
English Summary

Malaria Control Programme in Indonesia

Arwati

Malaria has been identified as a major disease not only in Indonesia but also in other tropical countries in the world.

As a disease which is widely distributed and mostly affects the rural poor population and also the production and development centres outside Java and Bali, hyperendemicity of malaria have a negative impact on the socio-economic condition of the whole society.

Indonesia began a limited malaria control programme since the Dutch occupation which was gradually expanded to a large scale malaria control; in 1959 a malaria eradication programme was started in Java and Bali.

The programme was integrated into the Health Services and put under the Directorate General of Communicable Diseases Control.

The main activities carried out were treatment of cases, limited residual house spray, anti larva measures and other supplementary measures as needed.

The present programme resulted in the general reduction of cases in Java and Bali, while in the other islands, reduction of prevalence of malaria was only limited to the priority areas.

Problems encountered are the resistance of vector *An. aconitus* to the insecticide DDT in Java and *P. falciparum* resistant to chloroquine in Kalimantan Timur, Irian Jaya and Lampung.

A Pharmacological View on Anti Malaria Drugs

R.H. Yudono

Anti malarial drugs are needed for causal prophylaxis, to suppress and to cure malaria. Most of the parasites found in Indonesia were vivax plasmodia (>50%), and falciparum plasmodia (< 50%); while malariae plasmodia and ovale plasmodia form the minority (resp. 0,1 - 0,2% and less). The drugs used against malaria are 4-aminoquinolines, diaminopyrimidines, biguanides, as suppressive agents, causal prophylaxis and as sporontocides. 8-aminoquinolines are used for causal prophylaxis and as gametocytocides.

The mechanisms of action of those drugs are as follows :

1. Sulfonamides and sulfones block the synthesis of folic acid.
2. Diaminopyrimidines and biguanides block further the reaction to form tetrahydrofolic acid, which is necessary for the synthesis of nucleic acid. 1 + 2 can be mixed to obtain a synergistic effect.
3. Quinine, 4-aminoquinolines and 8-aminoquinolines are drugs which have an affinity to DNA and therefore also disturb the synthesis of nucleic acid.

Because of inadequate use of those drugs during mass campaigns, some falciparum plasmodia became resistant to chloroquine. In those cases alternative drugs must be used to treat falciparum malaria. Many therapeutic regimens can be used as substitutes, for example : Double drug combination : Quinine sulfate + tetracycline HCl. Triple drug combination : Quinine sulfate + pyrimethamine + sulfonamides or sulfones.

Although those drugs are good for eradicating malaria parasites, most of the potent drugs, such as quinine, 4-aminoquinolines and 8-aminoquinolines, are also toxic and possibly mutagenic or carcinogenic.

Chloroquine Resistant Plasmodium falciparum in Indonesia

Wita Pribadi, Legia S Dakung

Resistance to chloroquine in falciparum infection was first reported in Colombia in 1961 by Moore and Lanier. Thereafter resistance has been confirmed in several parts of South America, Panama, India and many parts of Southeast Asia. Investigation in Africa failed to confirm the existence of chloroquine resistant *Plasmodium falciparum* (1972). However, since 1978 resistant cases has been reported from Sudan, Zambia, Kenya and Tanzania.

In Indonesia, resistance of *Plasmodium falciparum* to quinine and quinacrine was observed since 1936. In 1951 *Plasmodium falciparum* and *Plasmodium malariae* were reported to be resistant to proguanil.

Resistance of *Plasmodium falciparum* to pyrimethamine and cross resistance to proguanil were observed by Meuwissen in Irian Jaya (1961). In 1973 the first 3 cases of chloroquine resistant falciparum infection were reported from East Kalimantan. All 3 cases were from Samarinda, followed by 11 cases from Balikpapan and 4 cases from Sangkulirang. Since 1975 resistant strains to chloroquine have been observed in Irian Jaya.

