Observation of the Home Environment of Grade 5 Elementary School Students in Filariasis Endemic Area Pekalongan City

Sofwan Indarjo[1], Agus Suwandono[2], Sulistiyani Sulistiyani[2], Zahroh Shaluhiyah[2], Iis Sriningsih[2]

[1]Faculty of Medicine, Semarang State University,
[2]Diponegoro University Faculty of Public Health
sofwanindarjo@mail.unnes.ac.id

Abstract. Pekalongan City is one of the cities where filariasis is endemic with an mf-rate > 1%. SFrom 2004 to 2017 the number of clinical or positive cases containing microfilariae was 417 people, while 40 people were chronic..In 2018, 6 people were found to be infected with microfilariae aged less than 12 years as a result of SDJ with a sample of 306 in Kertoharjo sub-district. The prevalence rate of microfilariae in children aged ≤ 10 years and > 15 years has been proven to be 20%.The aim of the research was to determine the condition of the home environment in the form of the presence of bushes, puddles of water, SPAL, the presence of livestock and the incidence of filariasis in Pekalongan City in a total of 180 student homes. The univariate test uses quantitative descriptive with a descriptive survey approach. The results of the study showed that the incidence of filariasis was more common in areas with bushes and open SPALs. The public is advised to maintain environmental cleanliness, prevent and eradicate mosquito nests.

Keywords: Vector, Filariasis, Environment, Students, Endemic.

1 Introduction

In Indonesia there are 236 districts/cities where filariasis is endemic. Until 2015, only 55 districts/cities had administered mass preventive drugs (POPM) for filariasis for 5 consecutive years. Of the 55 districts/cities, 23 districts/cities are study areas where implementation of filariasis control is not done at the same time. This can be known from the stages that have been passed, both pre-TAS (Transmission Assessment Survey), TAS 1, 2, and 3. Filariasis is a disease caused by parasites in the form of filarial worms, which consist of 3 species, namely Wuchereria bancrofti, Brugia malayi and Brugia timori. This disease infects lymph tissue. Filariasis is transmitted through mosquito bites that contain filarial worms in their bodies. In the human body, these worms grow into adult worms and settle in the lymph tissue, causing swelling in the feet, legs, breasts, arms and genital organs. The filariasis elimination program is implemented through two pillars of activity, namely the provision of mass prevention

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drugs (POPM) for filariasis to all residents in filariasis endemic districts, secondly by managing clinical cases of filariasis to prevent and reduce disability. Based on the results of evaluating the prevalence of filariasis after POPM [1].

The 5th year of filariasis in Poncol Village and Jenggot Village in November 2015, the results showed that out of 319 samples in Poncol Village, no positive mf rate was found, while in Jenggot Village, out of 300 samples, 3 positive samples were found (mf rate ≥ 1%).1Based on the Republic of Indonesia Minister of Health Regulation No. 94 of 2014 concerning Filariasis Management, Pekalongan City is stated to still have a risk of transmitting filariasis because the microfilaria rate is > 1%, so that filariasis POMP is carried out again at least 2 years in a row with high coverage. POPM Filariasis 2017 is the sixth year of drug administration, which was launched or a drug taking event with the Mayor of Pekalongan on October 13 2017 at the South Pekalongan District Office. From 2004 to 2017 the number of clinical or positive cases containing microfilaria was 417 people, while there were 40 people who were chronic (swelling of body parts or disability) [2].

In the 2011 SDJ in several sub-districts in Pekalongan City, it was shown that the Mf-rate in Jenggot Sub-District was 5.4%, Banyurip Ageng was 1.3%, Kertoharjo was 3.5%, and Pabean was 3%. Then the SDJ carried out in 2012 showed that the Mf-rate in Kertoharjo Village was 2.4%, Jenggot 5%, Banyurip Ageng 0.5%, and Pabean 3.7%. In addition, based on the 2013 Pekalongan City Health Profile, the six sub-districts of the research location had mf-rates > 1%. In fact, the latest data in 2014, the mf-rate in Kertoharjo Village increased to 6.5%. Based on the Ministry of Health of the Republic of Indonesia (2005).

