PREVALENCE OF LYMPHATIC FILARIASIS AMONG CHILDREN IN KALA'A, HONG LOCAL GOVERNMENT AREA OF ADAMAWA STATE

Batta K. and Mivanyi Rapheal
Department of Biological Sciences, Adamawa State University, Mubi, Nigeria.

Abstract
The importance of lymphatic filariasis (LF) in children has been remarkably overlooked and understudied. This however led to this study of the prevalence of lymphatic filariasis among children in Kala'a, Hong Local Government Area of Adamawa state. Microfilaria were detected from the blood of children aged 12 to 15 and identified after staining with giemsa staining technique. Out of the two hundred samples collected, 24 (12%) were positive for microfilaria with 14 (7%) in males and 10 (5%) in females. This result suggests that lymphatic filariasis disease may start its development in children which may later have immediate practical implication for the public health sectors in overcoming adulthood diseases.

Key word: lymphatic filariasis, elephantiasis.

Introduction

Filariasis is an infectious tropical parasitic disease that is caused by thread-like filarial nematodes (roundworms) in the superfamily filarioidea also known as filariae (Addiss *et al* 1995). There are eight known filarial nematode of humans. Lymphatic filariasis is caused by the worms *Wuchereria bancrofti*, *Brugia malayi* and *Brugia timori* and its transmitted by the mosquito *Culex quenque fasciatus*, and members of the *Anopheles gambiae* complex (Ottesen, 1999). These worms occupy the lymphatic system, including the lymph nodes, and in chronic cases these worms lead to the disease elephantiasis.

It is a major public health problem in many parts of Asia, Africa, the Western pacific and America (Anosike *et al*, 2005). Infection by *W. bancrofti* is common and account globally for approximately 90% of all infections (Anosike *et al*, 2005). Worldwide, over 120 million people are infected and over 40 million are in the sub- Saharan (Lenhart *et al,* 2007). Nigeria is the third most endemic country in the world (after India and Indonesia) and 22.1% of its population is thought to be infected. The importance of lymphatic filariasis (LF) in children has been remarkably overlooked and understudied. The development of techniques to diagnose infection much more sensitively than in the past by detecting antigen in the blood (Weil *et al* 1997) and to identify subclinical lymphatic disease by ultrasonography has led to the recognition that LF is a common infectious disease of children in endemic areas (Dreyer, 1998). Diseases associated with LF infection in children, however, are poorly understood. Reports attest to the occurrence in some children of the same LF manifestations commonly recognized in adults e.g. elephantiasis (Dreyer *et al*, 1998), hydrocele, (Gyapong, *et al* 1998) and tropical pulmonary eosinophilia (Magnussen *et al*, 1995), these manifestations are not as frequent in children as they are in adults. Other non-pathognomonic syndromes have also been suggested as clinical presentations for LF in children (including adenopathy, fever, arthropathy). Dreyer *et al* (1998) reported an observation that describe the clinical presentation and the clinical course of definitively diagnosed filarial adenopathy in two girls whose ultrasonographic studies revealed specific LF and lymphatic abnormality. The changes in their clinical and ultrasonographic findings over time provide insight into the evolution of lymphatic filarial infection and disease in children.

Epidemiology of lymphatic filariasis is also associated with developmental projects such as dams for irrigation, economic or

cultural activities of the community which serve as breeding sites for mosquitoes. Poor living conditions for example overcrowding and inadequate waste disposal have also shown to increase its prevalence. There are cases where associations between lymphatic filariasis and irrigation schemes have been detected in parts of Africa (Micheal *et al* 1996). Ngiwira *et al* (2002) also reported the influence of rice irrigation scheme as a breeding site for vectors of lymphatic filariasis.

Noreos *et al* (1996) noted the correlation of infection with sex. In Ghana, studies have shown that women were found to be more infected than men (Gyapong *et al* 1994). In communities where lymphatic filariasis is endemic, as many as 10 percent of women can be afflicted with swollen limbs, and 50 percent of men can suffer from mutilating genital symptoms (Noreos *et al* 1996).

The research was therefore aimed at the study of the disease symptoms and manifestation which will help to provide valuable information for monitoring the onset of the disease and to initiate appropriate management before it becomes uncontrollable and halting further progression in adulthood.

Materials and Methods

Study Site

The study was carried out in Kala'a, Hong local Government Area of Adamawa State. The indigenes of Kala'a are mostly farmers, fishermen. The town is bounded by rivers and streams where irrigation activities are carried out. The presence of water bodies makes the area potentially endemic for breeding of mosquito's number one host for filariasis and water associated parasitic infections.

Study Group

The study was carried out in four different zones (A, B, C and D) selected at random. A total of 200 blood samples of children aged 6-17years were collected and labeled as either male or female. Fifty (50) samples were collected from each zone.