In Jakarta, The Department of Parasitology and General Pathology, University of Indonesia, identified 3 resistant cases, imported from Irian Jaya. In 1978, 4 resistant cases were imported from a new focus in Lampung and South Sumatra.

A total of 84 cases of chloroquine resistant *Plasmodium falciparum* infection were reported from Indonesia. Most of the cases were resistant at the R I level.

Although resistant falciparum infections are increasing, the total number is very small in comparison to the number of malaria cases in Indonesia. Chloroquine is still the drug of choice for the treatment of all malarial infections. Only in areas where chloroquine resistant cases are present, the use of other antimalarial drugs is recommended.

The Effect of Malaria on The Nutritional Status of Preschool Children

Marbaniati

Malaria in Wanadadi subdistrict has been an endemic disease since 8 years ago. Many efforts have been done to control this disease, but the slide positivity rate is still high (8,1% in 1979) and the annual parasite incidence was 82,7 ‰ in 1979.

Observation on 5-year-old children in the Health Centres showed that there was a relation between malaria fluctuation and child growth.

Drug prophylaxis among the five-year-old children exerted a positive effect to the nutritional condition of the children.

A Malariometric Survey of an Endemic Area

Soesanto Tj., Supogiyono, Noerhayati S dan Siti Musfiroh

Malariometry is a measure for estimating the level of endemicity of malaria. The village Medayu is an endemic area of stable malaria which at the time of this survey had the characteristic of meso-endemicity.

Although the control of malaria is being carried out, the incidence of malaria remains high. This is caused by several factors including the resistance of *A aconitus* to DDT, inaccessible breeding places along the Serayu River, and wet rice fields which are planted two or three times a year.

It is necessary to increase the research for a method which is acceptable and feasible in the community for treating malaria and at the same time prepare a budget which will at least safeguard the ongoing program of malaria control.

Intermittent Irrigation as a Means of Control of Malaria Vector

Sustriayu Nalim PhD.

A study was carried out to explore the feasibility of using intermittent irrigation as a means of control to cope with DDT resistance in *Anopheles aconitus* (the malaria vector in Java). Ricefields were flooded for 10 days and dried for 3 days. This intermittent irrigation starts after the rice is 2 months old.

Two evaluation methods were used in the study, the larval dipping method and the emergence traps for adult mosquito density evaluation. Intermittent irrigation is found to be efficient enough to reduce mosquito population densities, provided certain criteria are met.

Brugia Timori eradication with low dose Diethylcarbamazine "By the people and for the people" method

F. Partono, Purnomo, A. Soewarto, Sri Oemiyati

The eradication programme of *Brugia timori* was conducted since 1977 in three villages of the Kecamatan Reok, Kabupaten of Manggarai, West Flores. Province of East Nusatenggara. Before it was started, a preliminary survey was carried out taking census of the population. Name, age, sex and family relations were recorded. The population was examined clinically and the signs and symptoms of filariasis recorded.

For filariasis examination, 20 μ l of blood were obtained by the fingerprick method between 20.00 and 24.00 p.m. At the same time blood was drawn by venapuncture, 1 ml before and 3 ml after the treatment.

The blood thus obtained was filtered by Nucleopore with a pore diameter of 5 μ . All blood samples were stained with Giemsa according to the method of Partono and Idris (1977). The type of microfilaria was determined and the amount counted. Diethylcarbamazine (DEC) was administered in a low dose : 50 mg for children of 10 years and older and 25 mg for those under 10 years of age, once a week during 1½ years.

The drug was distributed by the schoolteachers or by the chiefs of the villages and the amount and the side-effects caused by the drug were carefully recorded. The whole population was examined clinically and parasitologically every year. The results of this filariasis eradication programme using the method "by the people for the people" proved very satisfactory.

After a period of three years only three patients with were found in three villages and only a few microfilaria could be detected in 3 ml of nocturnal blood. Both acute and chronic symptoms of filariasis were significantly reduced. With this low dose of DEC side-effects were practically absent.

