

An overview of microfilariae on patients who have received treatment in Batuah Village, Kotawaringin Timur District 2015

Gambaran mikrofilaria pada penderita filariasis yang telah mendapat pengobatan di Desa Batuah Kabupaten Kotawaringin Timur Tahun 2015

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Abstrak. Filariasis adalah penyakit menular kronis, yang disebabkan oleh cacing filaria di kelenjar getah bening dan menyebabkan limfangitis dan kaki gajah. Desa Batuah merupakan daerah di Sampit dengan persentase mikrofilaria terbesar dibandingkan dengan daerah sekitarnya. Dari 196 jumlah penduduk desa Batuah yang diperiksa oleh petugas eliminasi filariasis Dinas Kesehatan Kabupaten Kotawaringin Timur pada tahun 2013 diperoleh 5 kasus positif filariasis dengan jumlah mikrofilaria 2,55% yang didominasi cacing filaria *Brugia malayi*. Dari pusat kesehatan setempat juga telah dilakukan program pengobatan massal dengan pengobatan DEC, dikombinasikan dengan albendazole selama 12 hari pada 14-16 Juli 2014. Tujuan dari penelitian ini adalah untuk mengetahui tingkat keberhasilan pengobatan yang dilakukan oleh petugas kesehatan terhadap pasien filariasis di desa Batuah. Metode yang digunakan dalam pemeriksaan mikrofilaria ini adalah metode mikroskopis. Darah kapiler diambil pada 4 pasien filaria yang dinyatakan positif pada pemeriksaan sebelumnya yang telah diberi pengobatan DEC + Albendazol, hasil dari 4 sampel yang diperiksa 1 sampel positif dari 4 pasien. Pelaksanaan pengobatan yang telah dilakukan oleh Dinas Kesehatan berhasil karena terjadi penurunan tingkat mikrofilaria yang sebelumnya 2,55% sampai 0,51% (<1%).

Kata Kunci: mikrofilaria, mikrofilaria rate, *Brugia malayi*

Abstract. Filariasis is a chronic infectious disease, caused by filarial worms in the lymph and lymph nodes cause lymphangitis and elephantiasis. Batuah Village is the area in Sampit with the largest percentage of microfilariae compared to the surrounding area. From 196 the number of Batuah villagers examined by the filariasis elimination officer of Kotawaringin Timur District Health Office in 2013 obtained 5 positive cases of filariasis with 2.55% microfilaria number which is dominated by filaria worm *Brugia malayi*. From the local health center has also conducted a mass drug treatment program with DEC medication, combined with albendazole for 12 days on 14-16 July 2014. The aim of this study was to determine the success rate of treatment conducted by the health officer against filariasis patients in the Batuah village. The method used in this microfilariae examination is a microscopic method. Capillary blood was taken on 4 filarial patients who tested positive on the previous examination who had been given DEC + Albendazole treatment, the result from 4 samples that examined 1 positive sample of 4 patients. The implementation of medication that has been done by public health office was successful because there was a decrease of microfilaria rate which was previously 2.55% to 0, 51% (<1%).

Keywords: microfilariae, microfilaria rate, *Brugia malayi*

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Introduction

Filariasis is a chronic infectious disease caused by filarial worms. Three species of filaria worm that causes elephantiasis are *Wuchereria bancrofti*, *Brugia malayi* and *Brugia timori*. *Wuchereria bancrofti* dominates almost 90% of the world's infection, 9% by *B. malayi* in the Southeast and East Asia, and 1% infection of *B. timori* in the Pacific region^{1,2,3}. Transmission of filariasis caused by addition to the presence of vectors, also involves many complex factors i.e human as host and adult mosquito, physical, biological and social environmental factors, and behavior of local people.⁴ The main vectors of filariasis infection are *Culex*, *Anopheles*, and *Aedes* mosquito^{5,6}.

According to the WHO guidelines for the Elimination of Lymphatic Filariasis, if the prevalence of blood and microfilariaemia test is positive $\geq 1\%$, then the implementing unit can perform the mass treatment. Lymphatic filariasis elimination program is carried out through mass treatment, resulting in a drastic reduction in microfilaria in the blood. Batuah Village is one of the areas in Sampit with the largest percentage of microfilariae compared to the surrounding area. The recommended drug is a combination of DEC 6 mg / kgBB and 400 mg albendazole given once a year for 5-10 years in a population over the age of 2 years. This village is a rice field area and is dominated by peatlands and some areas there are also swamps. Given such geographical conditions, it may be possible to breed mosquitoes of filariasis vectors. Batuah village is just adjacent to the river with the city of Sampit which is the capital of East Kotawaringin regency.

