

Special Article :

Improving Knowledge, Attitude and Practice of the Community in the Field of Parasitology

with special attention to environmental problems .

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The general policy in achieving goals of health development in Indonesia states that health activities should be implemented totally, integrated, evenly distributed, acceptable and accessible to the community and with active community participation. According to the Alma Ata Declaration, community participation is a prerequisite for the success of health development. To sustain active community participation, the community should be educated so that the people can take care of themselves and do not depend on the government. The goal to improve the knowledge and the intelligence of the community was expressed as a national goal in the Preamble of the 1945 Constitution of Indonesia. The learning process is not only obtained by formal education. The basic, the middle and the higher education only partly back up the needs for the development of manpower. Manpower development is more than basic knowledge and technical material, learned at school. It goes beyond that, and the objectives are to improve the quality of life or to educate people to be self reliant. These efforts try to include education in the development process of a community.¹

Basically the objective of education is to influence the environment of the intellectual process of people, to guide them in order to develop the physical ecosystem. Conscious or unconscious people thinks first before they act. There is an old proverb that says thinking is the light of the heart and one will be destroyed if one thinks wrong.

Therefore the community should learn so that it will develop positively and constructively leading to the improvement of the physical environment, how to analyse information on nutrition, sanitation, mother and child health, family planning, management of "the living drugstore" etc, all of which are part of what is called "community education". It also includes the improvement of behaviour and the development of an

active community, whose members are not only giving attention to the improvement of the quality of their own lives, but also to those of their neighbours. This is a way of learning which cannot be forced by outer forces, but should be searched for and developed by a group of people who wants to learn. This kind of education, is useful for young people as well as for adults, illiterates and literates; this is closely related to local needs and does not depend on time and place. It does not need a school-building, it is not necessary to take a formal curriculum, it is not necessary to finish in time and also it is not necessary to obtain a degree. Such an education is a life-time education and does not depend on time, where or how the education will be conducted.¹ The role of women to educate people with the purpose to improve their knowledge, attitude and practice is very important.

The Ministry of Health has also prepared general guide-lines for the control of Communicable diseases including parasitic diseases and the improvement of environmental health through primary health care. Health workers should be trained to increase their knowledge, skills and awareness of the programs of the Ministry of Health through primary health care approach. Also, to prepare the community, training of cadres (voluntary health workers) is conducted to increase their knowledge and skills. At the village level, for the village community, cadres perform activities on the control of communicable diseases such as conducting courses and other activities on environmental health.

The problem on environment is a very serious global problem. The air, water and soil are essential for life. The air of many cities is already polluted as evidenced by the acidity of the rain water. Acid rain has caused damage to millions of acres of forest and it is predicted that it will decrease agricultural products. Pollution by industrial waste, which contains mercury

(Hg) in Japan has caused the Minamata disease, the spreading of schistosomiasis (snail fever) as the result of the construction of dams and the development of irrigation, the pollution of breastmilk by the use of DDT as an insecticide are some examples of pollution.

In many countries destruction and pollution of soil still continues. Erosion and flood is connected with the destruction of forests and other vegetation.² An example in the field of health is the pollution of soil with the faeces of man and animals which contain micro-organisms, parasites and other agents. The pollution of the environment will cause continuous infection and reinfection of people and animals.

Besides the physical environment, there are also the economical and the socio-cultural environment, which include religion, habits, beliefs and superstitions. All this will influence the behaviour of people in certain areas. An example of bad behaviour is the use of water from the river for the household such as for bathing, washing and also for drinking.³ This will cause many diseases accompanied with symptoms like abdominal pain, diarrhea and vomiting.

A group of disease closely connected with environmental problems are parasitic diseases. The prevalence of parasitic diseases is still high in tropical developing countries such as Indonesia. The high prevalence of parasitic diseases are influenced by many factors e.g. the tropical climate which is favourable for the development of parasites, the socio-economic situation, including the low educational level of the community and the high population density.