Immunity in Filariasis

D.A. Higgins

The filariae are complex parasites with three major life stages : the adult worm, the microfilariae and the third stage, infective larvae. These stages interact with the host to initiate a variety of immune responses including antibody production, cellular immunity and combinations of cellular and antibody mechanisms. It is probable that the clinical picture presented by the host is dependent upon the type of immune response produced. There is also a possibility that some individuals are protectively immune, suggesting that in filariasis the development of a vaccine might be feasible. A scheme suggesting the interdependence of clinical picture and expression of immunity will be presented. Recent evidence pointing to the involvement of antibody, eosinophils and lymphocytes in a combined mechanism of response under the control of T cells will be discussed.

Filariasis Bancrofti in Semarang : the Results of Entomologic and Parasitologic Survey

F.A. Sudjadi, Soesanto Tj., Moetrarsi F, Noerhayati S, Isdiarto H, Agus Soewito

The results of a dissection of 8,926 mosquitoes, gathered from various areas in Semarang, proved the existence of filarial infections in Ngemplak Simongan, West Semarang; Sendang Guwo, East Semarang; and in Petompon, South Semarang. The vector was shown to be *Culex fatigans* which had an infection rate of 0,09% in Sendang Guwo and 0,10% in Petompon.

The results of examination of blood specimens from 1,472 persons from the same three areas demonstrated the presence of Bancroftian filariasis with microfilaria rates of 4.5%, 5.4% and 6.5%, and microfilarial densities of 7.2, 14.9, and 13.3 per 30 mm³, respectively, in Ngemplak Simongan, Sendang Guwo, and Petompon.

It is possible that the infection rate of *Culex fatigans* gives an indication of the level of endemicity and intensity of Bancroftian filarial infection in Semarang.

Effectiveness of Long and Short Term Mass Treatment of Filariasis with Diethylcarbamazine and associated side effects

Jan Rusch, JR Palmieri, DT Dennis, B. Ibrahim, Hariyani A. Marwoto

Mass treatment of *Brugia malayi* filariasis with diethylcarbamazine was conducted in Pengiuran and Sungai Baru, two villages of Banjar Regency, South Kalimantan, Indonesia. Pengiuran was given a short term treatment of 10 mg/kg BW/day for 5 consecutive days. Sungai Baru received a long term treatment of 2 mg/kg BW/day for 25 consecutive days. Reexamination six months and 12 months post treatment revealed prevalence reductions of 93% and 79%, respectively, in Pengiuran and 73% and 78%, respectively, in Sungai Baru. The MFD₅₀ also decreases from 4 to 1.5 six months and 12 months post treatment in Pengiuran and from 4.5 to 2 six months post treatment and to 2.7 twelve months post treatment in Sungai Baru. In Pengiuran, 22% experienced general reactions and 3% local reactions while in Sungai Baru, 9% had general reactions and 18% local reactions. The short term treatment with high doses of DEC evoked a greater number of general reactions than the long term treatment with low doses. On the contrary, the long term treatment schedule evoked more local reactions than the short term regime.

Schistosomiasis in Indonesia, 1980

WP Carney, Moh Sudomo

Classical oriental schistosomiasis transmission in Indonesia is very limited in distribution. Extensive parasitological examinations and snail surveys indicate that *Schistosoma japonicum* and its molluscan host, *Oncamelania hupensis*, are limited in distribution to two contiguous drainage systems of Central Sulawesi, the Gumbasa River and the Lariang River systems. In these drainage systems transmission areas have only been found at high elevations, 1,000 meters or more. It is estimated that 7,000 Indonesians are exposed to schistosomiasis in the Lindu and Napu Valleys and that 35 to 60% of these individuals are infected.

Cases of schistosomiasis from other areas of Indonesia are discussed. Most are considered non-autochthonous but some most likely due to a mammalian schistosome with *Schistosoma japonicum*-like eggs. These mammalian schistosomes which are probably more closely related to *S. mekongi* than to *S. japonicum* are most likely transmitted through small, aquatic triculid mollusks.

