LYMPHATIC FILARIASIS IN INDONESIA

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Abstrak

Filariasis limpatik di Indonesia

Filariasis masih merupakan masalah kesehatan masyarakat di Indonesia. Walaupun penyakit tersebut tidak mematikan tetapi akan menyebabkan kecacatan serta menurunnya produktivitas penderitanya, keluarganya maupun masyarakat, dan merupakan beban sosial. Penyakit tersebut di Indonesia disebabkan oleh tiga spesies cacing filaria yaitu Brugia malayi, B. timori dan Wuchereria brancofti. Filariasis di Indonesia tersebar di hampir seluruh provinsi terutama di daerah pedesaan. Pengobatan masal dengan DEC sampai saat ini merupakan cara pemberantasan yang paling baik untuk menurunkan prevalensi penyakit tersebut. DEC yang diberikan dengan dosis konvensional akan menyebabkan efek samping yang berat. Pengobatan dengan dosis rendah akan menurunkan efek samping dan dosis ini lebih disukai penduduk dari pada dosis konvensional. Kendala pengobatan dosis rendah adalah lamanya pengobatan, yaitu 40 minggu, sehingga mengakibatkan adanya ketidakpatuhan. Perubahan lingkungan baik lingkungan fisik maupun sosio-budaya sangat penting di daerah endemik filariasis karena secara tidak langsung akan menghilangkan penyakit tersebut, dengan demikian kerjasama lintas sektor, kemitraan dan peran serta masyarakat sangatlah penting.

INTRODUCTION

Filariasis was known in Indonesia since Haga and van Eecke reported a case of scrotal elephantiasis in 1889. Since then many papers have been published, mostly in Dutch Journals.

Flu in 1921 has found microfilaremia cases in the city of Jakarta. In the island of Rote, Brug has reported in 1937 a microfilaremia rate of 70%.

Intensive surveys on lymphatic filariasis have been conducted since 1972 mainly through collaborative studies between Ministry of Health (NIHR&D, DG-CDC), US NAMRU-2, WHO VBCRU, and the Department of Parasitology, Faculty of Medicine, University of Indonesia. Data have been collected from many parts of Indonesia e.g. South Sulawesi, Central Sulawesi, South Kalimantan, West Kalimantan, Flores, Timor, and Sumatera showed microfilaremia rates of over 30%. Sri Oemijati found a microfilaremia rate of 40 - 70% among the indigenous people of Buru Island, in the Moluccas (Oemijati,S. 1999). Other studies have been conducted in different areas of Indonesia by different scientists, their reports could be found somewhere else.

CURRENT SITUATION OF FILARIASIS IN INDONESIA

At present lymphatic filariasis has decreased considerably, but foci of high endemicity may still exist, especially in rural and remote areas. In many areas filariasis has disappered totally, with or without health interventon.

In some areas filariasis may increase and new foci may appear, mostly due to the change of the environment and population movement such as transmigration (Oemijati, 1999).

In 1975 a national filariasis control program has been established and started conducting mass treatment with DEC as the main control strategy (Widarso, 1998).

Unlike malaria which causes high mortality rate in hyperendemic areas, lymphatic filariasis causes high morbidity.

It is thus a disease of socio-economic and public health importance.

Results of rapid surveys conducted in late 2000's showed that suspected chronic cases of LF were found in almost all of 26 provinces in Indonesia. The chronic cases were found in 231 out of 336 districs. If the average population of each district is 650,000, the total population at risk is about 150,000,000.

THE PARASITES AND ITS EPIDEMIOLOGY

In Indonesia lymphatic filariasis caused by three species of filarial worms i.e. *Brugia malayi, B. timori* and *Wuchereria bancrofti,* with at least 6 epidemiologically different types.

1. *BRUGIA MALAYI*

Brugia malayi is widely endemic in Sumatera, Kalimantan, Sulawesi and adjacent islands, but its distribution is limited by the Weber Line, which separate Irian from the Seram Ambon islands (Brug, 1928; Lie & Rees,1958; Lie,1970). In man it is usually associated with elephantiasis of the lower limbs, recurrent lymphadenitis and lymphangitis. The parasite in man is classified into two physiological forms, the periodic and subperiodic (Turner & Edeson,1957). Both of these forms are present in Indonesia (Lie,1970). Another form of periodicity has been identified by Sudjadi (Oemijati,S.,1999), in Kalimantan, the nonperiodic form. Thus nowadays there are three forms of *B.malayi* periodicity in Indonesia, the sub-periodic, periodic and non periodic, all are nocturnal.