Sampit is a densely populated area, therefore it is feared this disease outbreak will spread to urban areas in Sampit. By providing treatment as well as with regular socialization is expected to filariasis outbreaks in the village of Batuah will be reduced. Mass elimination programs in endemic areas ($\geq 1\%$ prevalence) have been declared by the WHO. Kotawaringin timur is an endemic area of filariasis, based on surveillance data by Health Office in 2015, from 196 Batuah villagers as respondent, 4 peoples were positive infected by filariasis and given DEC and Albendazol for therapy. After one year of medication, to make sure the medication was successful, the evaluation needs to be done. The aim of this research is to know how the medication works on filariasis eradication in there because there is so many factors reported can affect the medication. Most of the factors are the people with filariasis positive result stopped to take the medicine intermittently because of the side effect

of the drugs, also patient feel discomfort after taking the medicine.

Method

This study were descriptive by using primary data and secondary data. Sampling was done in the Batuah village, subdistrict Mentaya Seberang Kotawaringin Timur. The total of populations are 196 people in Batuah Village. The primary data collection started with collect the thin blood smear from the respondent. The sampling method used is purposive sampling with criteria of the population who have received filariasis treatment, as many as 4 people. Blood sampling was accompanied by the health officer of Kotawaringin Timur. Microfilariae examination of respondents was done by reading blood thin of capillary blood smear with Giemsa staining. The density of microfilariae determined by using the

formula $\frac{A}{B} \times F$ (A= amount of microfilariae found in blood smear, B= amount of positive patient infected by microfilariae, F = Factor multiplier volume of blood supply). Examination and blood sampling were done in collaboration with the officers from the Health Office of East Kotawaringin. Patients were given explanations and informed consent.

Secondary data from treatment result and patient data and also mf rate obtained from the health office of Kotawaringin Timur. The data of the examination results were analyzed descriptively.

Result

The research was conducted in Batuah Village, Seranau Sub District, Kotawaringin Timur, Central Kalimantan Province, Population density of Kotawaringin Timur District are 2,025 consisting of 1,019 male and 1,001 female. General population work as a farmers and unskilled labores. Respondents in this study were 196 Batuah villager. Based on 5 positive samples of filariasis according to capillary blood survey conducted by Kotawaringin Timur District Health Office earlier in 2013, from 5 positive result 1 respondent reported died in 2014 and 4 respondent were infected with filaria and have received treatment. Batuah Village is a filariasis endemic region with Micro Fill Rate (MFR) of 2.55%.

The percentage of positive filariasis patient was 25% and filariasis negative percentage was 75% from the entire sample of filariasis patients who had received treatment in Batuah Village.

Table 1. result of microscopic examination of filariasis patients in Batuah Village.

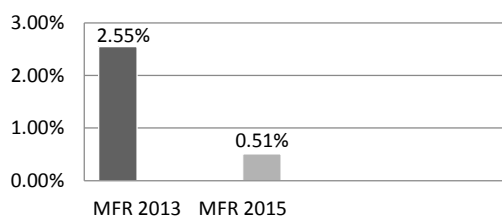
Code	Age / Sex		Result	Type
	M	F		
A	45	-	(-)	-
B	55	-	(-)	-
C	28	-	(+)	<i>B. malayi</i>
D	33	-	(-)	-

Microscopic examination conducted at Health Laboratory of East Kotawaringin District obtained 46 microfilaria / 60 μ l of blood, from the result can be known microfilaria density in 1 mL of blood equal to 768,2 Mf / 1 mL blood.

Finding from this study, the calculation of the microfilaria rate is 0,51%, decreased than first-time medication held in 2013 as 2,55%.

**Figure 1.** Positive results of microscopic examination of *B. malayi* capillary blood smear (Magnification 1000x)

From the results of capillary blood sampling on filariasis patients who have received treatment in Batuah Village and microfilaria microscopic examination was obtained 1 positive sample of microfilariae and 3 negative results. We found the number of microfilaria rate was 0, 51%.

**Figure 2.** Graph comparison of microfilaria rate (MFR) in 2013 and 2015

Discussion

Therefore in microfilaria rate calculation only use 4 sample which is considered as an amount positive results from a total of 196 residents. The number of microfilaria before treatment decrease from 2.55% (2013), to 0.51% after treatment (2015). Survey conducted by District Health

Office of Kotawaringin Timur found to decrease microfilaria rate are conducted before treatment. The decreasing in filariasis-endemic areas in Batuah Village which previously exceeded the threshold set by WHO above 1%⁴ is now reduced after a mass treatment program conducted by Kotawaringin Timur District Health Office with microfilaria rate 0, 51% (<1%) by 2015.

