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## THE PRESENT SITUATION REGARDING LYMPHATIC FILARIASIS IN CABO DE SANTO AGOSTINHO, PERNAMBUCO, NORTHEAST BRAZIL

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### SUMMARY

A cross-sectional population-based survey on the occurrence of lymphatic filariasis was carried out in the municipality of Cabo de Santo Agostinho, Pernambuco, Northeast Brazil. 7,650 individuals of both sexes were examined (from 1,416 households) of whom six tested positive for microfilaria according to the thick blood diagnostic test. The age of the individuals examined varied from 0 to 98 (averaging 26.6 years), whilst the age of the microfilaria-positive individuals varied from 11 to 29, averaging 22.5 years. Five of the six positive cases were male. These cases were residents of the following areas: Pista Preta (one case); Ponte dos Carvalhos (four cases); and Pontezinha (one case). This last case from Pontezinha was autochthonous. Of the individuals examined, 109 (1.4%) cited complaints relating to filariasis. These results suggest that filariasis is being transmitted in the municipality of Cabo de Santo Agostinho, a finding that establishes the need to carry out disease control activities, and to collaborate with the planning of the national programme for the elimination of filariasis.

**KEYWORDS:** Lymphatic filariasis; Epidemiology; *Wuchereria bancrofti*.

### INTRODUCTION

In 1993, owing to the availability of new control strategies, the International Task Force for the Eradication of Diseases included lymphatic filariasis as one of the six infectious diseases considered eradicable or potentially eradicable<sup>7</sup>. In response to this announcement, in 1997, the Brazilian Ministry of Health set up a national programme for the elimination of lymphatic filariasis<sup>5</sup>.

Lymphatic filariasis is currently considered endemic in Brazil in the city of Maceió (in the State of Alagoas) and in the Recife Metropolitan Region - RMR (in the State of Pernambuco)<sup>5</sup>. The first national survey was carried out in the 1950s, in 538 localities, infected individuals being found in 89 (16.5%) of these. Nonetheless, active transmission was proved in only 11 of these locations<sup>17</sup>.

In Pernambuco, lymphatic filariasis was first identified in the city of Recife in 1952<sup>4</sup>. In 1959, a study was conducted in some municipalities in Pernambuco (Goiana, Igarassu, Paulista, Cabo de Santo Agostinho, Ipojuca, Serinhaém, Rio Formoso, Barreiros and Jaboatão dos Guararapes). In most of these, the rate of infection was lower than 1%, and they were therefore defined as areas of no epidemiological significance. In this 1959 study, and specifically in

the municipality of Cabo de Santo Agostinho, 2,829 individuals were examined, of whom three turned out to be microfilaria-positive, giving prevalence rate of 0.11% for filarial infection. In the light of these results it was concluded that filariasis did not constitute a public health problem in this municipality<sup>8</sup>.

In the 1990s, a study was carried out in the three main municipalities of the Recife Metropolitan Region: Olinda, Jaboatão dos Guararapes and Recife. It was found that, in the municipalities of Olinda and Jaboatão dos Guararapes, there were not only autochthonous cases, but also rates of around 1.2% for infection by *Culex quinquefasciatus*, higher than the rates for Recife<sup>12</sup>. It was found that transmission of lymphatic filariasis remained active in Recife and was in the process of spreading to other municipalities that make up the RMR<sup>6</sup>.

In another study, conducted with 23,773 soldiers from the Brazilian army living in the RMR, the presence of autochthonous microfilaria-positive cases were found in seven municipalities of the RMR, three recognized as endemic (Jaboatão dos Guararapes, Recife and Olinda) and four where there were no previous records of infection: Abreu e Lima, Cabo de Santo Agostinho, Camaragibe and Paulista. The autochthonous case in Cabo de Santo Agostinho was from the Ponte dos Carvalhos district<sup>14</sup>.

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Given this background information, it is clear that there is a lack of information on the current distribution of this endemic disease in Pernambuco, and that there is thus a need for an epidemiological re-evaluation of the foci, and identification of new areas in the RMR where transmission has been occurring. This information will be useful for the lymphatic filariasis eradication programme in Brazil. Cabo de Santo Agostinho was one of the eight Pernambuco municipalities<sup>6</sup> that carried out a survey in order to produce data for mapping of the disease and to provide input for the filariasis eradication programme in Brazil, helping the planning of control initiatives, with greater precision in the choice and implementation of the necessary action.

