

RESURGENCE OF MALARIA IN JAFFNA

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Malaria is a disease of the tropics and subtropics, and has dominated the morbidity pattern of Sri Lanka for centuries.

Malaria is usually spread by mosquito bites. But persons could be accidentally infected by

- *blood transfusion*. Unfortunately refrigeration of stored blood does not eliminate malarial parasite since they can remain viable for indefinite periods even at -70 degrees C. [Wilcocks & Manson-Bahr, 1972].
- *infection from person to person* can also occur in drug addicts who borrow unsterilized syringes and needles.
- *intrauterine transmission* from mother to fetus. This is possible, sometimes without demonstrable damage to the placenta.

FEATURES OF MALARIA

Clinically malaria is characterized by intermittent fever occurring every other day or every third day, depending on the species of the parasite.

The malarial parasite belongs to the genus *Plasmodium*. There are four species which commonly cause malaria in humans. They are

- *Plasmodium vivax*
- *Plasmodium falciparum*
- *Plasmodium malariae*
- *Plasmodium ovale*

The common parasites in Sri Lanka at present are *Plasmodium vivax* and *Plasmodium falciparum*. *Plasmodium malariae* was present during the epidemics in the first half of this century.

All species of plasmodium have a life cycle in man and in an anophlene mosquito. There are hundreds of species of anophelens that spread malaria [Wilcocks and Manson Bahr, 1972]. However the commonest vector of malaria in Sri Lanka is *Anopheles culicifacies*. But other anophlene species have also been incriminated [Ranjan Ramsamy, 1993]. Other anophelens which have been shown to support the development of malarial parasite and are therefore considered to be potential malaria vectors are

- *Anopheles Subpicus*
- *Anopheles tesellatus*
- *Anopheles aconitus*
- *Anopheles annularis*
- *Anopheles hyrcanus*

- *Anopheles pallidus*
- *Anopheles vagus*
- *Anopheles varuna*

Mosquito collection by the Anti-malaria Campaign has shown that *Anopheles subpictus* is the most prevalent man biting anophelene in this country. But probably because of its less efficient parasite development *Anopheles subpictus* shows lower sporozoite rates. This makes the *Anopheles subpictus* a less significant vector of malaria.

INCIDENCE OF MALARIA SINCE THE BEGINNING OF THIS CENTURY

The incidence of malaria by 5 years intervals is given in table 1

The malaria epidemic of 1934 - 35 was the worst in recorded history of this country. The epidemic of malaria which commenced in Kurunegala & Kegalle district in 1934 spread rapidly to other districts affecting a third of the people and killing an estimated 80,000 people. The highest incidence was in December 1934 and January 1935.

The indoor spraying of DDT was introduced in Sri Lanka in 1946. This was an important milestone in the history of malaria control. The introduction of residual spraying and other measures resulted in a drastic fall in the incidence of malaria to 17 cases in 1963.

However, by the end of the 1960's, the incidence increased to epidemic proportions.

MALARIA IN NORTH-EASTERN PROVINCE

The North -Eastern Province (NEP) of Sri Lanka which is engulfed in a civil war since 1983, has been severely affected by malaria.

According to the Director, Anti-Malaria Campaign (Lionel Samarasinghe, 1990) 'The North -East provinces were devoid of malaria control for several years'.

In 1996, 41% of the total malaria cases in Sri Lanka was from the North-Eastern Province (Figure 1)

In 1995, 31% of the malaria cases was from the North-East Province. This had increased to 41% in one year. (Figure 2). Between 1995 - 1996 the incidence of malaria has decreased in all provinces except NEP & western Province.

It should be noted that these are all cases where the blood film was found to be positive. The count does not include those who have not been blood filmed especially in the Vanni District where there is probably a very high prevalence of malaria.

MALARIA IN JAFFNA

With the resurgence of malaria in 1967 there were sporadic outbreaks of malaria in the Jaffna District and more so in the Kilinochchi area. Most of the cases of malaria detected in the Jaffna district at that time were imported from Kilinochchi. Local transmission was also detected in the areas of MOH, Kayts, Chavakachcheri, Kopay and Point Pedro. Focal spraying with DDT was under taken in these areas.