The approach model is based on HL Blum's theory, the success of elimination is influenced by environmental, behavioral, service and genetic factors. The six factors in the conceptual framework diagram can be grouped as environmental factors (vectors, reservoirs, physical environment), behavior (community behavior), services (preventive drug administration and control management), while the contribution of genetic factors is small and can be ignored [3].

The filariasis vector that plays a role in disease transmission in Pekalongan City is Culex spp. This vector transmits filariasis by carrying urban type W. bancrofti microfilariae. This is also proven by the results of research by Windiastuti, Suhartono, and Nurjazuli using mosquito dissections in the South Pekalongan District area. Of the three mosquito species obtained from mosquito catching activities, it was proven that six Culex quinquefasciatus mosquitoes contained microfilariae. Filariasis transmission is influenced by various factors. Based on the Gordon Model or Epidemiological Triangle [4-5]. The occurrence of disease in society is influenced by three main elements, namely the agent (cause of disease), the host or host which is also influenced by several aspects including the degree of sensitivity, and the environment as the last element. Poor environmental sanitation influences the existence of filariasis vectors. For example, for Cx mosquitoes. quinquefasciatus, which can breed in ditches containing clean water or domestic waste disposal ditches. Apart from that, the presence of resting places such as bushes and hanging clothes can influence the transmission of filariasis [6].

2 Method

This observation of the home environment of elementary school students is part of a research model for developing filariasis vector control in Pekalongan City in 9 elementary schools with a sample size of 180 students with intervention and control. The type of data in this research is univariate testing using quantitative descriptive with a descriptive survey approach. Environmental surveys are the collection of data and information related to the biological environment of vectors and reservoirs in the area where the study is carried out. As for the vector biological environment, the number of samples was 180 house buildings at the implementation site. The building environment of the respondents' houses was selected for sampling. The data and information obtained are edited, coded and entered directly in the field using a prepared program. Analysis of clean quantitative data will be carried out descriptively. Environmental surveys were carried out in the villages/sub-districts of the research locations with the aim of determining the biological environmental conditions of vectors and reservoirs [7-8].

3 Result and Discussion

The characteristics of respondents in this study include education, employment and family income. Meanwhile, the number of samples in this study was 360 student respondents with 180 respondents as cases and 180 respondents as controls.

3.1 Characteristics of 5th grade elementary school students

Table 1. Characteristics of students in the intervention group and model control group filariasis vector control.

variable		intervention		control		Total	
		n	%	n	%	n	%
Gender	Man	79	43.90	82	45.60	161	44.70
	Woman	101	56.10	98	54.40	199	55.30
Age	< 11 years	147	81.66	148	82.22	295	81.94
	>11 years	33	18.34	32	17.78	65	18.06
What order do you come in your family	number 1	67	37.20	74	41.10	141	39.20
	2nd	71	39.40	72	40.00	143	39.70
	the 3rd	23	12.80	27	15.00	50	13.90

	4th and above	19	10.60	7	3.90	26	7.30
Cell phone ownership	own	154	85.60	128	71.10	282	78.30
	Do not have	26	14.40	52	28.90	78	21.70
Participation in taking medication							
POPM 2018	yes	88	48.90	99	55.00	187	51.90
	No	92	92.00	81	45.00	173	48.10
POPM 2019	yes	40	22,20	57	31.70	97	26.90
	No	140	77.80	123	68.30	263	73.10
POPM 2020	yes	11	6,10	27	15.00	38	10.60
	No	169	93.90	153	85.00	322	89.40
Work	Laborer	136	75.56	117	65.00	253	70.28
	Civil servants	7	3.89	7	3.89	14	3.89
	Self-employed	29	16.11	47	26.11	76	21.11
	Doesn't work	8	4.44	9	5.00	17	4.72

It is known that the majority of respondents were 11 years old, namely 66.70% in the intervention group and 67.20% in the control group. The equal age between the intervention and control groups makes it easier to carry out model development. In the gender variable, 56.10% of respondents from the intervention group were female and 54.40% of respondents from the control group were female.