Current knowledge of other schistosomes enzootic to Indonesia, *Schistosoma incognitum*, *Schistosoma spindale* and *Trichobilharzia brevis*, are reviewed. Particular emphasis is placed on *S. incognitum* as an emerging zoonosis and because of its potential to hybridize with *S. japonicum* and generate an offspring that retains infectivity to man yet utilizes ubiquitous freshwater limnaeid mollusks.

Mass Treatment of Soil Transmitted Helminthic Infections with Pyrantel pamoate to Primary School Children

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Various techniques of mass treatment for soil-transmitted helminthic infection using pyrantel pamoate with different dose regimens and frequencies have been reported.

However, the appropriate schedule of treatment for controlling these parasites in endemic areas should still be determined.

In view of these, an evaluation was made to compare the effectiveness of mass treatment with pyrantel pamoate 10 mg/kg body weight to primary schoolchildren, given at 2 month intervals in one area and at a 6 month interval in the second area.

In Sleman regency, Yogyakarta, the pretreatment prevalence rate of *Ascaris lumbricoides* was 84.2%, and of hookworm 30.5%. The average EPG (eggs per gram feces) was 8273 for *Ascaris* and 54 for hookworm. After three mass treatments given every two months during a period of seven months (August 1976—March 1977), there was a regression of the prevalence rate of *A. lumbricoides* to only 9.0%. There was an absolute drop of 75.2% after the third treatment, which was a 89.3% reduction. The infection rate of hookworm decreased from 30.3% to 5.0% after the treatment, which was a 83.5% reduction. The averages EPG after the third treatment were 1677 and 27 for *A. lumbricoides* and hookworm respectively.

In Sewon, Bantul regency, Yogyakarta, after two mass treatments with a 6 month interval in a period of seven months (August 1977—March 1978), there was a regression of the prevalence rate of *A. lumbricoides* from 76.4% to 28.6%. It was a 62.6% reduction. The averages EPG of *Ascaris* were 4806 and 2794, before and after the second treatment respectively. The prevalence rate of hookworm prior to the first treatment was 41.4%, reduced to 24.6% after the second treatment, which was a 40.6% reduction. The average EPG of hookworm was 29 before treatment, decreased to 25 after the second treatment.

After four times mass treatments in Sewon, Bantul regency given every 6 months (March 1979), it was found that the result was not as effective as in Sleman regency.

It seemed that *Trichuris trichiura* was more resistant to pyrantel pamoate.

Intestinal Nematode Infections in Preschool Children and Their Treatment : A study in The Village of Berta, Susukan, Banjarnegara

Moetrarsi F, Noerhayati S, Sri Soemarni, Soenarno, Elias Winoto

A study of soil transmitted helminthic infection and its treatment with piperazine citrate among 84 preschool children was carried out Berta Susukan, Banjarnegara.

It was found that the prevalence rates of *A. Lumbricoides*, *T. Trichiura* and hookworm prior to treatment were 89.3%, 77.4% and 20.2% respectively.

The infection rate of hookworms was higher in males (33.3%) than in females (12.2%). This difference was statistically significant.

The result of treatment showed that piperazine citrate was more effective against *A. Lumbricoides* than against *T. Trichiura* and hookworm. The cure rate for *A. Lumbricoides* was 46.1%.

Three months after treatment the re-infection rate of *A. Lumbricoides* was 24.4%; *T. Trichiura* 20% and of hookworm 50%.

Combination of Mebendazole — Tetramizole and Pyrantel pamoate — Mebendazole Single Dose for the Treatment of Intestinal Nematode Infections

Soebagyo Loehoeri, Soenarno, Sumarni

142 patients with intestinal nematode infection were divided into two groups. The first group was treated with a combination of 300 mg mebendazole and 75 tetramizole in single dose, the second group was treated with a combination of 500 mg pyrantel pamoate and 150 mg mebendazole in single dose.