By 1968, the situation worsened and all MOH's areas in the Jaffna district were brought under perennial spraying (spraying throughout the year). This operation was successful and transmission was arrested. The spraying units were reduced and transferred to malarial areas outside the peninsula. However, strict vigilance was observed throughout the district.

Table 1 : Malaria incidence by 5 year intervals 1910/11 to 1995

Year	Cases of malaria	Deaths due to malaria
1910/11	515 590	
1915	485 082	
1920	505 370	
1925	808 638	
1930	1 759 648	
1935	5 459 539	47 326
1940	3 413 618	9 169
1945	2 539 949	8 539
1950	23 370	1 903
1955	422	268
1960	308	0
1965	468 202	1
1970	400 777	12
1975	n.a.	
1980	47 949	
1985	117 816	
1990	279 172	
1995	142 294	

*Source: C G Uragoda. History of Medicine in Sri Lanka
Annual Health Bulletin 1996, Ministry of Health*

Figure 1

MALARIA INCIDENCE BY PROVINCES 1997

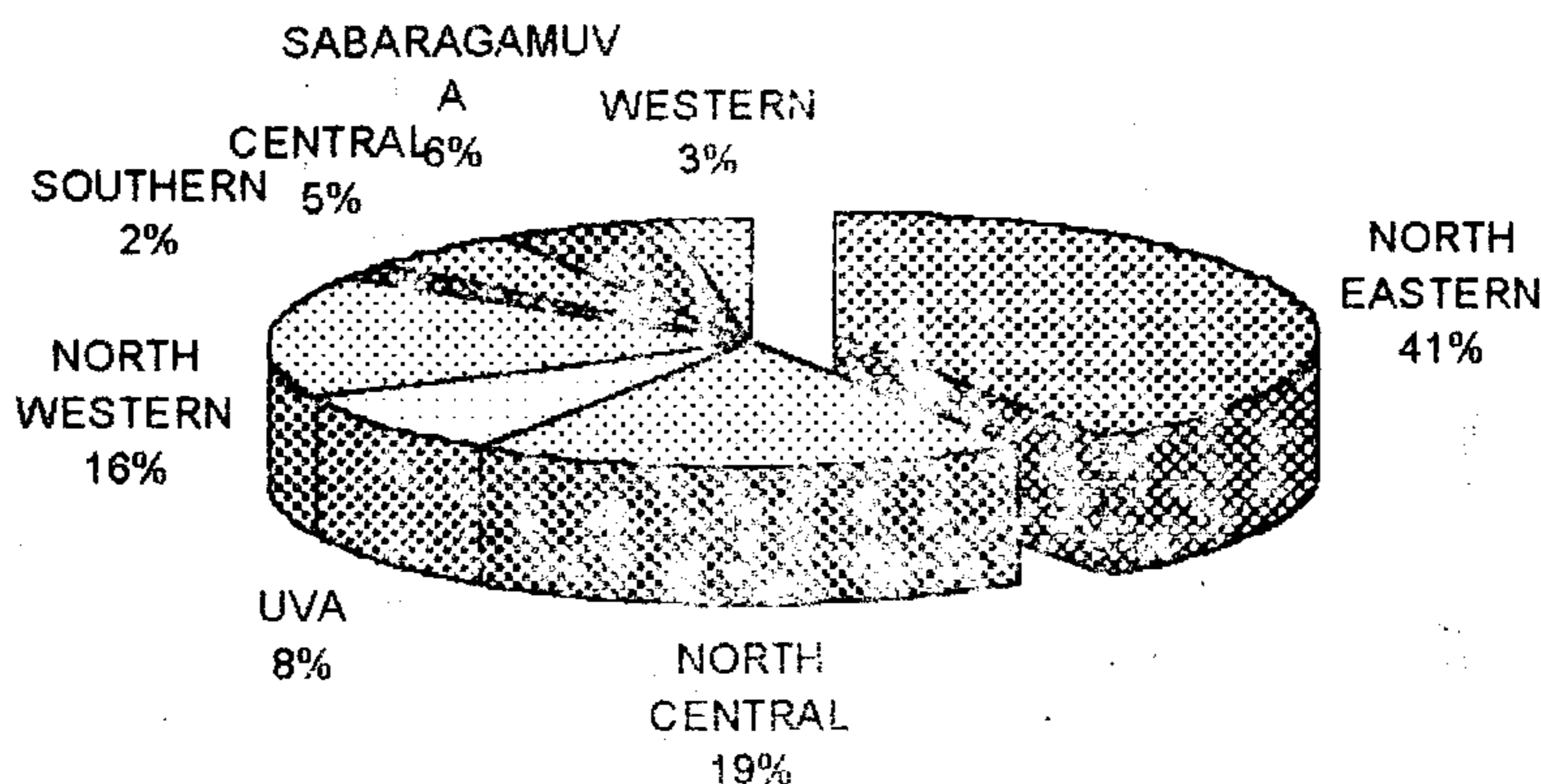
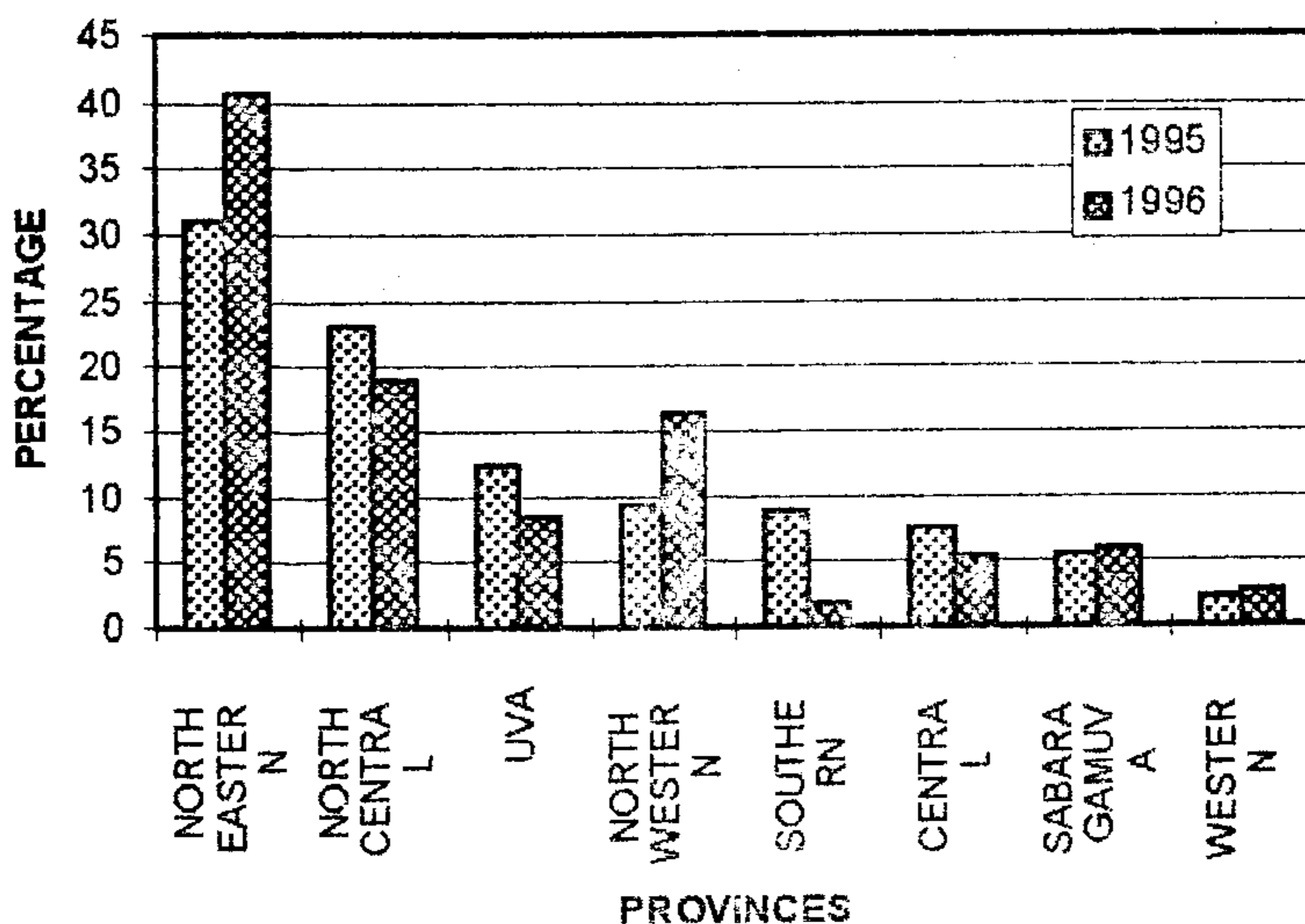