Soil-transmitted helminthiasis

One very important group of intestinal helminths, is the group of the soil-transmitted helminths. The eggs or larvae of these helminths develop to infective stages in the soil. The most important species are the round worm (*Ascaris lumbricoides*), the whipworm (*Trichuris trichiura*) and two species of hookworm (*Necator americanus*, *Ancylostoma duodenale*).

Activities to control intestinal helminths infection, especially soil-transmitted helminths, was conducted in several areas in Indonesia.^{4,5,6} The project, called The Integrated Project on Family Planning and Parasite Control was started in 1976, with specific objectives as follows :

a. To integrate the family planning program with the control of soil-transmitted helminths. In using deworming as *entry point* it was hoped that the community can easier accept family planning as a way of life.

- b. To persuade the community to live a more hygienic life, in a better environment, so that the level of the individual and community health will increase.
- c. To decrease the prevalence and intensity of the soil-transmitted helminths infections and to increase the nutritional status, especially of the children.

At the beginning the project covered rural areas (between 1976- 1979) i.e. the small town of Sawahlunto, the whole district of Sawahlunto-Sijunjung, West Sumatra and the subdistrict of Serpong, West Java. Afterwards in 1981, the project was extended to the coalmine area at Bukit Asam, South Sumatra and the tea plantation of Kayu Aro, Gunung Kerinci in Jambi and next to Lhok Sukon, Aceh. At the end of 1982 project activities in all locations were returned to authorities of the area. Later on, during the transition period, the project managed rural and semi-rural areas, consisting of two villages in South Sulawesi and Joglo, West Jakarta. Since 1986-1987 the Integrated Project only conducted activities in the metropolitan city of Jakarta. The control of soil-transmitted helminthiasis has been done mostly in primary schools.

The Integrated Project was supported by several studies among other for the purpose of determining the kind and the dose of the anthelmintics to be used and the therapeutic schedule.^{7,8,9}

One of the studies has proved a decrease of soil contamination with helminths eggs after installing a number of latrines and subsequent to an education course, resulting in a decrease of new infections and reinfections with intestinal worms.¹⁰

The program on the control of worms induced several activities which create the awareness of the community on the importance of good environmental sanitation. At the end the objectives of obtaining a healthy community and environment will be reached.¹¹

Studies on the analysis of the effect of treatment of intestinal helminths on the health status of children under five in Serpong, West Java, were reported by Prihartono et al.^{12,13} It was shown that a single intervention consisting of periodical treatment of intestinal helminths, during a certain time, did not improve the health status of the children under five significantly. Therefore an integrated intervention was launched, consisting of periodical treatment of intestinal worms, administering extra local food and vitamin coinciding with an educational course, focussed on nutrition. The integrated intervention gave better results. The integrated course was given using the method "learning by doing". The course material for the mothers of children under five, consisted of knowledge on nutri-

tion, how to handle a household, family planning and environmental health, including the problems of intestinal worms. After demonstrating how to make use of local food stuff to prepare acceptable dishes, the mothers themselves cooked a meal and the food was directly given to their children of underfive. It was concluded that the course had a positive result on the improvement of the health status of the children of underfive.

Ismid et al.¹⁴ and Amri et al.¹⁵ reported on "Taman Gizi" (Nutrition Education Center) which was used as a model of the program for the integration of the control of parasites, improvement of nutrition and family planning. These activities were located in Pulo Gadung, East Jakarta. A workshop on nutrition, which also discussed the problems of parasites and family planning, resulted in a design for a five months program. The results of the activities conducted by a study and a control group were as follows :

a) The Nutrition Education Center for children of underfive can induce several activities in the field of health and increases the cooperation with the local health center.

b)

An increase of knowledge of the cadres and the mothers was noticed, which was reflected by :

1. the capability of the cadres to give lectures on nutrition, intestinal helminths, family planning and other topics.
2. the better quality of the extra food during the observation period.
3. the capability to distribute anthelmintics to the children of underfive, resulting in a decrease of the prevalence of the soil-transmitted helminth infections.
4. the capability to use the Nutrition Education Center for family planning activities.
5. the capability to create new activities or to develop on-going activities.

