

Lymphatic Filariasis Situation After Mass Drug Administration in Kamundu and Tanah Miring Village in Merauke Regency, Papua, in 2017

Semuel Sandy
 Departement of Parasitology
 Balai Penelitian dan Pengembangan
 Kesehatan Papua
 Jayapura, Indonesia
 mercury.sandy56@gmail.com

Anorital
 Pusat Penelitian dan Pengembangan
 Upaya Kesehatan Masyarakat
 Jakarta, Indonesia
 ano.anorital@gmail.com

Raflizar
 Pusat Penelitian dan Pengembangan
 Upaya Kesehatan Masyarakat
 Jakarta, Indonesia
 raflizar.drh@gmail.com

Abstract—Background: The mass drug administration program (MDA) has been implemented since 2007 and the evaluation of the assessment survey (TAS) was carried out in elementary school children in 2014 and 2016 with negative results. The activity was to assess whether there was any transmission of lymphatic filariasis in the community so that it was free from the disease. In supporting the success of MDA, a survey of knowledge, attitudes, and behavior of the community was needed to be conducted by the head of health center and the health department in order to control the disease. **Method:** the design of this study was cross-sectional study which was conducted from January- November 2017 in Kamundu and Tanah Miring village. A simple random sampling was 622 people. The measurement of the community knowledge, attitudes, and behavior was done using a structured questionnaire. The microfilariae survey was conducted with a fast test (diagnostic rapid test), alere *Wuchereria bancrofti*. Then, microscopic confirmation was carried out to find out whether or not the respondents were positive. Meanwhile, the data were analyzed descriptively. **Results:** The results of a microfilariae survey using an antigen test were quickly obtained that 12 respondents were positive and then that 2 respondents were positive based on microscopic confirmation. The results of the respondents' knowledge survey on the mass drugs administration were that the respondents still lacked of knowledge, in particular, of the causes, transmission, and sources of information about lymphatic filariasis. The attitude of respondents to POPM was good according to the number of MDA coverage treatment for 5 years. The respondents' behavior towards MDA and prevention of lymphatic filariasis was still not particularly preventive. The positive findings of respondents indicated that respondents' knowledge, attitudes, and behavior, in general, were still insufficient. **Conclusion:** The survey of antigen microfilariae rated of 1.9% (12/622). Then, community knowledge and behavior were still low about MDA and the prevention of lymphatic filariasis.

Keywords: *filariasis, Merauke, Papua*

I. INTRODUCTION

Lymphatic filariasis is a disease caused by *Wuchereria bancrofti* worms, *Brugia timori* and *Brugia malayi*. [1][2] Filariasis does not cause death in humans but it can cause disability. Therefore, it can interfere working activities and

long-term socio-economic benefits. [3] Filariasis is categorized by WHO as a neglected tropical disease and is found in countries with low socioeconomic populations.

[4] An estimated 120 million people are infected with lymphatic filariasis in 81 endemic countries in the world and an estimated 1 million people live in the country. [5]

Lymphatic filariasis is a health problem in Indonesia. In 1975 Indonesia attempted to eradicate filariasis, especially in high-endemic filariasis areas. In 1997, the World Health Assembly adopted a resolution of the "Elimination of Lymphatic Filariasis as a Public Health Problem", which is 2000 was strengthened by the WHO decision by declaring "The Global Goal of the Elimination of Lymphatic Filariasis as a Public Health Problem by the Year 2020" [1]

In 2014, there were more than 14 thousand people suffering from chronic clinical filariasis spread in all provinces of Indonesia. Epidemiologically, more than 120 million Indonesians live in filariasis-endemic areas. Until the end of 2014, there was 235 regency/city filariasis endemic, from 511 regencies/cities throughout Indonesia. The number of filariasis endemic districts/cities can increase because there are still several uncharted districts/cities. Based on the evaluation of the prevalence of microfilaria in Indonesia, the Minister of Health on April 8, 2002, in the village of Mainan, Banyuasin III Subdistrict, MusiBanyuasin District, South Sumatra, has launched the Global Filariasis Elimination Program in Indonesia [1]