## MATERIALS AND METHODS

In the municipality of Cabo de Santo Agostinho, situated to the south of the Recife Metropolitan Region, latitude 8°20'57''S and longitude 34°56'49''W, a population-based cross-sectional study was carried out in 2000. This included suburbs (Bela Vista, Centro, Charneca, Charnequinha, Cohab, Cruzeiro, Malaquias, Pista Preta, Rosário, Santo Inácio, São Francisco, Sapucaia, Torrinha, Vila Roca and Vila Social C.M.), rural communities (Usina Liberdade, Usina Mercês, Usina Bom Jesus and Engenho Trapiche) and four districts (Jussaral, Gaibu, Ponte dos Carvalhos and Pontezinha).

The study sample was taken from a universe of 31,000 private households, and an estimated prevalence rate of 1% for filariasis and an acceptable error of 5% for each confidence interval of 95% resulted in a quantitative sample of 1,209 households being selected.

Of the 116 census sectors (CS) - geographic units of analysis used in censuses by the Brazilian Institute of Geography and Statistics - in the municipality, 70 (60%) were analyzed. All the urban CS was examined, as filariasis in Brazil has an urban distribution<sup>9</sup> and a sample of the rural CS (sugar mills and plantations) and of the districts, were examined using the simple random technique. For the selection of the 20 households, the midpoint in each CS was identified, and from there it was divided into four quadrants. The two quadrants diagonally opposite each other (the 2<sup>nd</sup> and the 3<sup>rd</sup>) and two locations, one at each midpoint of the quadrant, were selected. Ten houses in each of these locations were chosen, giving a total of 20 in each CS.

All the members of the household were registered and, on signing the spontaneous informed consent form, the test was performed. An interview was carried out with each individual in the house, applying a questionnaire containing personal data and information on filariasis (previous treatment and cited complaints).

Microfilaraemia was investigated by collecting around 50 µL of capillary blood between 11 pm and 1 am<sup>9</sup>, the thick blood being prepared, stained with eosine and counter-stained using Giemsa. In cases where microfilaria was found in the thick blood, the filarial species was identified<sup>18</sup>.

The individuals living in the same household as the microfilaria-positive cases were investigated for the lymphatic filariasis by examination of films prepared from 10 mL of venous blood and examining Nucleopore® membranes. All the microfilaria-positive individuals were given physic examinations, the microfilarial density being determined by filtering 1 mL

of venous blood, treated with diethylcarbamazine (DEC) citrate, using the dosage recommended by the WHO<sup>18</sup>.

The data obtained in the study was processed and submitted to statistical analysis using the EpiInfo programme, version 6.04d. The research programme was approved by the Committee of Research Ethics at the Centro de Pesquisas Aggeu Magalhães/FIOCRUZ.

## RESULTS

7,650 individuals of both sexes, residents in 1,416 households, were examined. Of these, 7,644 tested negative and six microfilaria-positive individuals were identified, giving a prevalence rate of 0.08% (IC 0.0288 - 0.1706) (Table 1). The density of microfilariae (mf/mL of blood) among the six individuals who tested positive for the parasite varied from 5 to 443 mf/mL, with an average of 94 mf/mL (Table 2).

**Table 1**

Population examined for infection by lymphatic filariasis, according to age group and microfilaraemia in the municipality of Cabo de Santo Agostinho, PE, 2000

Age group (years)	MF +	MF -	Total
0 - 5	-	739	739
6 - 13	02	1,402	1,404
14 - 19	-	1,231	1,231
20 - 30	04	1,620	1,624
31 - 40	-	901	901
41 - 60	-	1,273	1,273
> 60	-	465	465
Ignored	-	13	13
Total	06	7,644	7,650

MF +: microfilaria-positive; MF -: microfilaria-negative

The age of those examined varied from 1 to 98 years (an average of 26.6 years) and, among the microfilaria-positive individuals, the age varied from 10 to 29 years, an average of 22.5 years. Of the 7,650 individuals examined, 4,147 (54.2%) were female and 3,503 (45.8%) male. Five of the six microfilaria-positive individuals were male ( $\chi^2$  2.07,  $p > 0.05$ ).

