

LYMPHATIC FILARIASIS

2



2.1. Role of vector control and mass drug administration (MDA) in the filariasis elimination campaign

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Duration : Five years

Starting Date : July 2001

Funding Agency : Intramural project [continuation of studies in the 9 villages of WHO/TDR/CTD project (1994- 1999)]

Evaluation of the intervention strategies (MDA with or without vector control) revealed that prevalence and intensity of microfilaraemia (Mf) and annual transmission potential (ATP) demonstrated significant reductions in the two village Groups (MDA alone & MDA+VC), compared to the villages without any intervention. Monitoring of entomological and parasitological parameters are being continued in 2 villages where only MDA is being implemented; while in all the 3 villages of Group B where VC is integrated with MDA, to determine the impact of various intervention strategies on the filarial infection variables. The long-term impact of the vector control operation on the sustainability of the gains achieved by the earlier intervention strategies were also determined in the these village groups. During the year, 2005 no MDA was carried out by the state health systems.

Entomological monitoring

The villages which are under MDA with and without vector control (VC) were monitored for the vector parameters both by collecting indoor resting as well as indoor landing mosquito vectors *viz*; *Culex quinquefasciatus*.

The villages with MDA+VC continued to demonstrate negligible vector density with nil transmission; both in the resting and landing population. In these villages, the PMH resting density during the period April 05 to March 06 was 24.06 & 0.15 respectively (Tables 7 & 8). In villages without vector control the PMHD was 24.06, and the transmission intensity index (TII) during this year was 0.1008. In the landing vector population, the annual biting rate (ABR) was 16,354 and 450 in MDA alone and MDA+VC villages, respectively. The vector infection rate in the former was 0.84%, with nil infectivity.

Table 7. Transmission parameters obtained from the resting catches in the two treatment blocks during the period April 05 - March 06

Treatment arm	PMHD	Infection rate	Infectivity rate	Mean L3	TII
MDA alone	24.06	2.15	0.18	2.33	0.1008
MDA + VC	0.15	0.00	0.00	0.00	0.00

Table 8. Transmission parameters obtained from the landing catches in the two treatment blocks during the period April 05 - March 06

Treatment arm	ABR	Infection rate	Infectivity rate	Mean L3	AIBR	ATP
MDA alone	16354	0.84	0.00	0.00	0.00	0.00
MDA+VC	450	0.00	0.00	0.00	0.00	0.00

Impact of MDA and vector control on the filarial infection variables

A survey was carried out during the month of June 2005, to determine the status of microfilaraemia (Mf) and antigenaemia in the age groups 2-5 and 15-25 years. In Group A villages, overall 7MDAs were made (1995,1996,1999,2001,2002,2003 and 2004) with antifilarial drug combination. During this year the Mf prevalence was 0.58% and 3.02% in 2-5 and 15-25 years respectively (Table 9). In Group B villages where vector control is being implemented, nil Mf positivity was found to maintain in 2-5 years. Antigenaemia prevalence (AGP) was also negligible in the Group B villages. The AGP was 3 times lower in the MD+VC arm as compared to MDA alone arm in both the age groups (Table 10).

Vector control implemented by the community with minimal supervision resulted in the suppression of vector population and this was reflected in reduced filarial infection in the villages which are integrated with vector control. From this it concluded that sustainability of gains achieved due to the implementation of MDA is demonstrated.