Respondents in the intervention group were 2nd children, namely 39.40%, while the majority of respondents in the control group were 1st children, namely 41.10%. Cell phone ownership, the majority of respondents had cell phones, namely 85.60% in the intervention group and 71.10% in the control group. Meanwhile, based on occupation, both groups mostly had respondents whose parents worked as laborers, namely 75.56% in the intervention group and 65.0% in the control group.

Participation in POPM in the intervention group varied in the percentage of respondents taking medication ranging from 48.90% (2018), 22.20% (2019), and 6.10% (2020). The same fluctuation is also found in the distribution of history of participation in POPM, namely taking medication in the control group, namely 55.00% (2018), 31.70% (2019), and 15.00% (2020). POPM among students has not been very successful from year to year, only in 2018 the percentage was quite good.

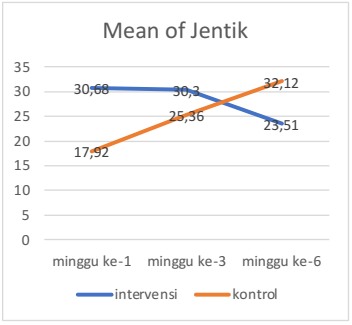
3.2 Observation of the Vector Control Environment in the Intervention and Control Groups

Changes in student observation results in the intervention group and control group can be seen in table 5.9g below:

Table 2. Frequency Distribution of Vector Control Environmental Observations in the Intervention and Control Groups

Outcome variable	Group	1st week			3rd week			6th week		
		mean	median	elementary school	mean	median	elementary school	mean	median	elementary school
Number of containers	Intervention	11.39	12	5.45	11.76	12	4.48	12.34	12.5	4.54
	Control	7.77	7	4.98	11.43	11	4.25	14.26	14	4.45
Number of larvae	Intervention	30.68	32	18.92	30.30	29	17.66	23.51	21	13.63
	control	17.92	14	15.86	25.36	21	17.68	32.12	32	17.59

In table 1 it is known that the average number of containers found by the intervention group was 11.39 in week 1 (median 12 and SD 5.45), 11.76 in week 3 (median 12 and SD 4). .48), and 12.34 in the 6th week (median 12.5 and SD 4.54), this environmental observation increased from week 1 to week 6. Meanwhile for the control group, the average number container was 7.77 at week 1 (median 7 and SD 4.98), 11.43 at week 3 (median 11 and SD 4.25), and 14.26 at week 6 (median 14 and SD 4.45), the control group also experienced an increase. An illustration of the trend in increasing environmental observations can be seen in the Figure 1.



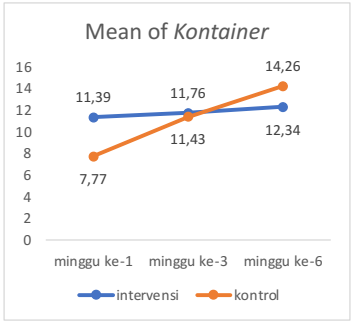


Fig. 1. Observation Results of the Vector Control Environment in the Intervention and Control Groups

In Figure 1, it is known that both the intervention group and the control group experienced an increase in the number of containers, but the control group had a much more significant increase from an average of 7.77 to 14.26 compared to the intervention group, namely from 11.39 to 12.34.

The average number of larvae found in the intervention group was 30.68 at week 1 (median 32 and SD 18.92), 30.30 at week 3 (median 29 and SD 17.66), and amounted to 23.51 at week 6 (median 21 and SD 13.63). Meanwhile, for the control group, the average number of larvae was 17.92 in the 1st week (median 14 and SD 15.86), 25.36 in the 3rd week (median 21 and SD 17.68), and 32 .12 at week 6 (median 32 and SD 17.59). It is known that the control group experienced an increase in the number of larvae found from an average of 17.92 larvae to 32.12 larvae, while the intervention group experienced a decrease in the average number of larvae from 30.68 larvae to 23.51 larvae, which is quite significant. The results of the intervention can influence the number of larvae found and the reduction in the number of containers [9].

Stagnants of flowing or non-flowing water with piles of rubbish or located in used areas that can hold water can be used as breeding grounds for mosquitoes to breed and as brooding grounds [10-11]. The condition of used fish ponds where there are no fish in the pond, used drums and used cans that can hold water, and ditches where the water is stagnant or not flowing are used as hiding places for larvae and mosquitoes as well as breeding places. Stagnant water is the place with the highest density of mosquito breeding compared to other flowing breeding places [12].

