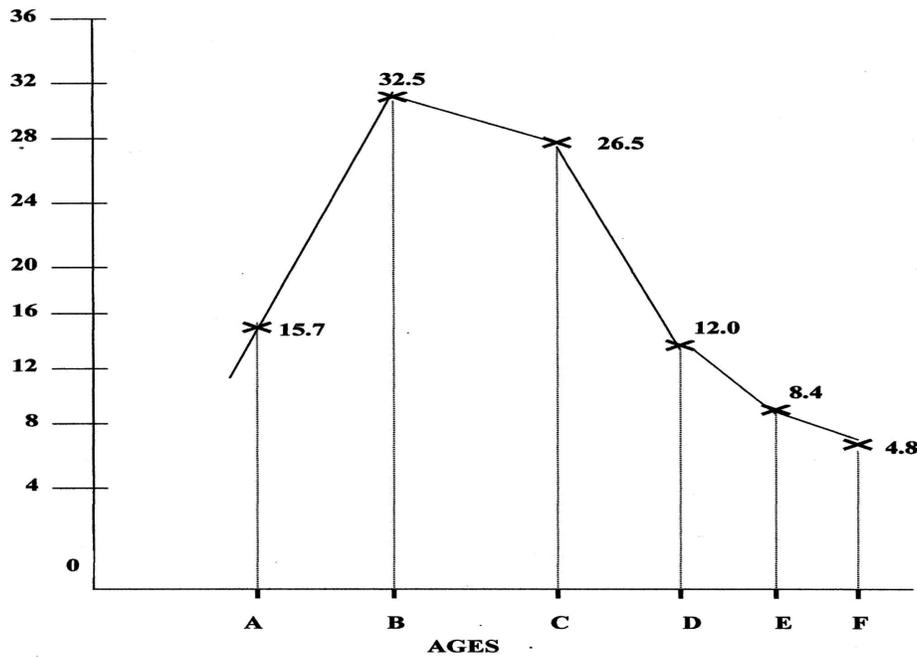


FIGURE 1: PERCENTAGE DISTRIBUTION OF POSITIVE SAMPLES BY AGE.

KEY:

- A - 0 - 14
- B - 15 - 29
- C - 30 - 44
- D - 45 - 59
- E - 50 - 64
- F - 65 AND ABOVE



Plate 1: Paragonimus egg in sputum (x 100 objective)



Plate 2: Paragonimus eggs in faeces (x 100 objective)

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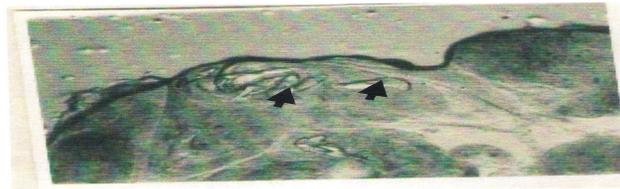


Plate 3: Sporocysts recovered from crayfish (*Astacus*) (x 100 objective)

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Plate 4: Mature second generation rediae of *Paragonimus* recovered from *Sudanautes africanus* (x 100 objective).

DISCUSSION

Positive faecal and sputum samples were found to have blood stain giving it a characteristic red colouration. The red colouration is believed to be caused by migration of the fluke across intestinal wall and other organs, penetration of the diaphragm and subsequent encapsulation in the parenchyma of the lungs resulting in loss of blood cells and lung abscess. These observations agree with the work of Yokogawa (1969) and Ikpeme *et al* (1991). Other effects of Paragonimiasis may include bronchopneumonia, pleural effusion or empyema (Hunter, 1976). Infected persons in the study area complained of cough and pains in the ribs. Few cases were observed in incapacitated. Their inability to work resulted in increase number of dependent on their family.

Human acquire Paragonimiasis through ingestion of raw or partially cooked infested crustaceans such as crab or crayfish or both (Hunter 1976). Transmission among humans is promoted by large number of intermediate host, spitting and communal social habit (hunter 1976 and Singh *et al.*, 1986). Infected persons agreed to have eaten crab and crayfish boiled or roasted with carapace. The carapace probably impedes killing of fluke larvae by heat (Ikpeme *et al*, 1991). Crabs (*Pseudanautes africanus*) and crayfish (*Asctacus*) were screened and found to carry sporocyst and second generation redia containing cercariae larvae and metacercariae respectively (figure 3 and 4 respectively).

Infection at Old Netim 1 spread among ages nine (9) and sixty-five (65) year old individuals. Individuals at these ages are involved in fishing and preparation of crab meals. They are by this involvement exposed to infection this is because Metacercaria can be ingested from contaminated hands after preparation of crab meals. This suggestion based on the fact that Yokogawa (1989) reported 2 fluke cysts on knife, 25 on bamboo basket, 14 on the chopping block and 1 on the table used in preparing crabs in an endemic area of Japan. Prevalence infection on males 34 (8.5%) and female 49 (12.25%) indicated a sporadic condition and that more females had infection than males. Females are more involved in preparation of meals containing the intermediate hosts of *Paragonimus* and are more infected.

Health education was organized during which the victims were taught to eat thoroughly cooked crab and crayfish meals and to avoid eating the intermediate host (crab and crayfish) of *Paragonimus* with carapace.

Attention of the various health sectors in Akamkpa Local Government Area of Cross River State, Nigeria have been drawn to Old Netim 1 by the author of this paper to avoid epidemicity resulting from a sporadic condition.

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