Figure 2

PERCENTAGE OF MALARIA CASES BY PROVINCES - 1995 & 1996



With the steady increase of malaria throughout Sri Lanka, malaria cases were reported among the persons who had returned from Vanni.

The number of cases of malaria reported is given in table 2.

Table 2 : Incidence of Malaria - Jaffna District, 1983 - 1997

Year	Number of blood films examined	Number of cases	Slide positivity rate (%)	P v	P f	Mixed
1983	58902	2354	4.0	2282	676	05
1984	26533	1859	7.0	1718	133	08
1985	45108	2393	5.3	2315	72	06
1986	35700	4053	11.4	3786	284	33
1987	36647	2185	6.0	2036	137	12
1988	59661	10885	18.2	10518	353	14
1989	67446	4253	6.3	4103	147	03
1990	52110	4565	8.8	4193	369	03
1991	95356	23371	24.5	20389	2875	107
1992	109116	23844	21.9	21747	2063	34
1993	118178	20711	17.5	19239	1430	42
1994	197549	52385	26.5	48181	4148	56
1995	183867	36957	20.1	33358	3577	22
1996	96723	25474	26.3	21913	3537	24
1997	191038	38778	20.3	36506	2229	43

Source : Deputy Provincial Director of Health Services, Jaffna.

In 1983, there were 2354 cases of malaria. This figure increased by more than 20 times (to 52385) in 1994. In 1997 the number of cases dropped to 38778, but it is necessary to bear in mind that the population of Jaffna peninsula in 1997 was half of what it was in 1994.

It is also important to note that the slide positivity rate which was 4% in 1983 rose to 20.3% in 1997.

The incidence of malaria in Jaffna district, compared to the rest of the country is given in table 3.

Table 3 : Incidence of Malaria (1990 - 1997) in Sri Lanka & Jaffna District

Year	Sri Lanka (including Jaffna District)			Jaffna District		
	Estimated Population (in '000)	Cases	Incidence (per '000 population)	Estimated Population (in '000)	Cases	Incidence (per '000 population)
1990	16,993	279,172	16.4	863	4,565	5.3
1991	17,247	n.a.	n.a.	871	23,371	26.8
1992	17,405	399,349	22.9	875	23,844	27.3
1993	17,619	376,736	21.4	879	20,711	23.6
1994	17,865	273,460	15.3	896	52,385	58.5
1995	18,112	142,294	7.8	905	36,957	43.5
1996	18315	184,320	10.1	400	25,474	63.7
1997		n.a.	n.a.	475	38,778	82.5

n.a. : Not available

The incidence of malaria in Jaffna is increasing while its decreasing in the rest of the country other than North East Province.

It is also important to note that the incidence of malignant malaria (*Plasmodium falciparum*) has also increased from 676 in 1983 to 4148 in 1994.

The incidence of malaria per 1000 population is given in Figure 3. Which gives a clear picture of the steady increase in the incidence of malaria.