It was stated that at the end of the observation period the management of the Nutrition Education Center had improved.

The purpose of these studies was to give informations which could be used for the implementation of the integration program.

During the first year the program in Jakarta covered 34 schools (1987/1988), which increased to 504 primary schools at the end of July 1991. The number of the students in this program increased from 9,591 to 142,077. The program was implemented by non-governmental organizations (NGO), Yayasan Kusuma Buana (YKB) and Perkumpulan Keluarga Berencana Indonesia (PKBI), with the support of the

Ministry of Health and the Ministry of Education and Culture, including the Faculty of Medicine, University of Indonesia and a professional society, Perkumpulan pemberantasan Penyakit Parasit Indonesia. During the fourth year (1991/1992) the health authorities in Jakarta implemented the program in 100 schools with the purpose to accelerate the coverage rate.^{16,17}

The control of soil-transmitted worm infections cannot succeed if it is not supported by a healthy behaviour and other preventive measures by the community. Therefore regular and systematic health education using multi-media is a very important part of the program. The education in Jakarta is performed by means of face-to-face meetings aided by audio-visual slides, the distribution of leaflets, posters, school bulletins and the use of banners. In ensuring better results yearly competitions on hygiene are held between schools, stressing the importance of a clean environment. The course is intended for the pupils, teachers and the parents and is done during the first cycle of a school, participating with the program for the first time. A contribution of Rp. 1,000,- should be paid for treatment and two stool examinations. Pupils, unable to pay, are given free examinations and treatment.

The course content for the community should be practical. Besides knowledge on the morphology and the life cycle of the parasite, easy and simple facts on the prevention of helminthic infections should be discussed. Some examples are as follows: rooms and gardens should be cleaned frequently, the more so if there is much wind carrying dust containing helminth eggs into the house. Vegetables, especially leafy vegetables, should be thoroughly washed with running water. Vegetables should be cleaned with boiling water or cooked before consumption. Hands should be washed before the meal. The body should be cleaned, hands and feet should be washed after working in the garden, soil from the garden should not be incidently taken inside the house and should not contaminate the floor with infectious agents, such as helminth eggs.¹⁸ These suggestions have been proven to be of value by several studies.^{18,19,20}

The course content is saturated with informations on a healthy environment and personal hygiene.

At the beginning, the program was mostly implemented by governmental institutions, but since 1984 non-governmental organization (NGO) are playing the main role. This is in accordance with the policy of the government, especially The Ministry of Health, who considers the control of intestinal helminth as having low priority, so it is logical that the program is mostly managed by NGO's.

Dengue Haemorrhagic Fever

The second problem that should be discussed is the dengue haemorrhagic fever (DHF). Dengue haemorrhagic fever is a community health problem in Indonesia. The number of cases is increasing and spreading throughout the country. After twenty years since it was found for the first time in Jakarta and Surabaya in 1968, the disease now has been spreading over 201 Regencies (Dati II). Periodically, the number of cases increases significantly every 5 years. The last wide-spread outbreak (Kejadian Luar Biasa, KLB) occurred in 1988. A total of 47,573 patients were administered in hospitals and 1527 (3.2%) of them died. If actions on prevention and control are not intensified, it is expected that the 5-years period cycle will repeat itself in 1992-1993.²¹

In 1990 provinces with high prevalence were Jakarta, West Kalimantan, East Kalimantan, Yogyakarta, East Java, South Kalimantan and Central Java.²¹

Three important aspects should be considered: the susceptible host (man), the vector/the virus transmitter and the environment.

The clinical manifestations of the dengue virus infection of man varied from very mild to very serious with high mortality and heavy bleeding. During the last five years the pattern of the clinical manifestations, observed in hospitalized patients, has changed. There was a shift of victims to the older age-group, children older than 10 years. Signs and symptoms such as abdominal pain, vomiting, diarrhoea, spasm were more seen, whereas intestinal haemorrhage such as melaena and haematemesis, were less prominent. Because of the changes in the pattern of the clinical manifestations, the management of DHF patients should be intensified, to decrease the mortality.