Filariasis endemic areas, in general, are lowlands, especially in rural areas, beaches, remote areas, rice fields, swamps, and forests. The three types of worms that cause lymphatic filariasis can be found in Indonesia. *W.bancrofti* filariasis worms spread in Sumatra, Java, Kalimantan, Sulawesi, Nusa Tenggara, Maluku, and Papua. *Brugia malayi* filariasis worms are found in Sumatra, Kalimantan, Sulawesi and parts of Maluku. *Brugia timori* is found in Flores, Alor, Rote, Timor and Sumba [6] Papua is a filariasis endemic area. Data in 2009 estimated that 1158 people infected with filariasis. In 2015, there were 1184 people involved in clinical filariasis cases in Papua. Subsequently, in 2017, three clinical filariasis cases involved 407 people. [7][8][9]

Filariasis endemic areas in Papua include Jayapura, Merauke, Boven Digoel, Mimika, Memberamo, Waropen, Sarmi, Keerom, Yapen, Mappi, and Asmat. [9] Merauke Regency is one of the filariasis-endemic areas. In 2007, filariasis prevalence was 0.14%. [9] The mass drug administration (MDA) has been carried out since 2007. The evaluation of filariasis treatment was carried out including the Pre-Transmission Assessment Survey (TAS) in 2012, TAS-1 in 2014 and TAS-2 in 2016 and it was successfully passed. The success of filariasis treatment in the community depends on participation, willingness and public compliance to take preventive medicine for DEC (diethyl carbamazine citrate) 6 mg / Kg / BB and Albendazole 400 mg for 5 years with treatment coverage above 65%. Then, the treatment was evaluated whether there was still transmission in the area. [3][10]

Environmental conditions (climatic factors, vector habitats, biological factors, and physical factors) greatly affect the transmission of filariasis in an area. [11] Merauke Regency is a lowland with rice fields, swamps, and forests. The presence of streams is potentially the development of filariasis vector culture which has a risk of contracting microfilariae through mosquito bites. [12] The people's mobility between provinces among filariasis-endemic districts is also a challenge in Merauke Regency to remain free from lymphatic filariasis. [13]

The purpose of this survey was to obtain an overview of the knowledge, attitudes, and behavior of the community regarding the prevention of treatment and prevention of lymphatic filariasis after the Mass drugs administration (MDA) since 2007, and to carry out serological and microscopic examination of *W. bancrofti* microfilaria in the community.

II. METHODS

The study was conducted in January-December 2017. The data collection was conducted with interviews using questionnaires and finger blood surveys at night (21.00-24.00). The study populations were people who were domiciled in the sentinel region and spot areas where the Transmission Assessment Survey (TAS-2) survey was conducted in elementary schools. The sample was calculated based on one proportion estimation formula with simple random sampling using the Stanley Lemeshow equation: [14][15][16]

$$N = [Z_{21-\alpha} / 2.P (1-P)] / d^2$$

Remarks, N = number of samples; $Z_{21-\alpha} / 2. = 1,960$ (95% confidence level); P = 0.28 (proportion of filariasis); d = 0.05.

Based on this formula, the number of samples for each village/kelurahan was: $n = 1.96 \times 1.96 \times 0.28 (1-0.28) /$

$0.05 \times 0.05 = 309.78$ people, rounded up to 310 people (minimum).

The number of 310 people was in 70-100 households (1 household 4.5 people) per location (village / kelurahan). The total sample was 620 people in 2 villages in different districts. Subjects drawn for blood were residents aged 5 years and over. Inclusion Sample Criteria: residents aged 5 years and above, especially children in grade 1 and 2 of elementary school who were positive at antibody/antigen tests. Exclusion: people who were chronically ill (TB,

leprosy), and mental disorders.

Analysis: survey results were analyzed descriptively to obtain an overview of the knowledge, attitudes, and behavior of the community towards lymphatic filariasis.

III. RESULTS

The serological survey on 622 people using RDT (diagnostic rapid test) filariasis *W. bancrofti* obtained 12 positive people, and then microscopic confirmation of fingertip blood examination at 21.00-24.00 resulted in 2 people positive for microfilariae. The results of interview activities to measure people's knowledge (age of respondents => 15 years) on filariasis were still very low. ; Elephantiasis / filariasis caused by worms by 5.3% (N = 438). Respondents' knowledge about the effects/effects of elephantiasis was 59.8% (N = 438) with 4.1% answering swollen legs and arms, fever and tiredness/sickness and 2.3% answering swelling on thigh fold. Information on how to treat elephants/filariasis was obtained from health workers (96.2%) (N = 91) while the one from other personnel (traditional healers, drug stalls, self-medication) (0-2%). The community's knowledge of elephantiasis preventive drug in the village was only 21.7%. Meanwhile, 78.3% did know it. The source of information for the treatment of elephantiasis was obtained from health workers/teachers 77.3% and announcements at the village hall/village 10.0%.