Lim (1985) demonstrated that the distribution of these various *B.malayi* forms in Indonesia is related to the landscape ecology, reservoir hosts and mosquito vectors. He observed there is a gradual change in the microfilarial periodicity from aperiodic to highly periodic corresponding to the change in the ecology of the habitats and its intermediate host and non-human primate reservoir hosts. By implication therefore, it would mean that as ecological changes occur, parasite behaviour as reflected in the periodicity and peak hour will have to evolve and adapt to situations present to ensure its continued transmission.

In Indonesia, adults *B.malayi* were recovered from wild monkeys in periodic endemic areas of South and North Bengkulu (Lim et al., 1984). While sub-periodic *B.malayi* is considered a zoonotic parasite and it has been observed that in areas of intense endemicity the infection rates in domestic and wild animal hosts (cats and monkeys) are correspondingly high (Palmieri et al., 1980; Liem et al., 1984).

The Mosquito Vectors

In Sumatera, the incriminated vectors of periodic *B.malayi* are *Mansonia* spp. The potential anopheline mosquitoes were *An.peditaeniatus* and *An. nigerrimus.* The mosquito vectors of the subperiodic *B.malayi* are also *Mansonia* spp. They are *Ma. uniformis, Ma. indiana, Ma. bonneae/dives* which breed in fresh water swamps adjacent to secondary and disturbed primary forests. *Anopheles nigerimus* which breeds in rice fields, is potential vector (Sudomo et al., 1984).

In Java Island, in West Java the vector of subperiodic B.malayi is *Ma.indiana.*

In Kalimantan, the vector of subperiodic *B.malayi* are *Mansonia* spp. primarily *Ma.uniformis* which breeds in fresh water swamps adjacent to secondary and disturbed primary forests, and in rubber estates (Sudomo et al., 1989).

In Sulawesi, the vector of periodic *B.malayi* are *Anopheles* spp. and three species of *Mansonia.* The primary vector is *An.barbirostris* and the mansonoids, *Ma. uniformis, Ma. indiana, Ma. bonneae/dives* are secondary vectors. The *Mansonia* spp also breed in the same ecological nitches as that of *An.barbirostris*, but they also found in

swampy areas adjacent to secondary forests.

In Moluccas, the vector of periodic *B.malayi* are *Ma. uniformis* and *An.bancrofti*.

2. *BRUGIA TIMORI*

The microfilaria of *B.timori* was first described from human blood in Portuguese Timor. In Indonesia first description of the microfilaria was presented by Oemijati and Lim in 1966. *Brugia timori* was described by Partono et al. (1977) after confirmation of adult worms recovered from experimental animals. So far the parasite has been found endemic in Southeastern part of Indonesia, the East Lesser Sunda Island (NTT) and Moluccas. Periodicity studies of Mf carriers revealed nocturnal periodic (Kanda et al., 1979). The parasite has so far been found in man only. The parasite causes elephantiasis of the lower limbs below the knee, lymphadenitis and lymphangitis (Dennis, et al., 1976; Partono et al., 1978; Partono & Purnomo,1978a).

At present the *B.timori* has spread to other areas such as Irian Jaya and Central Kalimantan. The parasite was brought by migrants from West Timor to other places. There is a possibility for the disease become endemic in new areas if there is potential vector in those areas.

The Mosquito Vectors

The vectors of *B.timori* are three species of *Anopheles* spp. The *An.barbirostris* is the confirmed vector which breeds in rice fields, open swamps, disused ponds and ditches (Atmosoedjono et al.,1977). *Anopheles vagus* and *An.subpictus* were also incriminated, but have yet to be confirmed.

3. *WUCHERERIA BANCROFTI*

Wuchereria bancrofti in Indonesia consists of two types, the urban and rural. The urban type was found in cities e.g. Jakarta, Bekasi, Tangerang, Semarang, and Pekalongan. While the rural type was found in the rural areas of the outer island of Java, such as Jambi and Irian Jaya.