The most important vector of DHF is the mosquito *Aedes aegypti*. This mosquito has a black coloured base with white dots on the body, especially on the feet. A white harp-like picture on the back is a specific diagnostic feature of the *Aedes aegypti*. The mosquito is mostly found in big cities, with high population densities, but are also observed around those cities. With containers, filled with rain water, mosquitoes are spreading by way of the increased transportation between cities and villages.

The female mosquito sucked human blood during day-time from morning to afternoon with two time peaks, that is between sunrise and noon (8.00-12.00) and before sun-set (15.00-17.00). The *Aedes aegypti* choose shrubs or low vegetations as its resting place, including vegetations of gardens and premises. Besides those places the mosquito rest on hanging items,

such as clothes. In nature the mosquito lives about 10 days, whereas the flight range is short, about 40 m.

Although the lifespan of the mosquito is short, it is able to transmit the virus very efficiently. Therefore the *Aedes aegypti* is called a *strong transmitter*.

Another mosquito, which is also capable in transmitting DHF, although of less importance, is the *Aedes albopictus*. This mosquito likes natural breeding places more, such as bamboo stumps and coconut shells containing rain water.²²

What is the influence of the environment? Dengue haemorrhagic fever is mostly found in tropical areas. Although there are incidents of DHF throughout the year, the number of cases increases during the rainy season. During this season the number of breeding places increases. The female mosquito, is attracted to dark-coloured water containers, with wide openings and protected from the sunshine.²³

The life span of the *Aedes* mosquito is longer during the rainy season, because of the higher humidity of the air. Therefore the number of *Aedes* mosquitoes increases. Although *Ae. aegypti* are found throughout the year, there is a density increase during the time when there is much rain and a decrease during the dry season.²⁴

Favourable resting places of this mosquito are dark, humid places with some aeration, like hanging clothes or other items in the house. At these places the female mosquito waits till the eggs are mature, lays them, flies away and bites again.²⁵

During 20 years observation of DHF in Indonesia, it was found that the incidence was only about 14 individuals among 100,000 inhabitants. Although this rate is low in comparison with that of the other infectious diseases such as malaria, diarrhoea and tuberculosis, the disease creates unrest, even panic. This is understandable, because the death rate of DHF is about 4%.²⁵

At this time the most effective control of DHF is the control of the vector by breaking the transmission chain. The participation of the community is very important, especially in the control of mosquito breeding places.²⁶

The program on the control of DHF which started in 1991/1992 in Indonesia used an effective method i.e. the control of mosquito breeding places (MBP). This method of control used the "3 M" strategy: "menguras, menutup dan mengubur" (cleaning, closing and burying) water containing items, to destroy the larvae.²⁷ For health education "2 M" and "1 B" was added, that is "mudah" (easy), "murah" (cheap) and "berkesinambungan" (continuous).

The efforts to control the disease include surveillance activities and to create awareness for the need of the early detection of an outbreak occurrence. Activities start with community health education before fogging the area. Intensive control in an endemic district include the regular investigation of larvae for the monitoring and evaluation of mosquito breeding place control by the community in every kelurahan ("principle village"). Further activities are complete health education through the multi-media approach. Health education should be followed by an effort to mobilize the community for the control of mosquito breeding places and afterwards the results are regularly evaluated by larvae investigation.²⁷

As it is shown in Table 1, the knowledge of the community about the disease and its prevention in 9 cities of Indonesia is still inadequate and can be improved.²⁸

Table 1. Survey on the knowledge, attitude and practice on DHF in 9 cities 1986-1987*.