Data Collection:

Physical examination

Each child was examined by health workers for clinical manifestation. lymphodema stages were classified based on the following:

Stage 1: leg swelling comes and goes, no cracks, fold

Stage 2: leg swelling may be permanent but no crack

Stage 3: leg swelling permanent with shallow fold and lesions

Stage4: leg swelling permanent may extend above the knee

Stage 5: leg swelling permanent fold, knobs present and may be severely disable

Stage 6: leg swelling folds, knobs, lesions and cracks present, is severely disfigured.

Parasitological Examination

Sample collection

Blood samples from each respondent were collected by qualified health personnel using appropriate containers which were then covered in black polythene bags and stored in small plastic food coolers loaded with ice before blood examination for parasitemia was carried out. Blood samples were collected at night from 10pm to12 midnight (the time when the microfilaria circulate in the blood). The middle finger was pricked with a lancet and two drops of blood was placed on a grease free microscopic slide. The thin and thick blood films were made and stained by Giemsa, the presence of microfilaria in the blood was detected (Udonsi, 1999 and Wanji, 2001).

Results

The results of two hundred (200) sample size collected from each zone of fifty (50) were analyzed. Microfilaria was detected in 24(12%) of the 200 children examined, 14 (7.0%) were males and 10 (5.0%) were females.

Table 1: The Prevalence of microfilaria based on the sample collected from four zones

Zones	No of blood samples collected	No of microfilarial positive	Percentage (%)
Zone A	50	9	37.5%
Zone B	50	7	29.2%
Zone C	50	5	20.8%
Zone D	50	3	12.5%
Total	*200*	*24*	*100*

The number of microfilaria ranged from 3(12.5%) in zone D to 9(37.5%) in zone A.

Table 2: Prevelence of microfilaria according to Age group

Age (Years)	No of blood samples examined	No of filarial positivity	Percentage prevalence (%)
6-8	52	5	20.8%
9-11	47	6	25.0%
12-14	64	10	41,6%
15-17	37	3	12.5%
Total	*200*	*24*	*99.9%*

Table 2.0 shows the distribution of microfilaria by age group. The age group 12-15 had the highest number of microfilaria of 10(41.6%).

Table 3: Prevalence of microfilaria by sex

Age (Years)	No of blood samples examined		No of filarial positivity		Percentage prevalence (%)	
	Female	Male	Female	Male	Female	Male
6-8	15	37	2	3	20.0	21.4
9-11	20	27	3	3	30.0	21.4
12-14	25	39	4	6	40.0	42.8
15-17	20	17	1	2	10.0	14.2
Total	*80*	*120*	*10*	*14*	*100*	*99.8*

Table 3.0 shows the distribution of microfilaria by sex.

Out of the eighty (80) females examined, 10 (12.5%) were positive while in the hundred and twenty male participant, 14 (11.7%) were positive for microfilaria

The result also shows that out of the two hundred samples collected, only ten (10) had adenolynphangitis (ADL) fever. Males had the highest number of palpitin nodules of six (6) while female had four palpitin nodules

Student's t-test was used, differences at $P< 0.05$ were considered significant (Bailey, 1994). However there was no significance difference between Clinical signs with age ($P>0.05$).

Discussion

From the results, it was seen that lymphatic filariasis can also be detected in children populations. Insight is gained concerning the LF-induced adenopathy and lymphatic lesions in children. The study also detected more lymphatic filariasis in children between the ages of 12-15 years of age. Presentation of lymphatic filariasis morbidity such as hydrocoel in the age group 12-14

years were due to the fact that the incubation period of microfilaria is five to seven years (Peters, 1989). The microfilarial infection (14 in males and 10 in females) could also be due to the fact that boys are more extrovert spending most of their time playing close to the breeding site of the vector thus increasing their chance of being infected by microfilaria than the females (Anosike 2005 and Onwuliri 2007). Decrease in prevalence does not mean the absence of microfilaria in the blood. The clinical signs such as adenolymphagitis, (ADL), elaphantiasis and hydrocoel were also age dependent in both sexes but higher in male. During this time, the worms remain hidden and continue to destroy the lymphatic system when the system is unable to overcome the destructive activities of the worm at the end of the incubation period, it manifest itself in the affected persons also, as shown by the result, males were more affected because of their attributes to physical activities that they mostly embark on in the course of these activities, they acquire cuts, providing the entry points for these worms or bacteria to invade the lymps. This position is reinforced by the fact that majority of the inhabitants of the villagers are rice farmers and as a result there are large collection of water bodies within the community serving as a breeding ground for vectors transmitting microfilaria. This result was similar to that of Ngiwira *et al* (2002) who confirmed that there is an association between farming and microfilarial intensity in the rural areas or settings. Although no single diagnostic test can identify every case of lymphatic filariasis. (Dreyer *et al* 1999), the method described here, Giemsa technique has greatly extended our diagnostic capabilities particularly in children. All of these possibilities merit further assessment.