Environmental factors which include stagnant stagnant water and puddles of flowing water, rice fields, swamps and especially ditches are very supportive as mosquito breeding places which can increase the density of mosquitoes in the area. Sewers are a place for mosquitoes to breed well because there are lots of nutrients from nutrients and organic materials that mosquitoes need [13].

The presence of used clothes hanging in the room is very popular with mosquitoes to rest after sucking human blood. The reason why mosquitoes rest on hanging used clothes is because used clothes contain several substances that can attract mosquitoes, such as amino acids, lactic acid and other substances [14]. Mosquitoes are very attracted to the scent of the human body, so mosquitoes will choose used clothes hanging up as a place to rest. If a large number of used clothes are hung up, this will trigger a large population of mosquitoes in the room and try to breed in places with standing water [15].

An overview of the environmental observation sub variables where mosquitoes breed can be seen in Figure 2.

Fig. 2. Mosquito breeding sites in the intervention group

Based on the figure above, it is known that in the intervention group, the top five brooding places that were most often found in the 1st, 3rd and 6th weeks were used fish ponds, used drums, ditches, water tanks and used cans. Used fish ponds were the most common breeding places found in the 1st, 3rd and 6th weeks.

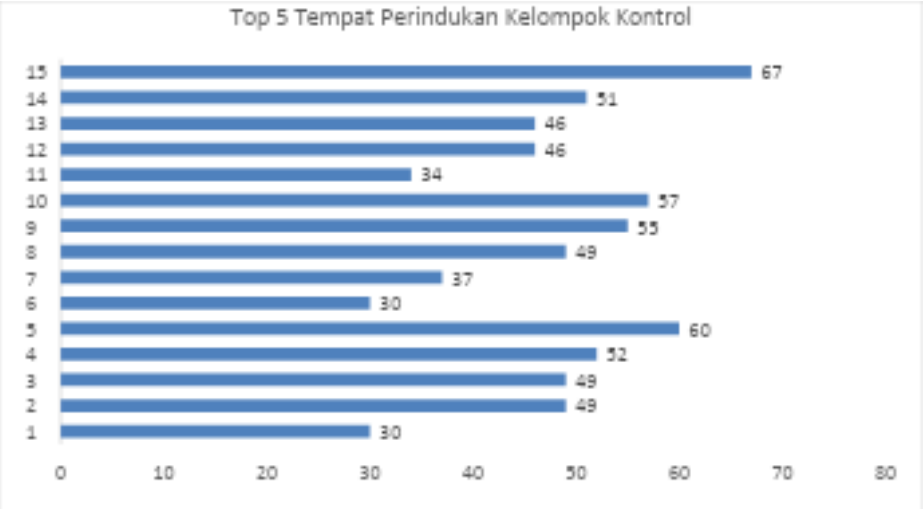


Fig. 3. Mosquito breeding sites in the intervention group

Based on the figure above, it is known that in the control group, the top five brooding places that were most often found in the 1st, 3rd and 6th weeks were ditches, used fish ponds, used drums, water tanks, swamps and cans. used. In the 1st week, the most common brooding place was found in the ditch (n=67), while the most common brooding place in the 3rd week was a disused fish pond (n=57). At week 6, the most common brooding place was used fish ponds (n=60).