Table 9. Impact of vector control on microfilaraemia prevalence (%) after 5 rounds of MDA

Age groups (Years)	Treatment groups	April 1999	June 2005	% reduction
2-5	MDA alone	2.44 (41)	0.58 (172)	76.23
	MDA + VC	0.00 (75)	0.00 (201)	-
15-25	MDA alone	4.21 (95)	3.02 (265)	28.27
	MDA + VC	4.04 (99)	0.66 (302)	83.66*

Number screened in paranthesis

* P<0.05

Table 10. Impact of vector control on antigenaemia prevalence (%) after 5 rounds of MDA

Age groups (Years)	Treatment groups	April 1999	June 2005	% reduction
2-5	MDA alone	7.32 (41)	5.60 (125)	23.50
	MDA + VC	5.33 (75)	1.56 (128)	70.73
15-25	MDA alone	17.89 (95)	14.40 (125)	19.51
	MDA + VC	18.18 (99)	5.00 (120)	72.50*

Number screened in paranthesis

* P<0.05

The impact of MDAs on the infection levels in both the arms was determined taking 1999 survey as the baseline. It was observed that after 5 MDAs there was significant reduction in both microfilaraemia and antigenaemia in the MDA+VC arm in the age group 15-25 years (Table 10). In children the MFP maintained at zero level, while there was 71% reduction in AGP. In MDA alone arm the reduction were about 20% for AGP.

2.2. Studies on filariasis elimination as implemented by the government agencies in two revenue blocks of Tirukoilur in Tamil Nadu

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Duration : Five years

Starting Date : October 2000

Funding Agency : Extramural project – WHO/TDR

The impact of mass drug administration (MDA) under filariasis elimination campaign on entomological and parasitological aspects of filariasis and soil transmitted helminth infection was continued during this year also with the initial project objectives. The results of the impact of three MDAs on filarial infection in human and the vectors are reported in the CRME Annual Report 2004-2005. During this year (2005), the mass drug administration programme (MDA V) was postponed due to unavoidable circumstances by the State Public Health Department. Since the postponement of MDA programme was announced only 2-3 days prior to the date fixed for MDA, the IEC activities were implemented. The influence of MDA 2004 on various parameters like filarial infection in human and vectors and the helminth infections was evaluated and the salient findings are discussed below.

Advocacy campaigns (2005 - 2006)

In anticipation of MDA V, advocacy campaigns were carried out during November 05, December 05 and January 06. The IEC activities were carried out in close collaboration with Tamil Nadu Public Health Department. The various levels of the community and the public health personnel, the NGOs and Filaria Prevention Assistants (FPAs) were motivated and encouraged to convey the MDA message to the villagers. Auto rickshaws (three wheeler vehicles) with audio system for canvassing the messages and distribute the pamphlets to all the villages were organized. The NSS volunteers of the local Govt. Arts College, Tirukoilur were approached and were educated about lymphatic filariasis, need for drug consumption and the necessity to enhance drug compliance to achieve the goal of elimination. They agreed to participate in the drug administration by assisting the FPAs. Local elementary school Head Masters (HMs) were called for their involvement in the dissemination of the MDA messages. The HMs were requested to include the message of the MDA programme daily

in their school prayer session. The local village women groups (Self Help Groups-SHG) were asked to spread the MDA message to their group members and to their neighborhood.

Impact of four MDAs on the microfilaraemia and antigenaemia

Prevalences and geometric mean intensities of microfilaraemia (MFP & GMI) for different age groups in Tirukoilur and Mugaiyur blocks are shown in Table 11. In the combined age group of 2-25 years the MFP was 2.12% and 1.65% in DEC+ALB and DEC alone arms respectively. The overall mean intensities in these 2 treatment arms were 0.0477 and 0.0346. In DEC+ALB arm, the Mf prevalence was 1.08%, 0.57% and 3.95% in 2-5, 6-9 and 10-25 years respectively. In DEC alone arm the prevalence was almost similar with 0.44%, 1.61% and 2.55% respectively. With each MDA there was a decline in the MFP in the DEC+ALB arm, which demonstrated a slight insignificant increase after the fourth MDA. The overall reduction in MFP after 4 MDAs was 61% and 68% in DEC+ALB and DEC alone arms respectively.

The antigenaemia prevalence was 6.18% and 7.55% in the 2 arms with no significant difference. In children of 2-5 years, the AGP was similar in both the arms (4.8%). In 10-25 age groups there is a greater reductions was recorded in DEC+ALB arm compared to DEC alone arm (Table 11). It appears that more MDA are needed to reach the elimination criteria of <1%.