The clinical manifestations of the brugian filariasis among others:

- Adenitis - seldom inflamatory reaction
- Elephantiasis the whole leg, arms, genital organs and mammae
- Chyluria

The Mosquito Vectors

In urban areas, the mosquito vector of *W.bancrofti* is *Culex quinquefasciatus* which breeds in polluted waters. The mosquito vectors of the urban type *W.bancrofti* are several species of *Anopheles, Culex* and *Aedes*.

FILARIASIS CONTROL IN INDONESIA

Diethyl Carbamazine Citrate has been proven very effective to extinguish the microfilaria as well as macrofilaria.

Different methods of DEC administrations have been tried in Indonesia:

1. Mass treatment with DEC was carried out in six villages in the Gumbasa irrigation areas, Central Sulawesi, by Putrali & Kaleb (1974) and Putrali et al. (1975) with the regimen of 5 mg/kg BW given in 6 consecutive days with a total dosage of 30 mg/kg BW. The results revealed that the mass treatment and the daily dosage scheme were practical for public health teams, the side effects were not severe, and the public acceptance were good. The results were good and the prevalence rate reduced from 29% to 4%.

2. Mass treatment which was conducted in a village on a rubber plantation at Banjar Disrict of South Kalimantan in 1977, was a failure. The prevalence rate increased from 15% to 18%. The failure due to the high drop-outs caused by the severe side effects or by

the incoming infected migrants (carriers) into the area (Ibrahim et al., 1977).

3. Experimental chemotherapy with different dosages of DEC as a short term and long term mass treatments were conducted in two villages of South Kalimantan in 1979 (Rush et al., 1980). The regimen for long term mass treatment was 2 mg/kg BW given daily for 25 consecutive days with a total dosage of 50 mg/kg BW. The short term treatment was 5 mg/kg BW given 2 times a day for 5 consecutive days with a total dosage of 50 mg /kg BW. The results showed that the reduction on the prevalence of microfilaremia for both methods was not significant at 12 months post treatment.
4. Control of *B.timori* by mass treatment using 50 mg/kg BW DEC and after one year later followed by short term selective re-treatment in highly endemic area, reduced the Mf rate by finger stick from 24% to 0% and by nucleopore membrane filtration from 30% to 2.5%. (Partono et al., 1979). The demonstrated low dose of DEC treatment supplemented by selective re-treatment through community participation was found to be successful for *B.timori*.
5. Mass treatment using low dosage DEC on weekly basis for 18 month period through community participation and supported by health education was carried out in three endemic villages in West Flores. Mild side effects were encountered during the first few weeks of treatment. One year after treatment, the microfilaremia rates decreased dramatically to very low levels, even by nucleopore membrane filtration. The adenolymphangitis rates also decreased and several persons with lymphoedema or elephantiasis realised that their limb sizes were also decreasing (Partono et al., 1984).
6. Mass treatments with low dosage of DEC was conducted in the province of Jambi, Sumatera. A dosage of 50 mg weekly was done for a period of 4 weeks and followed by 100 mg weekly for 8 weeks. After the side effect was disappeared, the rest of the dosage was given by standard dosage for 10 days. It was found that this method of treatment was well tolerated by the cases (Sudomo et al., 1989). The results were very good, the microfilaremia rates reduced tremendously.
7. Based on the results no.5 & 6, the control program has adopted the method. A dosage of 100 mg for adults and 50 mg for children for a total duration of 40 weeks. The total intake of the DEC is approximately 3000 mg for adults and 1500 mg for children.
8. Medicated salt has been tried in an inland areas in the province of Kalimantan. A concentration of 0.1 % DEC in salt was given to the population in the endemic areas in a period of 4 month and a 0.2 % concentration was given for a period of 2 months. The results showed a cure rate of 76 to 78% with mild side effects.
9. The use of medicated salt-plus was tried in several filariasis endemic areas in 4 provinces i.e. Jambi, South Kalimantan, Central Sulawesi and East Nusa Tenggara. A total of 21,500 kg of mixed iodine salt with DEC was distributed. In two provinces, Jambi and East Nusa Tenggara, the salt was given free of charge while in two other provinces the salt was sold to the people. The distribution of the fortified salt was conducted by health cadres and a series of meetings were held in the community to encourage the community to use the salt. The results were very satisfactory, the prevalence of microfilaremia were decreased, from 1.1% to 0% in the province of Jambi, from 4.6% to 0.39% in South Kalimantan, 3.0% to 0% in Central Sulawesi and from 11.5% to 0% in East Nusa Tenggara.