The increase in incidence of malaria was sudden. Between 1990 & 91 there was a five fold increase, and since then there was a steady increase.

The increase in incidence of malaria has not been uniform throughout the country as shown in table 4.

In 1984, only 1.2 % of the total malaria cases in Sri Lanka was from the Jaffna district. In 1995, 26 % of the malaria cases were from the Jaffna district.

During 1995 & 1996 there was probably some degree of under reporting as the entire population was displaced from 30th October 1995 to end of April 1996.

The sudden increase in 1991 coincided with the complete closure of the land route through Elephant Pass and the 'economic blockade' in 1990. The closure of the land route made it necessary for people traveling between Colombo & Jaffna to stay overnight (sometimes several nights) at Nallur in Vanni District (on the Southern bank of the Jaffna Lagoon). It is likely that a large percentage of travelers were infected at this point on their return to Jaffna. They brought the malarial parasite in large numbers into the peninsula.

Figure 3

**MALARIA CASES JAFFNA DISTRICT
1983 TO 1997**

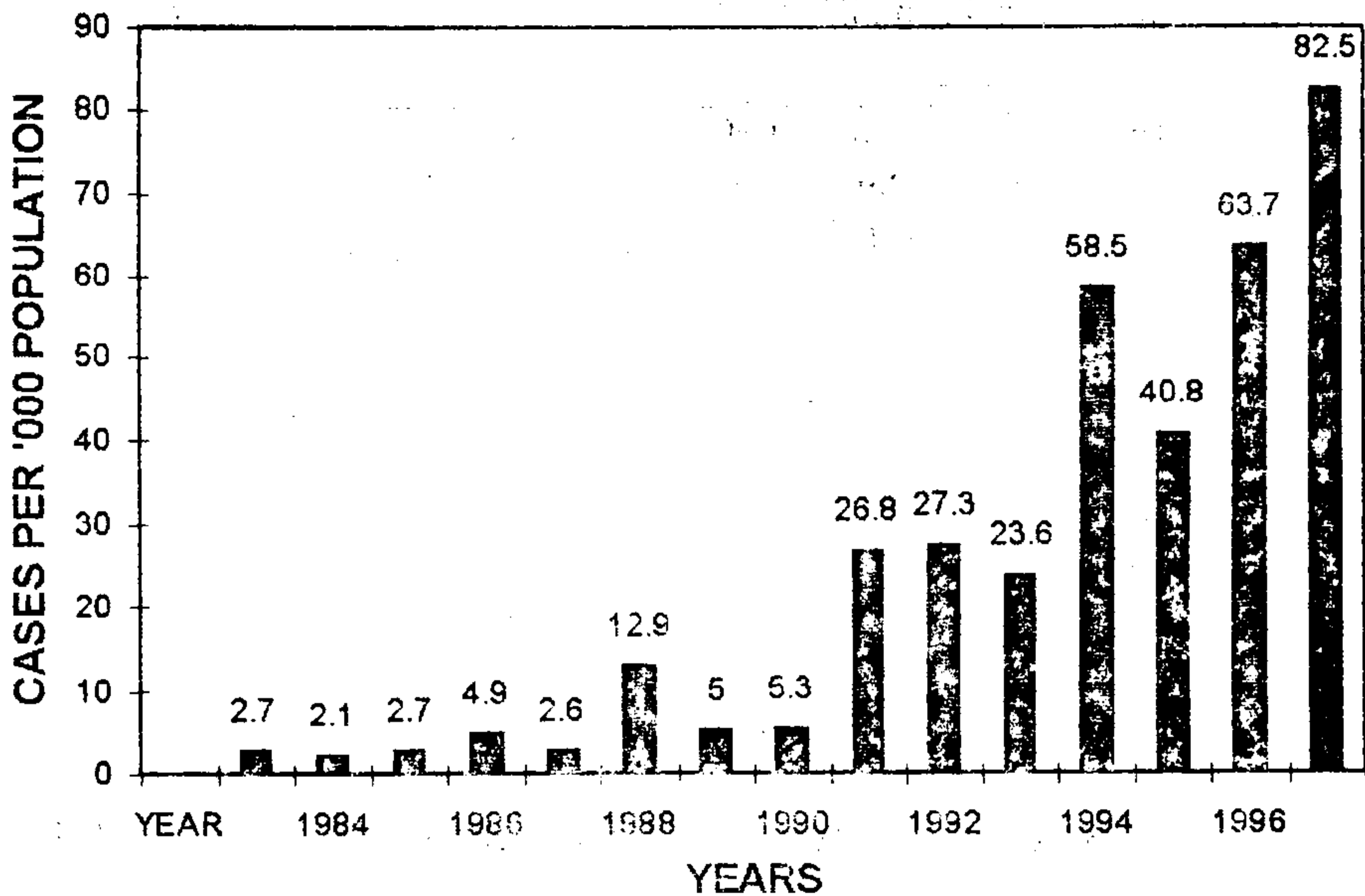


Table 4 : Malaria cases in Sri Lanka and Jaffna District . 1984 to 1995.

Year	Total number of cases		Percent of Total cases in Jaffna District
	* Sri Lanka	# Jaffna District	
1984	149,470	1,859	1.2
1986	412,521	4,053	1.0
1988	383,294	10,885	2.8
1990	279,172	4,565	1.6
1992	399,349	23,844	6.0
1994	273,460	52,385	19.2
1995	142,294	36,957	26.0
1996	184,320	25,474	13.8

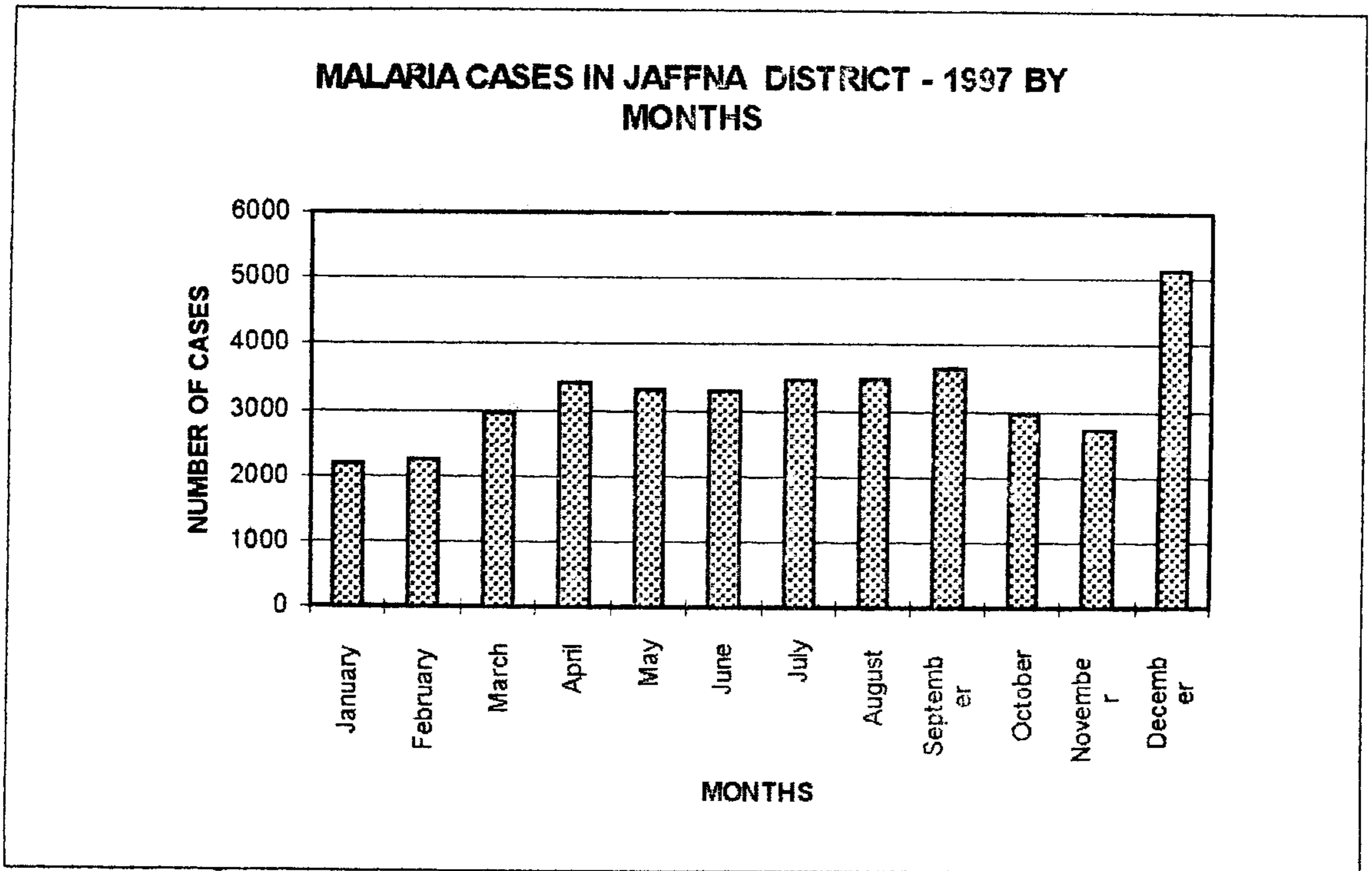
Source: * *Annual Health Bulletin 1995. Ministry of Health Colombo p.92*