Infection status in children born after the initiation of control programme in 2001 was determined, and the AGP and MFP in 2-4 years age group was 4.62% and 0.77% in DEC+ALB arm, while 5.88% and 0.65% in DEC alone arms respectively. The antigenaemia was nil in the 2nd and 3rd years of age in DEC+ALB arm, while infection was found in the 2 ages in DEC alone arm. The microfilaraemia was nil in both the arms for these children of 2nd and 3rd years.

Table 11. Filarial infection status in the community during October 2005 (one year after MDA IV)

Treatment arm	Age groups (Years)	Microfilaraemia			Antigenaemia	
		Sampled	% prevalence	GMI (Mf)	sampled	% prevalence
DEC+ALB (Tirukoilur)	2-5	185	1.08	0.0219	185	4.86
	6-9	153	0.57	0.0204	153	4.58
	10-25	228	3.95	0.0883	228	8.33
	2-25	566	2.12	0.0477	566	6.18
DEC alone (Mugaiyur)	2-5	228	0.44	0.0097	228	4.82
	6-9	186	1.61	0.0411	186	4.3
	10-25	314	2.55	0.0492	314	11.46
	2-25	728	1.65	0.0346	728	7.55

Impact of mass drug administration on the soil transmitted helminth infections in school children

The infection due to soil transmitted helminthes was determined for its impact due to the mass drug administration programme. The infection was due to three intestinal helminthes viz., *Ascaris*, Hookworm & *Trichuris* in school children. After each MDA, the infection levels in DEC+ALB arm declined steadily. In the arm administered with DEC alone there was no drastic reduction in prevalence (Fig. 8). For the egg intensity, the decline was drastic immediately after the first MDA in the treatment arms, with much higher reduction in DEC+ALB arm. This gain achieved in the 1st MDA was sustained in the subsequent MDAs in both the arms (Fig. 9). The reduction observed in the DEC alone arm was mainly due to the drug impact on *Ascaris*. As there was no effect of MDA on the other 2 helminths in DEC alone arm. For any of the 3 helminth infection the prevalence after 4 MDAs was 13.41% and 45.03% in DEC+ALB and DEC alone arms respectively. The overall percent reduction with 4 MDAs was 78% and 23% for prevalence, while 98% and 68% for the egg intensity in DEC+ALB and DEC alone arms respectively (Fig. 10).

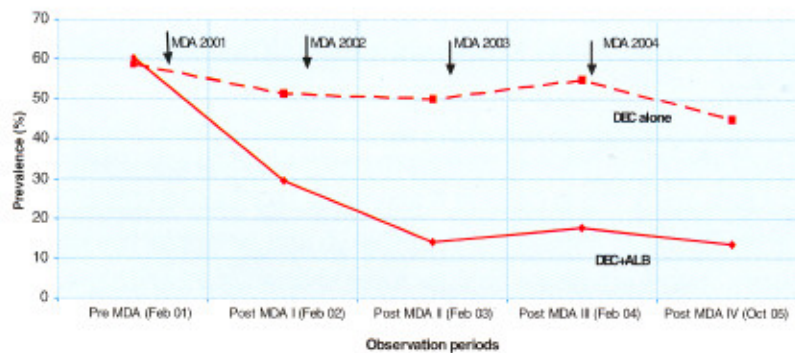


Fig. 8. Impact of MDAs on the prevalence of STH infection in the two treatment arms