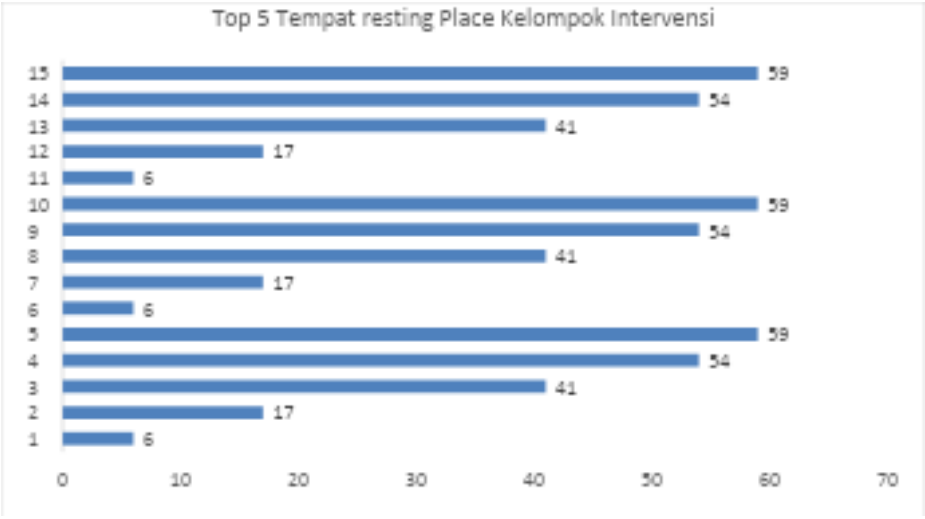


Fig. 4. Mosquito breeding sites in the intervention group

Based on the picture above, it is known that the mosquito resting places found by the intervention group were hanging used clothes, bushes, piles of batik cloth, lush ornamental plants, and livestock pens. Used clothes that are hung as resting places are most often found in the 1st, 3rd and 6th weeks.

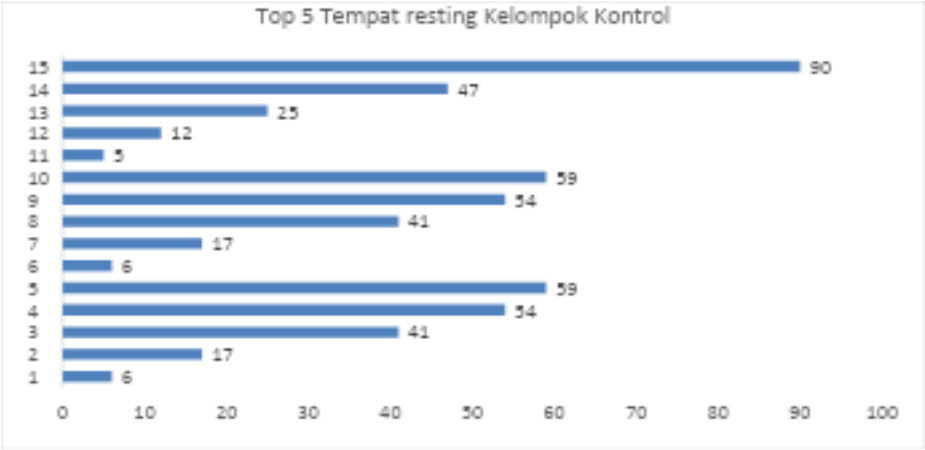


Fig. 5. Mosquito resting places in the control group

Based on the picture above, it is known that the mosquito resting places found by the control group were hanging used clothes, bushes, piles of batik cloth, lush ornamental plants, and livestock pens. Used clothes that were hung up were the most common resting place found both in the 3rd week and 6th week, while bushes were the most common resting place found in the 1st week.

A large number of mosquitoes in an environment has a major negative impact on the quality of life of the surrounding population. The presence of mosquito larvae in an area is an indicator that there is a mosquito population in that area. The density of mosquito larvae populations can be measured by the number of containers infected with larvae or pupae [16].

The house is a place with great potential for breeding [17]. A person who has basic knowledge of vectors and their transmission will realize the seriousness of the disease and practice some form of prevention and seek treatment [18]. After controlling for confounding variables in this study, it can be seen that the application of educational games can contribute to controlling filariasis vectors. This contribution value can be said to be effective through health education games by considering the method, media and duration of the game.154

The large number of unused containers causes mosquito larvae to breed due to their high productivity [19]. Reducing the number of containers in the form of containers containing standing water that are stored can reduce the number of mosquito larvae and reduce the incidence of malaria. Recognizing the breeding habitat of mosquito larvae and implementing behavioral aspects plays an important role in effective disease control intervention [20].