Items	Average percentage
Has heard about DHF	93 %
Consider DHF dangerous	90 %
Knows signs/symptoms of DHF	51 %
Knows that DHF is transmitted by mosquitoes	78 %
Knows breeding places of <i>Ae. aegypti</i>	46 %
Knows how to prevent DHF with control of breeding places	36 %
Knows how to use a bate for prevention (Temephos)	14 %

* Padang, Jambi, Pontianak, Singkawang, Jakarta (subdist. Sunter), Depok (Bogor), Bandung, Yogyakarta, Bantul.

Source : WHO Dengue Newsletter, 1991 (quoted by Suroso).²⁷

Sutomo et al.²⁹ mentioned that in Sukabumi, West Java control of the quality of the environment, is the most effective intervention to increase the knowledge, attitude, practice of the community and can decrease the larval index. Percentages of effective changes on knowledge was 71.2, on attitude 39.8 and practice 46.5, whereas the house index was decreased to 13.3, the container index to 1.0 and the breteau index to 13.4.

In Jakarta health education activities are routinely conducted. During the activities posters, leaflets and other communication, information and education materials are used. In the near future again there will be health education activities in Jakarta for several

groups of the community, stressing the monitoring of *Aedes aegypti* larvae in breeding places. The material and results of the education will be evaluated and the evaluation will be used to improve the method of health education.

Workshops and clinical lectures have been held at a national level since 1968 to improve the professional capability of physicians in the accurate diagnosis and management of DHF patients. Between 1975-1985, 10,000 physicians and 700 nurses have been trained on the clinical aspects of DHF. In an attempt to decrease the mortality rate health education was given since 1981 to health cadres, so that DHF cases are reported as early as possible to the local health unit.³⁰

What is the future of dengue haemorrhagic fever control?

As the *Ae. aegypti* is widely distributed throughout the country, dengue haemorrhagic fever is not expected to disappear unless there is an active participation of the whole community in controlling larvae in houses and public buildings. The community coordinated by the head of the district or area should participate in the campaign, while evaluation and monitoring of the results should be done regularly.²⁷

Malaria

The third problem which is also very important is malaria. Malaria, caused by *Plasmodium* and transmitted to man through bites of *Anopheles* mosquitoes, is a prominent health problem in Indonesia. Many efforts have been tried, but the results are still unsatisfactory. Reasons for this are among others the low quality of the activities, the insufficient budget to maintain the results already acquired and the lack of active participation of the community.³¹

No area in Indonesia is free from malaria. This widely distributed disease found in variable grades from mild to very serious, can be found autochthonously, imported, introduced or re-introduced.

Some factors which influence the pattern of malaria in a certain area are : 1) the parasite found in the host; 2) the susceptible host; 3) the mosquito vector and 4) the environment, favourable for the lifespan of the parasite, man and mosquito.³²

The sensitivity of the *Plasmodium* parasite against antimalaria drugs varies. At the present time many *Plasmodium falciparum* cases are found resistant against chloroquine. There are groups of people, who are susceptible and who are more immune. For example: new-comers in an endemic area, are more susceptible to malaria than the original inhabitants.

Among the *Anopheles* mosquitoes, 60 species are able to transmit malaria. There are 16 species found in Indonesia as malaria vectors with many different breeding places.³³ As examples can be mentioned, that in Java and Bali *An. sundaicus* and *An. aconitus* are the most important vectors, whereas in Irian Jaya *An. farauti*, *An. punctulatus* and *An. bancrofti*.³²

The environment has a great influence on the malaria situation in a certain area. The transmission of malaria in an area with a cold climate is only possible during the dry season. Environmental changes sometimes create different breeding places, which then cause changes in the situation of malaria in that area.³⁴

Better malaria control can be obtained through improvement of the knowledge and changing the attitude and the habits of the community. Prior to health education a survey should be conducted, including a sociological survey. Let us for example discuss results of a survey in a community, living in the village of Berakit, Riau Province, which is an hyperendemic area for malaria.³⁵ The three malaria species found were *Plasmodium falciparum* 71,6%, *P. vivax* 25,0%, *P. malariae* only 1,1 % and mixed infections 2,3%.