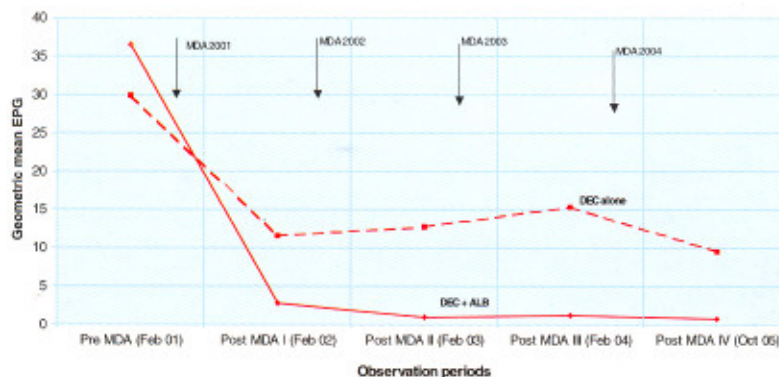


Fig. 9. Impact of MDAs on the egg intensity of STH infection

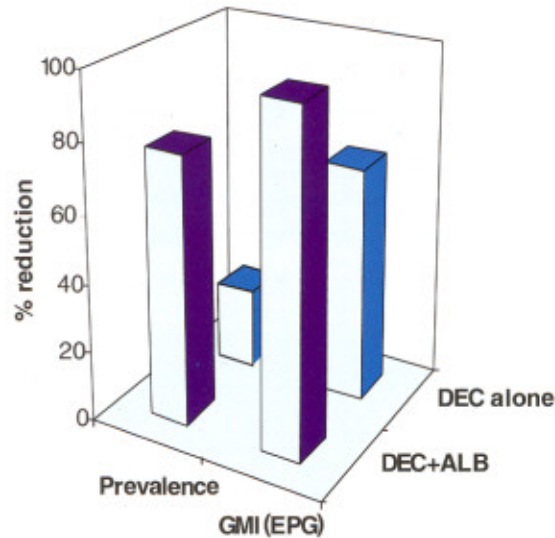


Fig. 10. Impact of 4 MDAs on the STH infection in children

Change in entomological indices with mass drug administrations

Vector mosquitoes of bancroftian filariasis, viz. *Culex quinquefasciatus*, were collected resting in human dwellings (in 18 villages) and those landing on human volunteers (in 8 villages), from Tirukoilur (DEC+ALB) and Mugaiyur (DEC) blocks by using hand catch method. Entomological indices like Transmission intensity index (TII) from resting catch & Annual Transmission Potential (ATP) from landing catches were estimated to demonstrate the impact of MDAs on these parameters.

Table 12. Transmission parameters obtained from the resting catches in the 2 treatment blocks during the period April 05 - Mar 06

Treatment arm	PMHD	Infection rate	Infectivity rate	Mean L3	TII
DEC+ALB (Tirukoilur)	27.35	1.24	0.13	2.3	0.0804
DEC alone (Mugaiyur)	20.15	1.86	0.12	1.3	0.0325

Adult resting collection

The PMH density was similar in both the treatment arms during this year (April 05 to Mar 06), which was 27.35 and 20.15 in DEC+ALB and DEC alone arms respectively (Table 12). During this period, a total of 6731 and 6381 vector mosquitoes were dissected to determine the infection and infectivity status in DEC+ALB and DEC alone arms respectively. The infection rate in DEC+ALB arm was lower than DEC alone arm showed that the transmission was recorded for 6 months in DEC+ALB arm, while 9 months in the arm administered with DEC alone (Fig. 11).