Only 45 patients of the first group could be evaluated 5 days after treatment; the results showed that the cure rate of *Ascaris lumbricoides*, *Trichuris trichiura* and *Necator americanus* were 77%, 51%, and 81% respectively. And the egg reduction rate of *A. lumbricoides*, *T. trichiura* and *N. americanus* were respectively 99%, 96% and 98%.

From the 45 patients of the second group which were evaluated 5 days after treatment, the results showed that the cure rate of *A. lumbricoides*, *T. trichiura* and *N. americanus* were 100%, 81% and 85% respectively. And the egg reduction rate of *A. lumbricoides*, *T. trichiura*, *N. americanus* were 100%, 92% and 95% respectively.

In this study both combinations of 300 mg mebendazole and 75 mg tetramizole or 500 mg pyrantel pamoate and 150 mg mebendazole were fairly good and effective in the reduction rate of *A. lumbricoides*, *T. trichiura* and *N. americanus*, although the combination of 300 mg mebendazole and 75 mg tetramizole showed minimal side effects on 3 out of 45 patients.

The Effect of Diethylcarbamazine (DEC) and Mebendazole treatment on Intestinal Helminths in South Kalimantan (Borneo), Indonesia

Harijani A. Marwoto, PB Mc Greevy, DT Dennis, Sutanti Ritiwayanto, Sofyan M.

This study was conducted from May 1977 through April 1978 in a rubber estate, Banjar Regency, South Kalimantan, inhabited by people of low socio-economic status, who derive their livelihood as rubber tappers. In the study area filariasis is highly endemic (35% – 40%) and intestinal parasitoses which include ascariasis, trichuriasis and hookworm are common. Four villages were selected for this study.

In village I, mebendazole was administered twice at a 3 month interval, at 100 mg 2 x daily for 3 days. In village II, DEC was administered at 5 mg/kg body weight/day for 10 consecutive days. In village III, both mebendazole and DEC were administered at the above dosage rates, while village IV served as an untreated control area.

In village I, one month after the first treatment with mebendazole the prevalence rates of *Ascaris lumbricoides*, *Trichuris trichiura* and hookworm were reduced 80%, 83% and 96% respectively. After the second treatment with mebendazole there was only a slight further reduction in the prevalence of *T. trichiura* and hookworm, while the prevalence of *A. lumbricoides* remained unchanged.

In the village treated with just DEC the prevalence of *T. trichiura* and hookworm decreased significantly one month after treatment, whereas DEC alone did not appear to have an immediate effect on *A. lumbricoides* but after six months the prevalence of *A. lumbricoides* also decreased significantly. In the village treated with both DEC and mebendazole there was a decrease in prevalence of all three species of soil transmitted helminths that similar to the results find in the village treated with DEC alone.

The dry latrine in the prevention of infection by intestinal helminths

Tonny Sadjimin, Soesanto Tjokrosonto

The low environmental health level is a contributing factor to the high morbidity and mortality rate in developing countries. Methods of fecal disposal are very much influenced by social customs. Among the factors, educational level, poverty and indifference are closely related and are determining factors in the success of community health services.

Prevention of infection by intestinal helminths can be accomplished by interrupting the epidemiological chain of the parasites. The dry latrine is one of the methods. It does not require water and is relatively easy to maintain by the village population. It can be used indefinitely and together with the compost it produces are distinct advantages.

Acceptance of this type of latrine, how to cope with the difficulties and the results of parasitological examination of its contents are discussed. More studies should be carried out to evaluate the acceptance of the dry latrine, its possible contamination of waterwells, its influence on the prevalence of intestinal helminths and on the incidence of diarrhoea.

Nutrition and Parasitic Infection

Soemilah Sastroamidjojo

The "host" and "agent" interaction concept can be applied to the interaction between nutritional status and parasitic infection. Basically the interaction concerns (1) the need for the same nutrients by both the host and agent, and (2) the immune response mechanism which involves nutrients.