THE PROGRAM OF FILARIASIS CONTROL IN INDONESIA

Filariasis control in Indonesia is divided into two terms: short term and long term programs. In the short term program the main course of the control is mass or selective treatments, using DEC, plus other medicine such as antipyretics and antibiotics.

The aims of the short term program are:

1. To reduce the infection rates
2. To reduce the morbidity rates especially acute morbidity
3. To reduce the intensity of the infection

The aim of the long term program are: Filariasis may disappear spontanously, even without intervention of the health sector. This can be reached if there were environmental changes both physical and socio-cultural, which eliminates the breeding places of the vectors. Physical development can change the environments such as swampy areas and converted into housing areas, industrial estates and others. This will eliminate the breeding sites of the mosquito vectors and consequently will eliminate the vectors, and also the transmission. When the physical environments have changed, the socio-cultural will also be changed. To change the environment, a collaboration or integration with other sectors is needed.

To implement the program, policy and strategic plan have been developed. The policy of filariasis control in Indonesia has been design to decrease the side effect of DEC on the other hand to increase the coverage of the mass treatment. It was developed by a team consisting of Program managers, Researchers (NIHRD) and Experts (Faculty of Medicine Universuty of Indonesia). The policy of the filariasis control program area:

1. Mass treatment of the population in the endemic areas with low dosage DEC in 40 weeks
2. The priorities of the control area are:
   - Highly endemic areas
   - Less developed villages
   - Transmigration areas
   - Centre of development
   - Borders
   - Tourism objects
3. The implementation of the treatment is conducted by the PHC with community participation
4. The mass treatment will be repeated if the Mf rate is still >= 1%

While the strategy of the control program are:

1. Mapping of the filariasis endemic areas
2. Implementing mass treatment of the people in the area of priorities.
3. To determine the village as the smallest unit in the controlled areas.
4. Training of the PHC staffs and cadres.
5. Provision of DEC and other medicines (against side effects) through Presidencial Instruction (Inpres).

The policy and the strategy of filariasis control program are implemented through activities such as:

1. Identification of the endemic areas through rapid surveys, clinical surveys, and blood surveys
2. Implementation of Health Education
3. Implementation of mass treatment in the endemic areas
4. Implementation of vector control
5. Evaluation

The program should be supported by supporting activities such as:

1. Implementation of training of the filariasis control program implementer
2. Implementation of intersectoral and interprograms collaboration
3. Provision of the infrastructures

All of those activities on the implementation of filariasis control program should be supported by community participation. Without community participation the program would not be able to reach the goal. The role of Formal and Informal leaders of the villages, the Woman's organisation (PKK) as well as NGO are very important to

support the program. Cadres who have been trained on the chronic and acute cases identification and distribution of drugs are essential to accomplished the program.

SUMMARY

1. Lympatic filariasis still a public health problem in Indonesia. Although it is not a killing disease but will decrease the productivity of the infected people, the family and the community.
2. Lymphatic filariasis in Indonesia caused by three species of Nematode, *Brugia malayi, B.timori and Wuchereria bancrofti.*
3. Lymphatic filariasis in Indonesia was distributed throughout the country but focally, especially in rural and remote areas.
4. Mass treatment with DEC so far has been the only effective control measure to reduce the disease rates and the infection rates.
5. DEC given in the conventional dosage may give severe side effects, and needs a close supervision of trained health personnel moreover in most areas the public acceptance is very bad.
6. Low dosage of DEC treatment decrease the side effects considerably. The treatment is more acceptable to the people. The method does not need close supervision and may be given by community leaders or cadres.
7. There is an indication that total intake of DEC is more important than the regularity of the drug administration.
8. The disadvantage of the low dosage mass treatment is the long duration of the treatment, which may cause compliance.
9. The change of the environment both physical and socio-cultural is very important, which may indirectly eliminate the disease.
10. Multisectoral partnerships and community participations are long term programs but when established will be sustainable.

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