The description of community attitudes towards elephantiasis can be seen in Table 2. Respondents' attitudes toward elephantiasis/filariasis that it could be prevented by not taking filariasis medicine were 47.0% of people who answered "no" and 19.2% of people answered "yes".

The prevention of filariasis using bed nets respondents wast 51.8%. Regarding the treatment of elephantiasis in the community, respondents that hoped to get advance information/notifications were 78.8%. Public also felt uncertain (45.2%) if taking filariasis medication would have side effect, but 38.4% of them agreed that it had side effect. Then, there were 87.0% respondents who had awareness of taking medication and 84.4% agreed that taking medicine would make them healthy.

The description of the respondent's behavior towards the treatment of elephantiasis can be seen in table 3. The survey results of 622 people were 21.7% (N = 622) who took drugs for prevention of filariasis and 78.3% who did not. Respondents who took all of the drugs given by health workers were 91.9% (N = 135) and 4.4% drank only some of them. The results of a survey of people who did not take medication were mostly due to forgetting and fearing the side effects of drugs. The most common side effect of the respondents complained was dizziness / headache 14.6% (N = 130) and drowsiness 16.9% (N = 130). The reason for the respondents not participating in filariasis treatment carried out by health workers and health centers was laziness 9.8% (492) and considered no benefit/benefits 3.3% (N = 492). Efforts to prevent transmission of elephantiasis/filariasis by mosquito bites outside the home were 29.7% (N = 622) and 20.6% (N = 622) used mosquito repellent or citronella oil. While, the prevention efforts at home that included using bed nets during night sleep were 74.3% (N = 622) and used mosquito coils were 58.5% (N = 622).

TABLE I. KNOWLEDGE OF RESPONDENTS ON LYMPHATIC FILARIASIS

Knowledge of respondents	Frequency	
	Yes (%)	No (%)
Causes of elephantiasis (N= 438)		
Disease caused by worms	23 (5,3)	415 (94,7)
Mosquito-borne diseases	130 (29,7)	308 (70,3)
Hereditary disease	3 (0,7)	435 (99,3)
Disease caused by spirits	0 (0)	438 (100)
Disease caused by violating taboos	1(0,2)	437 (99,8)
Effects caused by elephantiasis (N=438)		
Swollen hands and feet	262 (59,8)	176 (40,2)
No symptoms and fever	7 (1,6)	431 (98,4)
Causes fever and weak / sick body	18 (4,1)	420 (95,9)
Swelling of the groin and armpits	10 (2,3)	428 (97,7)
Swollen breasts and scrotum	6 (1,4)	432 (98,6)
How to get information on filariasis treatment (N= 91)		
Health workers	63 (96,2)	28 (30,8)
Shaman	2 (2,2)	89 (97,8)
Buying medicine at a food stall / drug store	0 (0)	91 (100)
Traditional medicine	2 (2,2)	89 (97,8)
Knowing that MDA had been done in the village (N=622)		
Sources of information on elephantiasis treatment (N=110)	135 (21,7)	487(78,3)
Health worker and teacher	85 (77,3)	25 (22,7)
Friends / neighbors / family	5 (4,5)	105 (95,5)
Announcements at the village village hall	11 (10,0)	99 (90,0)
Sheet, banners, and newspapers	0 (0)	110 (100)
Announcements at mosques or churches	0 (0)	110 (100)
Radio / church	2 (1,8)	108 (98,2)

TABLE II. ATTITUDES OF RESPONDENTS TO THE TREATMENT OF LYMPHATIC FILARIASIS

Attitudes of respondents (N = 438)	Frequency (%)		
	Agree	Doubtful	Not Agree
Filariasis can be prevented by not taking filariasis medication	84 (19,2)	148 (33,8)	206 (47,0)
Filariasis can be prevented by just sleeping using a bed net	101 (23,1)	227 (51,8)	110 (25,1)
If you take filariasis medicine, you must have advance notice	345 (78,8)	77 (17,6)	16 (3,7)
Taking filariasis medication will have side effects	168 (38,4)	198 (45,2)	71 (16,2)
If you do not take filariasis medication, you will not be infected	101 (23,1)	227 (51,8)	110 (25,1)
If you take filariasis medicine, it will cause your feet / hands to swell	32 (7,3)	189 (43,2)	217 (49,5)
Taking filariasis medicine because it was told by parents / family / village head / community leaders / village health cadres	43 (9,8)	122 (27,9)	273 (62,3)
Taking filariasis medicine due to reluctance to the village head / community leader / village health cadre	67(15,3)	106 (24,2)	265 (60,5)
Taking filariasis medicine we will be healthy	383 (87,4)	47 (10,7)	8 (1,8)
Take filariasis medication because of your own awareness	381 (87,0)	49 (11,2)	8 (1,8)