The microfilaria-positive individuals showed no signs or symptoms of lymphatic filariasis. All the other residents of the household of microfilaria-positive individuals were microfilaria-negative. The case from Pontezinha was autochthonous. The epidemiological profile and the testing of food specimens for *W. bancrofti* infection in the municipality of Cabo de Santo Agostinho is described in the Table 2.

The results of the interview and questionnaire showed that 7,541 (98.57%) did not mention complaints related to filarial disease, seven (0.09%) suffered from elephantiasis, 20 (0.26%) had urogenital manifestations, 2 (0.03%) referred to "milky urine", 80 (1.05%) complained of having had erysipelas.

The correlation between the complaints cited and the area of residence shows that three of the seven cases of elephantiasis were situated in the suburb of Rosário. In the district of Ponte dos Carvalhos,

**Table 2**  
Profile of microfilaria-positive individuals in the municipality of Cabo de Santo Agostinho, PE, 2000

Patient	Age(years)	Sex	Mf/mL	Current area of residence	Autochthonous	Place of origin
01	10	F	05	District of Pontezinha	Yes <sup>1</sup>	—
02	11	M	05	Suburbs of Pista Preta	No	Prazeres, Jaboatão dos Guararapes
03	29	M	25	District of Ponte dos Carvalhos	No	Prazeres, Jaboatão dos Guararapes
04 <sup>2</sup>	28	M	67	District of Ponte dos Carvalhos	No	Casa Amarela, Recife
05 <sup>2</sup>	26	M	18	District of Ponte dos Carvalhos	No	Casa Amarela, Recife
06 <sup>2</sup>	22	M	443	District of Ponte dos Carvalhos	No	Casa Amarela, Recife

<sup>1</sup>- Family from suburbs of Jordão, Jaboatão dos Guararapes; <sup>2</sup>- Individuals from the same household.

38 reports of some of the clinical forms of filariasis were found, these being one case of elephantiasis, 26 cases of erysipela, nine of urogenital manifestations, and all the reports of “milky urine” (Table 3).

Of the 7,650 people who were evaluated in the municipality, 50 stated that they had already had previous treatment for lymphatic filariasis, of which total 22 were male and 28 female. However, at the time of the study, all these individuals were microfilaria-negative. Among the individuals who referred to having had previous treatment, 18 cited some complaints, 14 cases being with reports of erysipela and four with urogenital manifestations. In relation to the origin of these individuals with a background of previous use of DEC, it was observed that the greatest casuistic area was in the district of Ponte dos Carvalhos

with 38% (19/50) of the cases, followed by the suburb of Cohab with a percentage of around 22% (11/50).

### DISCUSSION

As with other endemic diseases prevalent in urban and peri-urban areas in developing countries, the permanence of lymphatic filariasis as a public health problem in Pernambuco is related to urban growth<sup>16</sup>. This process involves social and economic phenomena such as migration, employment opportunities, and urban infrastructure and services<sup>16</sup> and, as such, has an impact upon health that reflects the social-economic inequalities in towns and cities<sup>2</sup>.

**Table 3**  
Population examined for infection by lymphatic filariasis, according to the cited complaints and residential areas in the municipality of Cabo de Santo Agostinho, PE, 2000

Areas	Elephantiasis	Erysipela	Urogenital manifestations	“Milky urine”	Asymptomatic	Total
B. São Francisco	1	2	-	-	445	448
Bela Vista	-	-	1	-	275	276
Centro	-	12	2	-	733	747
Charneca	-	5	-	-	683	688
Charnequinha	-	-	-	-	25	25
Cohab	1	12	1	-	868	882
Cruzeiro	-	2	-	-	77	79
Engenho Trapiche	-	-	-	-	55	55
Gaibu	-	2	-	-	111	113
Jussaral	1	2	1	-	305	309
Malaquias	-	6	1	-	258	265
Pista Preta	-	-	-	-	71	71
Ponte dos Carvalhos	1	26	9	2	2,509	2,547
Pontezinha	-	3	1	-	265	269
Rosário	3	1	-	-	198	202
Santo Inácio	-	2	-	-	126	128
Sapucaia	-	-	-	-	43	43
Torrinha	-	-	-	-	34	34
Usina Bom Jesus	-	2	1	-	138	141
Usina Liberdade	-	1	1	-	43	45
Usina Mercês	-	2	2	-	136	140
Vila Roca	-	-	-	-	39	39
Vila Social C. M.	-	-	-	-	104	104
Total	7	80	20	2	7,541	7,650

Since 1940, the changes resulting from the process of industrialization of the State have been associated with migration from the interior to the Recife Metropolitan Region. In the 1970s, the population of the Recife Metropolitan Region grew by 44.5%, 33.5% being immigrants<sup>15</sup>.