Deputy Provincial Director Of Health Services. Jaffna.

The shortage of drugs, displacement of people and closure of hospitals all contributed to partial and incomplete treatment of malaria.

SEASONAL VARIATION

The incidence of malaria in Jaffna by months for 1997 is given in table 5.



There appears to be a peak in December. The peak in December is probably the usual peaks following the monsoon rains.

GEOGRAPHICAL DISTRIBUTION

The 38778 cases of slide positive malaria cases identified in 1997 have been distributed as in table 6.

74% of the cases have been from the MOH's areas of Jaffna (25.8%) Point Pedro (24.6%) and Chavakachcheri (24.1%).

The proportion of malignant malaria among the slide positive cases also varies between the MOH's areas as shown in table 6. 8.3% of the malaria cases in Jaffna were of the malignant type while only 0.7 % were malignant in the adjoining Kopay MOH's area.

Table 6 : Malaria slide positivity by MOH areas - 1997

MOH Area	Total fever cases	Malaria cases	% of Total Malaria cases
Jaffna	29605	10022	25.8
Point Pedro	38921	9525	24.6
Chavakachcheri	47578	9336	24.1
Kopay	23259	3547	9.1
Manipay	24940	3696	9.5
Tellippalai	21837	1845	4.8
Kayts	4898	807	2.1
Total	191038	38778	100.0%

Table 7. : Malaria Cases in the Jaffna District (1997) by type of Malarial Parasite

MOH's area	Slide Positive cases	Pv	Pf	Mixed	% Pf
Jaffna	10022	9194	828	-	8.3
Tellippalai	1345	1692	153	-	8.2
Chavakachcheri	9336	8732	584	20	6.5
Manipay	3696	3478	218	-	5.9
Point Pedro	9525	9089	413	23	4.6
Kayts	807	800	07	-	0.9
Kopay	3547	3521	26	-	0.7
Total	38778	36506	2229	43	5.7

Malignant type of malaria appears to be more prevalent in areas where refugees who have recently returned from Vanni are setting down.

MORTALITY

The exact mortality in Jaffna district due to malaria is not available.

However the recorded deaths due to malaria at Teaching Hospital Jaffna (THJ) during 1997 and January - March 1998 is given in table 8.

MALARIA IN CHILDREN

During the period January to March 1998 1378 children under 12 years were admitted to Teaching Hospital Jaffna. Out of them 392 (28.4%) had malaria, and 3 of them died

Table 8 : Deaths due to malaria at Teaching Hospital Jaffna.