References

1. Kusumo AP, Adi S, Ginanjar P. (2019). Overview of Knowledge, Stigma, and Community Discrimination for Lymphatic Filariasis Sufferers in Pekalongan City in 2018. J Health Masy, ;7:341–7.
2. Pekalongan City Health Department (2017). Pekalongan City Health Profile. 1st ed. Pekalongan,. 1–228 p.
3. Balitbangkes. multicenter filariasis study. (2018). 1st ed. Jakarta: Balitbangkes,.1–162 p.
4. Soemanto R. (2014). Definition and Scope of Family Sociology. Definition and Scope of Social Affairs Kel, 1.
5. Astuti D, Putri S, Research P, System P, Policy D, Health D, et al. (2009) Effort to Asset Iodine Deficiency Disordered at Primary School Children Bubutan X State Primary School and Elementary School, 12(03):148–55.
6. Blondine C., Rendro W, Sukarno. (2000). Control of mosquito larvae vectors for dengue fever, malaria and filariasis using local strains of Bacillus thuringiensis. Health Researcher Bul, 27(1).
7. O'Neill Hayes T, Delk R. (2018). Understanding the Social Determinants of Health. (May). Available from: https://www.americanactionforum.org/research/understanding-the-social-determinants-of-health/#_edn9
8. Farasari R. (2018). Pocket Book Model and Larvae Monitoring Report in Improving Mosquito Nest Eradication Behavior. J Heal Educ, 3(2):110–7.
9. Baitipur LN, Widraswara R. (2018). Health Education Through Video to Increase Knowledge and Practice of PSN DHF. JHE (Journal Heal Educ, 3(2):86–90.

10. Oktafian M, Siwiendrayanti A. (2021). Characteristics of Culex sp mosquito breeding sites. Around the Residences of Lymphatic Filariasis Sufferers in Brebes Regency in 2020. Indonesia J Public Heal Nutr, 1(1):101–13.
11. Purcell R, Pilkington V, Carberry S, Reid D, Gwyther K, Hall K, et al. (2022). An Evidence-Informed Framework to Promote Mental Wellbeing in Elite Sport. Front Psychol, 13(February):1–13.
12. Santoso. (2011). Relationship of Environmental Conditions to Filariasis Cases in Community (An Advanced Analysis of Basic Health Research 2007). Aspirator J Vector Borne Dis Stud, 3(1):1–7.
13. Yanuarini C. (2015). Factors Associated with the Incident of Filariasis at the Tirto I Health Center, Pekalongan Regency. Fikkes J Nursing, 8(1):73–86.
14. Puteri TAN, Darundiati YH, Dewanti NAY. (2018). The Relationship between Breeding Places and Resting Places on the Incidence of Dengue Hemorrhagic Fever (DBD) in West Semarang District. J Public Health, 6(6):369–77.
15. Salim MF, Satoto TBT, Kusnanto H. (2016). Filariasis Susceptibility Zones Based on Risk Factors with a Geographic Information System Approach. J Inf Syst Public Heal, 1(1):16–24.
16. Ranyamtel R, Nurjazuli N, Sulistiyani S. (2019). Environmental factors and community practices related to the incidence of filariasis in Semarang Regency. J Indonesian Environmental Health, 18(1):8.
17. Prasetyowati H, Fuadzy H, Astuti EP. (2018). Knowledge, Attitudes and History of Vector Control in Dengue Fever Endemic Areas, Bandung City. ASPIRATOR (Journal of Vector-borne Dis Stud, 10(1):49–56.
18. Sugiarto S, Hadi UK, Soviana S, Hakim L. (2016). Habitat Characteristics of Anopheles spp Larvae. in Sungai Nyamuk Village, Malaria Endemic Area in Nunukan Regency, North Kalimantan. Balaba J Research and Development for Animal Source Disease Control Banjarnegara, 12(1):47–54.
19. Hapsari A, Isgiantoro I. (2014). Knowledge of Conjunctivitis among Class Teachers and Providing Hand Washing Health Education to Elementary School Students. Public Health Natl Public Heal J, 8(8):366.
20. Bedasso AH, Gutto AA, Waldetensai A, Eukubay A, Bokore GE, Kinde S, et al. (2022). Malaria vector feeding, peak biting time and resting place behaviors preferences in line with Indoor based intervention tools and its implications: scenarios from selected sentinel sites of Ethiopia. Heliyon, 8(12).