The average of the density of microfilariae obtained in sample C preparation was 768.2 microfilaria / 1 mL of blood with the formula of all microfilariae found in all preparations divided by the number of persons in positive preparation, then multiplied by the multiplier. A person may become infected with filariasis if the person gets bitten by a vector mosquito a thousand times, thus the density in filariasis contagion is very important. Transmission cannot occur when the age of the vector mosquito is less than the extrinsic incubation period of the parasite, the extrinsic incubation time is the time required for the development of microfilariae into L3 in the mosquito body.⁵ 4 patients filariasis who have received the treatment have been examined their blood smear. The result is 3 negative filariasis and 1 person positive filariasis after microscopic examination of 4 capillary blood smear obtained in the village of Batuah. The age of respondents are 2 people are over 40 years old and 2 are under 40 years. Filariasis attacks in all age groups and basically everybody can be infected by filariasis parasite when they get bitten by mosquito containing 3rd stage larva thousands of times (L3).¹¹ The patients' job are temporary job such as farming and worker from total 4 patients who have received treatment around the village of Batuah and outside the village of Batuah. The prevalence of filariasis in men is higher than the prevalence of filariasis in women because men are generally more likely to be in contact with vectors due to their work and may be in contact with the filariasis vector while working in filariasis endemic-areas.⁶ In patients who are in direct contact with a vector or working in an environment at risk of infection can be prevented by using long clothes while working on plantations and using anti-mosquito repellent when working.^{12,13} Residents who have received treatment, all patients complain about the side effects of the drug and are reluctant to take the prescribed medication, 25% stops at the time of taking the drug on the first day and 75% stops when taking the drug on the second day on the grounds of inhibiting activity.

Massive and lengthy medical treatments annually cause some complaints and saturation of

communities involved in the treatment program, leading to low coverage of treatment in an area.¹² Environmental factors and the behavior of residents in the village of Batuah very influential in the success of treatment programs that have been done by local agencies. The geographic state of the riverside and predominantly peatlands and swamps allow the filariasis (mosquito) filarial vectors to thrive. In endemic-area *B.malayi* was difficult to eliminate because the reservoir in the environment was still exist such as cat, dog and monkey. Batuah village consist of palm plantation, and this geographic situation can increasing the amount of reservoir and vector of lymphatic filariasis in Batuah Villager.¹⁴ Control of filariasis vector is a series of activities in filariasis elimination, so the identification of mosquitoes as filariasis vectors needs to be done simultaneously.¹⁵ Vector control can be applied in various ways, including spraying, larvacides, use of mosquito nets, repellent use and environmental manipulation.^{14,15}

The environmental manipulation in Batuah Village is impossible, due to the social condition of the community and the income source of the community in the form of plantations. It causes filariasis to be difficult to eliminate. Behavior of residents who often go out at night above 21.00 pm with a percentage of 100% of 4 patients. Night behavior at the time above 21.00 would cause patients more susceptible to mosquito bites filariasis vector. Santoso et al (2015) in his research concluded that the active hour from the vector of filariasis in Tanjung Jabung Timur was at 20.00 -21.00¹⁴, that's why social conditions and community behavior in Batuah Village also supports why infections still occur in Batuah Village. All patients complained of pain and lumps in the genital area showed clinical symptoms of filariasis commonly found in filariasis patients with *Brugia malayi* species.³ Microfilaria periodization and mosquito bite behavior have a major effect on the risk of transmission. Periodic microfilariae (microfilariae only present in capillary blood at night) have vectors that actively seek blood at night so that transmission also occurs at night. In areas with sub-periodic nocturnal and non-periodic microfilariae the contagion may occur day and night. In addition to the above factors, population mobility from filariasis-endemic areas to other areas or vice versa has the potential to become a medium for the spread of filariasis between regions.³ Various reasons for treatment failure include officers who did not directly witness the community taking medication and fear of drug side effects.¹⁴ Based on the research and questioner asked to the Batuah Village

peoples, they are not taking the medicine because they do not get the symptoms of lymphatic filariasis. So, they feel they do not have to take medicine; this is due to lack of information from the officers about the importance of this mass treatment so as not to be attention is important to society.¹⁵

According to the document from Ministry of Health 2012 on Determination of Termination of Drug Prevention Prevention of Filariasis, if still found positive results in the examination of capillary blood samples in a region then the mass treatment should be continued. Although the microfilaria rate in Batuah Village is now less than 1%, mass treatment should still be done because there is still a positive result of filariasis which is feared will occur transmission through filariasis vector mosquito that may bite the patient who still positive filariasis. Serious side effects can affect the patient's interest in consuming the drug continuously.

The most important thing in the mass treatment was the explanation and understanding of the reaction of treatment to the population so that the residents do not feel afraid and do not refuse to take medicine at a later stage. Management of inappropriate medication reactions will have a worse impact on communities in endemic areas that can disrupt the course of filariasis elimination programs.

Conclusion and Recommendation

In Batuah Village microfilaria rate after treatment was 0.51% in 2015. The microfilaria rate decrease from 2.55% to 0.51%, The conclusion is the treatment was success because Batuah Village was no longer endemic area.

It is expected that the Health Office of East Kotawaringin Regency should conduct re-treatment because there are still positive results of filariasis. Health workers expected to improve health education and promotion for patients to understand about filariasis disease and the importance of such mass treatment for them. Further research on filariasis vectors in the area as well as microfilariae examination to know the spread of filariasis disease. Direct supervision of local health workers in drug delivery is critical to the success of the treatment program for those filariasis patients.

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Author Contribution

DN write this journal manuscript, data compilation, collecting the article and references. MF collecting the sample, do the examination in the laboratory. PW and RFQ make the conceptual framework and also laboratory examination. PKS, AA, and MA write the draft and data compilation.

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