Year	Quarter	Cases	Deaths	Case fatality rate
1997	1	472	10	2.1 %
	2	568	07	1.2 %
	3	495	-	0.0 %
	4	846	14	1.7 %
1998	1	255	21	8.2 %

Source : Director Teaching Hospital, Jaffna

ACTION TO BE TAKEN

According to the WHO's "New Global Malaria Control Strategy" the undermentioned activities should be undertaken to control malaria.

- Early detection & prompt treatment of cases
- Application of selective and sustainable control methods, including vector control
- Development of mechanisms to forecast outbreaks and epidemics early
- Regular reassessment of control programmes in keeping with the changing socio economic environment of the country.

The objectives of the Anti-malaria Programme of the Health Ministry is given in table 9.

In order to control malaria in Jaffna, the following steps should be taken.

1. Decentralization of Malaria activities.

The Jaffna district which has the maximum number of malaria cases does not have an officer in charge for malaria control activities. An experienced officer with expertise in implementing, monitoring and continuous evaluation of malaria control measures should be appointed. As far back as 1990 the Director Anti-malaria Campaign lamented "although the concepts and objectives of devolution are undoubtedly laudible and effective if so carried out, a lack of clear understanding in its principles has, very often, led to serious practical problems being artificially (and sometimes) knowingly created in the provinces which have had serious consequences on the status of the disease. Not the least of these has been the lack of participation of the primary health services in malaria control, which ironically was the very void which devolution was meant to fill".

Table 9 : Objective of the Anti-malaria Programme and present status in Jaffna

* OBJECTIVE TO BE ACHIEVED BY 2001	PRESENT STATUS IN JAFFNA
Reduce incidence of malaria to a level that the animal parasite index would not exceed 10 per 1000 population. (The population refers to those living in areas at risk of malaria)	The incidence of malaria in Jaffna in 1997 is 82.5 per 1000 population.
To minimize the population of <i>Pl. falciparum</i> infection.	The <i>Pl. falciparum</i> infection has increased from less than 500 in 1990 to over 3500 in 1996.
To prevent malaria epidemics	Epidemic of malaria is occurring in Jaffna
To prevent malaria in pregnant mothers	District wise data is not available, but clinicians observe several cases of malaria among pregnant women & congenital malaria

Source : Annual Health Bulletin - 1996, Ministry of Health, Sri Lanka. P. 41

- 2 **Staff and spraying equipment.**
At the moment Jaffna district has only 10 walking units. Jaffna District needs 30 walking units and 2 mobile units to cover the present population of 475,000. The vehicles, sprayers and insecticide for these teams should be regularly supplied. The annual requirement of malathion is 180,000 kg. (At 18 kg per 30 houses).
- 3 **Establishment of mobile malaria treatment centres in villages** where there is high incidence of malaria. This activity could be undertaken by NGOs. The mobile teams should carry out Blood filming and treatment for malaria.
The Family Health Worker & Public Health Inspectors should be trained to detect and treat cases of malaria.
- 4 **Improvement of case detection facilities.**
There are only 8 microscopists in the Health Department to identify malarial parasites in the blood films. One microscopist could examine only about 60 slides a day. Any excess slides received are left aside to be examined when the 'slide load' is low. Invariably these slides (in thousands) are washed away unexamined when shortage of slides arise. It is suggested that more microscopists are trained locally and be employed to do this activity.
- 5 **Regular supply of anti-malarial drugs is essential.**

6 **Health Education of people to ensure that complete treatment is taken by patients.**

7 **Research**

The malarial vector mosquito breeds in stagnant pools of clean sunlit water, and the river and irrigation system in Sri Lanka provided ideal breeding grounds.

In the absence of such rivers and irrigation channels in Jaffna, the perennial maintenance of the spread of malaria needs investigation and research especially regarding drug resistance and insecticide resistance.

Further research and action is also necessary to identify and introduce other malaria prevention methods such as

- the introduction of insecticide impregnated nets
- biological control of mosquito larva using larvivorous fish

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