In conclusion this study showed that children can be affected by microfilaria at an early age of five (5) years which could later manifest in life if unchecked. Infected children develop lymphatic filariasis later in these forms such as elephantiasis, adenolymphangitis

References

Addiss, D. G., Dimock, K. A., Eberhard, M. L., Lammie, P. J. (1995). Clinical, parasitologic, and immunologic observations of patients with hydrocele and elephantiasis in an area with endemic lymphatic filariasis. *Journal of Infectious Disease 171:* 755–758.

Anosike, J. C., Nwoke, B. E., Ajayi, E. G., Onwuliri, C.O.,Okoro, O. U., Oku, E. E., Asor, J. E., Amajuoyi, O. U., Ikpeama, C. A., Ogbusu, F. I.and Meribe, C. O.(2005). Lymphatic filariasis among the Ezza people of Ebonyi State, Eastern Nigeria, *Annals of Agriculture and Environment Medicine 12:181-186*

Bailey, N. T. J. (1994). Statistical methods in Biology, 3rd (Edn.) University press, Cambridge 38-87

Dreyer, G., Santos, A., Noroes, J., Amaral, F. and Addiss, D. (1998). Ultrasonographic detection of living adult *Wuchereria bancrofti* using a 3.5 MHz Transducer. *American Journal of Tropical Medicine and Hygiene 59:* 399 403. 13.

Gyapong, M., Gyapong, J. O., Adjei, S. Vlassoff, C and Weiss, M. (1994). Filariasis in northern Ghana: some cultural beliefs and practices and their implications for disease control. *Social Science in Medicine* 43: 235-242

Gyapong, J. O., Webber, R. H., Morris, J. and Bennett, S. (1998). Prevalence of hydrocele as a rapid diagnostic index for lymphatic filariasis. . *Transaction of Royal Society of Tropical Medicine and Hygiene*. *92:* 40–43.

Lenhart, A., Eigege, A. Kal, A, Pam, D. Miri, E.S, Gerlong, G., Onyeka, J., Sambo, Y. Danboyi, J., Ibrahim,B., Dahl, E., Kumbak, D., Dakul, A., Jinadu, M.Y., Umaru, J., Richard, F. O. and Lehmann, T. (2007). Contribution of different mosquito species to the transmission of lymphatic filariasis in central Nigeria: its implication for the monitoring infection by PCR in mosquito pools. *Filarial Journal* 6:14-23.

Magnussen, P., Makunde, W., Simonsen, P. E, Meyrowitsch, D. and Jakubowski, K. (1995). Chronic pulmonary disorders, including tropical pulmonary eosinophilia, in villages with endemic lymphatic filariasis in Tanga region and in Tanga town, Tanzania. *Transaction of the Royal Society of Tropical Medicine and Hygiene. 89:* 406–409. .

Michael, E., Bundy, D. A and Grenfell, B. T., (1996). Re-assessing the global prevalence and distribution of lymphatic filariasis. *Parasitology 112:* 409–428.

Noro˜es, J., Addiss, D., Amaral, F., Coutinho, A., Medeiros, Z., Dreyer, G., (1996). Occurrence of living adult *Wuchereria bancrofti* in the scrotal area of men with microfilaremia. *Transaction of the Royal Society of Tropical Medicine and Hygiene. 90:* 55–56.

Ngiwiri, E. M. M., Jabu, C. H .,Kanyaloko, H., Nponda, M., Crampin, A. C. and Alexander, N. D. (2007). Lymphatic filariasis in Koranga district of northern Malawi. A prevalence survey. *Annals of tropical medicine and parasitology* 96:137-144

Okoye, I. C. and Onwuliri, C., O. (2007). Epidemiology and psycho-social aspect of onchocercal skin disease in northern Nigeria. *Filarial Journal* 6:15

Ottesen, E. A. (1999). Towards elimination of lymphatic filariasis In: *Infectious disease* and *public health*, Angelico, M. and Rocchi, G (Eds), Balaban Publishers, Philadelphia 58-64

Peter, W.,(1989). *Liver enzyme and diagnosis* (6 edn.). Golden Press, Philadelphia 8-9

Udonsi, J. K. (1999). *Parasites and parasitic diseases*. A textbook of general and medical parasitology in tropical Africa, Josany press port Harcourt, 127pp.

Wanji, S. (2001). Rapid assessment procedure for loaiasis; a report of a multi-centre study UNDP/World Bank/WHO Special Programme for Research and training in tropical disease (TDR), (TDR/IDE/RP/RAPL/.01.1 (s)

Weil, G. J., Lammie, P. J. and Weiss, N. (1997). The ICT filariasis test: a rapid-format antigen test for diagnosis of Bancroftian filariasis. *Parasitology Today 13:* 401−404.