Relatively extensive studies on animals have shown that the effect of interaction may be synergism or antagonism or an indifferent effect. However, limited studies in man have shown that synergism seems to be the general rule, infection (including parasitic infection) negatively affects nutritional status and moderate to severe nutritional deficiencies increase the seriousness of infection.

Immunological Aspects of Parasitic Diseases

Aryatmo Tjokronegoro

Organisms such as protozoa and metazoa consist of, or produce, various kinds of foreign antigens capable of eliciting an immune response. Basically there are two systems of body immunity responsible for the protection of the body from parasitic diseases, i.e. (i) humoral immunity system, represented by the antibody molecules, and (ii) cellular immunity system, carried by sensitized lymphocyte cells.

Not all of the body immune responses against the very complex antigens have the characteristics of "protective immunity". On the contrary, some of the clinical symptoms of parasitic diseases are the result of the immune response itself.

So, although the body immune response has been induced, and effector mechanisms of the immunity systems have arisen, sometimes the parasites are capable of living safely in the immune body. This is exactly what differentiates multicellular organisms from unicellular ones.

The mechanism of the immune response, the mechanism along which the parasites avoid the attack of the immune response, its implications in the diagnosis through immunological methods, and the prevention of the disease by vaccination are discussed in this paper.

Amoebic Liver Abscess in the University of Gajah Mada Hospital, Yogyakarta

Haryono Adenan, Soegijanto Soemomarto, J Wijono

A retrospective study was conducted on 14 patients with amoebic liver abscess admitted to the Department of Medicine, Gadjah Mada University Hospital, Yogyakarta, from June 1975 to December 1979. These 14 patients consisted of 6 males and 8 females, age between 20 - 60 years, and peak incidence between 40 - 49 years.

The main complaints were fever (78,57%), right hypochondrial pain (71,42%), an history of watery and bloody stool (37,7%). Physical examinations revealed hepatomegaly (40%), fever (78,57%) hepatic pain and tenderness (64,28%), jaundice (28,57%), anaemia with hemoglobin less than 10 gr% (64,28%), leukocytosis (64,28%).

Stool examinations did not show any evidence of either cystic forms or trophozoite forms of entamoeba.

Two patients underwent an open aspiration with evidence of anchovy sauce and no evidence of trophozoites of entamoeba. All of these patients were treated with metronidazole 500 mg, thrice daily, for 10 days, with good response.

Intestinal Amoebiasis in Hospital Employees

Siti Moesfiroh Is., Cholid A.B., Sutarti A, Noerhayati S, Mufrodi

Hospital employees closely associated with patients with amoebiasis may have an increased prevalence of intestinal amoeba. This study demonstrated a prevalence of 17%.

Gastro-intestinal symptoms were demonstrated in 41% of the infected employees; 40% complained of abdominal cramps, 36% of nausea, and 28% of obstipation.

Diagnosis was based on two different laboratory examinations : a direct and an indirect method. *Endamoeba histolytica* was demonstrated in the cyst form.

Two thirds of the infected employees were treated with metronidazole 50 mg/kg/day for 5 successive days; the remaining one third were used as controls.

Based on a single post treatment stool specimen, the cure rate was 100%.

Side effects of the metronidazole treatment (nausea in 59%, headache in 41% and abdominal colic in 34%) disappeared following the conclusion of treatment.

Giardiasis in Children

Yati Soenarto, Moenginah P.A., Teluk Sebodo, Cholid A.B., Siti Musfiroh, Noerhayati Soeripto

A study on giardiasis in children with diarrhoea, children suffering from PCM, and "normal" asymptomatic children was conducted in the Department of Pediatrics, Gajah Mada University Hospital and in a village, Godean.

This article presents the results of the study and also discussed the problems of diagnosis and therapy in giardiasis.