All non-autochthonous microfilaria-positive individuals identified in this study had come from areas already known to be endemic: the district of Casa Amarela in Recife<sup>11</sup> and of Prazeres in Jaboatão dos Guararapes<sup>12</sup>, and had migrated to the municipality of Cabo de Santo Agostinho in search of housing. Although this kind of migratory process is important for the introduction of the infection in a given area, it is clear that it is not the determining factor for establishing its transmission and dissemination.

Sanitation in Cabo de Santo Agostinho is highly precarious, given that only a small part of the population (14.7%) has sanitary installations connected to the general network<sup>10</sup>. This lack of sanitation results in a considerable increase in the number of breeding sites for the vector, which is one more determining factor for the possible transmission of the disease<sup>16</sup>.

Family aggregation contributes to the dynamics of lymphatic filarial transmission. MEDEIROS, 1998, demonstrated that individuals from families which already have microfilaria-positive members run a risk 4.19 times greater of filarial infection, compared with households with microfilaria-negative members<sup>13</sup>. Moreover, studies suggest that children born of microfilaria-positive mothers are more susceptible to acquiring filarial infection than the offspring of microfilaria-negative mothers<sup>3</sup>.

A relevant piece of information on the endemic nature of lymphatic filariasis in the area was the finding of 107 cited complaints (erysipela, elephantiasis and urogenital problems). Filarial morbidity is silent, since its manifestations occur in only a small number of those infected, and normally after several years of exposure to the parasite, thus complicating its diagnosis. So far as DEC use prior to the survey was concerned, 50 individuals declared they had already been treated for lymphatic filariasis, as they had tested microfilaria-positive. These findings point to a need for more detailed investigation of these cases.

The situation of lymphatic filariasis identified in the municipality of Cabo de Santo Agostinho shows the need to take action to control the disease, and introduce a filariasis surveillance service in the area. Surveillance has been carried out in the districts of Pontezinha and Ponte dos Carvalhos, because of their proximity to the municipality of Jaboatão dos Guararapes (an area where filariasis is endemic), because autochthonous cases were found in one of these (Pontezinha), and because they had the highest levels of cited complaints and previous filariasis treatment in the municipality.

This information, together with the reports from MEDEIROS *et al.*, 1999, who identified one autochthonous case in Ponte dos Carvalhos<sup>14</sup>, contributes to knowledge regarding the disease and the planning of the national elimination programme by establishing a buffer zone between unaffected and endemic areas of lymphatic filariasis in the Recife Metropolitan Region.

## RESUMO

### A situação da filariose linfática em Cabo de Santo Agostinho, Pernambuco, nordeste do Brasil

Foi realizado um estudo seccional de base populacional, sobre a ocorrência da filariose linfática bancroftiana no município do Cabo de Santo Agostinho, Pernambuco, nordeste do Brasil. Foram examinados 7.650 indivíduos de ambos os sexos, residentes em 1.416 domicílios, dos quais 7.644 indivíduos foram identificados como negativos para filariose e seis casos positivos. A idade dos indivíduos examinados variou de 0 a 98 anos (média de 26,6 anos), enquanto que a idade dos positivos variou de 11 a 29 anos, média de 22,5 anos. Cinco dos seis casos eram do sexo masculino. Os indivíduos microfilarêmicos eram residentes na localidade de Pista Preta (01 caso) e nos distritos de Ponte dos Carvalhos (04 casos) e de Pontezinha (01 caso), sendo esse último autóctone. Entre as pessoas examinadas 109 (1,4%) apresentaram queixas clínicas relacionadas à filariose. Esses resultados apontam para a existência de transmissão da filariose no município do Cabo de Santo Agostinho, dado esse que determina a necessidade de se estabelecer atividades de controle da endemia, assim como vem colaborar no planejamento do programa nacional de eliminação, uma vez que consegue delimitar áreas contíguas na região metropolitana do Recife com e sem transmissão filarial.

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