The results of the sociological survey were as follows: the people of Berakit village were aware of the presence of malaria but had limited knowledge on the cause and prevention of the disease. Part of the people were Malays (49%), Bugis (12%), Chinese descendents (9%), Javanese (9%) and the rest were from other parts of Indonesia. Among the people 68% had primary school education, 2 % had higher than primary education, whereas the rest were illiterate or drop outs from the primary school. The people of the village live from selling agricultural products primarily coconuts and from other sources of income. The people had also audiovisual communication channels such as radio and television. Health facilities in the village were not optimally used, but the people were aware of the function of the facilities.

During the following years i.e. 1983/1984 and 1984/1985 intervention consisted of treatment with chloroquine with community participation, sociologic observation based on a teaching module with illustrations and implementation of control with the purpose: (1) to know the effect of the changing attitude of the community towards malaria control after having used the teaching module (2) to know the effect of the community participation on the control of malaria with chemoprophylaxis.

Health cadres spread the informations on malaria during the distribution of drugs. Out of 145 heads of the family 95,1% discuss malaria at home, 56,6 % at meetings of the head of the family with the health

cadres, 46,2 % during meetings and 37,9% at work. Furthermore, information on malaria using the teaching module was spread to neighbours (58,6%), to members of the family and close friends (70,3%), to visitors (31,7%) and also to the community of other villages (14,5%).

Survey on the anti-malaria drug distribution by the cadres showed that 72,5% among the 145 families obtained the drug every week, whereas 27% of the families did not receive the drug regularly every week. Two families did not receive the drug at all.

It was concluded that the people were using the teaching module with good results. The community was aware that their participation was important in controlling malaria in their village.³⁶

The participation of the community was ensured in an attempt to decrease the morbidity rate of malaria in a vulnerable area in Central Java. During the years 1982/1983 80% of 70,000 cases were found in 8 focal areas in the upper Serayu Valley, Jepara, Batang, Pekalongan, Kebumen and Boyolali.

It was found that in these areas the malaria was unstable with varying endemicity pattern. and very susceptible to changes. An epidemic broke out in the district of Cilacap reaching its peak in July-August 1984 and another peak in October-November, causing death to babies, children of underfive and ageing people.

With this background, a field operation study was then implemented with the purpose to decrease the morbidity rate of malaria with several interventions.

Results of the interventions were as follows: increase of knowledge and changes in the habit of regular self-medication for the prevention of the disease were noticed. A high compliance rate of about 95% was observed among the children, below 10 years of age, who were taking the drug for prevention regularly. Among these children 2,1-4,8% did not use the drug regularly.

The regular weekly visit by the malaria field workers in order to give health education using the guide book "malaria", caused changes of opinions on malaria in the community. Before interventions the community was of the opinion that malaria was not dangerous, whereas after interventions they were sure that the disease was chronic, if not cured well, even could cause death.

Before interventions, bitter tasted traditional drugs were used for prevention as well as for cure, whereas after interventions the community was asking for anti-malaria drugs, although they still were taken bitter tasted traditional drugs.

Before interventions were implemented the people tried to cure themselves but after these interventions they were going to the local health unit for medication.³⁷

Very communicative posters, available for the malaria control program state the following phrases : 1) Are you suffering from fever and chills? Possibly malaria. Examine your blood at the local health unit or take medicine at the hospital; 2) To prevent mosquito bites and malaria: sleeping inside bednets is the best way for prevention; 3) The number of mosquitoes will decrease if you have fish in your ponds [(like mujair (*Tilapia mozambika*), gupi (*Poecilia reticulata*), kepala timah (*Panchax-panchax*)]. Distribute fish in your ricefield or other water bodies (Ministry of Health). These posters, using simple words provided with illustrations are attractive.

Control of soil-transmitted helminthiasis, dengue hemorrhagic fever and malaria which are implemented in Indonesia shows the importance of health education in parasitic disease control. Since elementary disease control is basically introducing an intervention to the community, it is important to involve the community in the control program. Community involvement or community participation can only be achieved by conducting effective health education.

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