TABLE III. THE BEHAVIOR OF RESPONDENTS AGAINST FILARIASIS MASS DRUG ADMINISTRATION PREVENTION

Behavior of respondents	Frequency	
	Yes	No
Taking Filariasis medicine (N = 622)		
Taking all drugs given by the officer (N = 135)	135 (21,7)	487 (78,3)
Drinking all	124 (91,9)	5 (3,7)
Drinking some of them	6 (4,4)	0 (0)
Reasons for not taking medication (N = 5)		
Forgetting	1 (20)	4 (80)
Working	0(0)	5 (100)
Being afraid of side effects	1 (20)	4 (80)
Reaction after taking medication (N = 130)		
Dizziness / headache	19 (14,6)	111 (85,4)
Fever	1 (0,8)	129 (99,2)
Body aches, pains	1 (0,8)	129 (99,2)
Stomach heartburn, pain	2 (1,5)	128 (98,5)
Gagging	3 (2,3)	127 (97,7)
Shortness of breath	0 (0)	130 (100)
Heart beat	0 (0)	130 (100)
Sleepiness	22 (16,9)	108 (83,1)
Reasons for not participating in MDA filariasis (N = 492)		
Laziness (less interested)	48 (9,8)	444 (90,2)
A rumour if taking medicine would cause sickness	0 (0,0)	492 (100)
Lack knowledge of the benefits / benefits	16 (3,3)	476 (96,7)
Feeling healthy (no need to take medicine)	7 (1,4)	485 (98,6)
There is a notification before MDA filariasis performed (N = 622)		
Efforts to prevent mosquito bites in the home (N = 622)		
Sleeping at night using a mosquito net	462 (74,3)	160 (25,7)
Using mosquito repellent	41 (6,6)	581 (93,4)
Using mosquito coils	364 (58,5)	258 (41,5)
Spraying bedrooms with insect repellent spray	64 (10,3)	558 (89,7)
Efforts to prevent mosquito bites outside the home		
Using mosquito repellent or citronella oil	128 (20,6)	494 (79,4)
Wearing long sleeves, trousers and socks	91 (14,6)	531 (85,4)
Burning waste to make smoke	185 (29,7)	437 (70,3)

IV. DISCUSSION

The results of serological surveys of people in Merinuke district, a sentinel area, namely Kamundu and Tanah Miring (N = 622), obtained positive results for serology of

W. bancrofti antigen in 12 people (1.9%) and after confirmation by microscopic examination, 2 positive people were obtained (0.3%). Merauke Regency was a filariasis endemic area. Mass drugs administration (MDA) had been done since 2007 with coverage of 58.23% (N = 208,580). Also, Pre TAS, TAS-1, and TAS-2 in 2016 (N = 1,540) were carried out. The results of the *W. bancrofti* were negative ICT serology test and passed. [16]. The presence of filariasis cases in this area is inseparable from the geographical conditions of the Merauke region, which are lowlands, swamps, rice fields, forests, and rivers. The economic activities of the community are mostly carried out in forests, swamps, and rivers so that the risk of contracting microfilaria is through mosquito bites. The potential for a large diversity of mosquito species causes a significant number of filariasis vectors in Papua. The types of filariasis vectors known in Indonesia are: *Culex* sp, *Anopheles* sp, *Aedes* sp, *Armigeres* sp, and *Mansonia* sp. [2] The mobility of people from the Mappi and Boven Digoul Regencies, which are also filariasis-endemic areas, has had an impact on filarial transmission in Merauke Regency. This is due to their family members who partly live in Merauke and once a month or their holiday holidays come to visit.