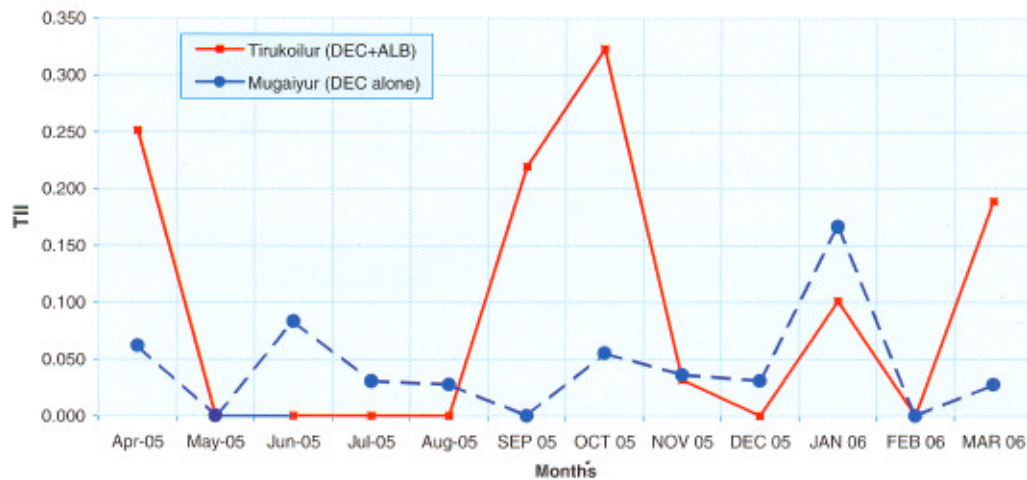


Fig. 11. Transmission intensity index (TII) estimated from the resting catch in the two treatment arms

Adult landing collection

In the landing catch, the annual biting rate was 31,761 and 22,037 in DEC+ALB and DEC alone arms respectively (Table 13). All the infection parameters were low in DEC+ALB arm as compared to DEC alone arm. During the one year period a total of 4211 and 2923 female mosquitoes were dissected from the 4 villages surveyed each in DEC+ALB and DEC alone arm respectively. In the former the infection and infectivity rates were 0.55% and 0.02% with a mean L_3 of 2.0. In DEC alone arm the respective values were 1.71%, 0.27% and 2.0. The Annual Transmission Potential (ATP), which is an estimated number of infective larvae exposed per person in the village per year, was 15.5 and 123.5 in DEC+ALB and DEC alone arms respectively (Fig. 12). Hence during this year the infective larval load in the biting vector population was 8 times lower in DEC+ALB arm.

Table 13. Transmission parameters obtained from the landing catches in the 2 treatment blocks during the period April 05 - March 06

Treatment arm	ABR	Infection rate	Infectivity rate	Mean L3	AIBR	ATP
DEC+ALB (Tirukoilur)	31761	0.55	0.02	2.0	7.75	15.5
DEC alone (Mugaiyur)	22037	1.71	0.27	2.0	61.75	123.5

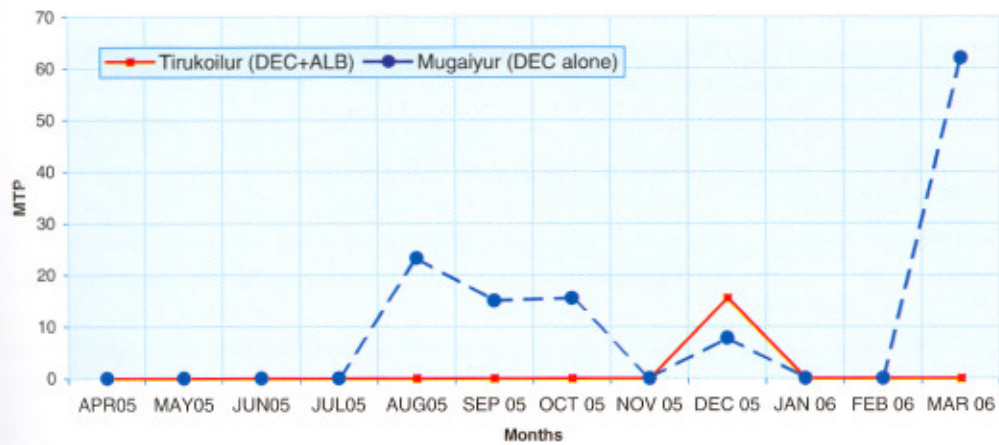


Fig. 12. Monthly transmission potential (MTP) estimated from the landing catch in the two treatment arms