The results of community knowledge survey about elephantiasis or filariasis can be seen in table 1. They state that the level of knowledge in the community was still very low for this disease. The interview results of what caused filariasis varied. The knowledge that the disease was caused by worms was 5.3%, mosquito bites 29.7%, hereditary disease 0.7%, violating taboo 0.2% and spirits 0%. The respondents' knowledge about the symptoms of lymphatic filariasis was 59.8% by answering swollen feet and hands, fever and sickness by 4.1%, and swelling of the thigh and armpit folds 2.3%. The sources of information knowledge of how to treat lymphatic filariasis was generally obtained from health workers which was 96.2%. Meanwhile, the source of treatment information was obtained from health workers/teachers which was 77.3% and reading information boards at the village/village hall was 10.0%. Information about lymphatic filariasis treatment was not always able to reach all family members because the common way was going a health center, health posts or asking parents. Besides, that information was obtained from teachers/health workers who carried out the treatment at schools. In addition, the head of the family and more mature family members generally worked as employees of state civil servants, private employees, farmer/gardeneer or fisherman. The results of interviews revealed that only a handful of respondents knew that in Kamundu and Tanah Miring Villages had been a provision of lymphatic mass drug administration by 21.7%. Low public knowledge of filarial diseases can inhibit the program of eliminating lymphatic filariasis in endemic areas because it is related to the source of transmission, prevention, and treatment. [17] The results of the study state that a low level of knowledge of lymphatic filariasis has a two times chance of being exposed to lymphatic filariasis

compared to those with high knowledge. Knowledge can change a person's health behavior factors and the most important part in shaping one's actions. [12]

The survey of respondents' attitudes towards the implementation of the provision of drugs for the prevention of lymphatic filariasis provides positive results for the implementation, administration of medication, and prevention. This is also supported by several studies regarding the attitude of respondents to the implementation of lymphatic filariasis MDA in Pekalongan and Mamuju areas. [17][18] Community behavior percentage in the prevention of lymphatic filariasis in terms of medication behavior was 21.7%. Those who claimed to take medication given by officers and took all types of drugs given were 91.9%. The respondents who took medicine were 4.4%. While, the reason for people who did not take medication was because they forgot. The side effects felt by respondents when taking medicine were dizziness/headache (14.6%) and sleepiness (16.9%). Community participation in lymphatic filariasis MDA activities did not know the benefits/benefits of taking medicine 3.3% and feeling lazy (less interested) (9.8%). However, in general, public behavior towards MDA activities was quite good. 74.3% respondents used bed nets while sleeping at night and 58.5% used mosquito coils to prevent lymphatic filariasis. Preventions by this method are the most common thing done in the community, but for people who work and work in the garden and live in the forces, it is very limited because the mosquito nets provided by officers are very limited. [17] other than this is the behavior of people who do not use mosquito nets for reasons of being uncomfortable (feeling hot) and the smell of insecticides that disturbs them. [19].

There were some efforts by health workers to socialize how to use bed nets, but people would possibly forget them. Yahya's research stated that around 78% of respondents did not know how to use the correct bed nets. [20] Besides, the respondents did not know the purpose of distributing bed nets by health workers. [19] There are 20.6% people using citronella oil repellents, 14.6% people wearing long sleeves, and 29.7 % people burning garbage at night to prevent mosquito bites outside. In general, the prevention of mosquito bites outside the community still lacks. Outside activities at night are risk factors for the transmission of lymphatic filariasis. This is due to *Anopheles* sp, *Culex* sp, *Mansonia* sp, *Armigeres* sp mosquitoes generally biting from 9 p.m. to 11 p.m. in the evening. [21]

Efforts to increase community knowledge must continue to be carried out through health promotion both at the district level health center and at the level of community health centers in the villages about the knowledge of lymphatic filariasis, the prevention, and the treatment.

This effort was made to keep the public aware of lymphatic filariasis transmission so that the elimination program could be achieved in 2020. Government supports, through the regent, Agency for Regional Development, Community Leaders and Religious Leaders are needed to conduct advocacy and funding. The education sector helps disseminate knowledge informatio. The family welfare program can be done to help raise awareness and concern for

filariasis. At last, treatment and prevention can be conducted by health sector [22].

V. CONCLUSIONS

The results of a microfilaria rate survey using *Alere* RDT were 1.9% (12/622) that were confirmed positive microscopic and they were as many as 2 people. Positive treatment was needed for respondents to prevent transmission. There were still cases of lymphatic filariasis due to community knowledge about the causes of the disease, symptoms, and modes of transmission, methods of prevention and treatment of filariasis

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CONFLICTS OF INTEREST

There is no conflict of interest in this research.

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