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Low Knowledge and Unawareness of the Health Promotion as the Determinant Factors in Non-Compliance to the Mass Drug Administration Program

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Abstract

The mass drug administration (MDA) program has been demonstrated its effectiveness in many filariasis-endemic regions. However, Kuningan as a filariasis-endemic area had the MDA program coverage lower than the government targeted. One of a district in Kuningan, Cilimus District was a filariasis-endemic area with the MDA program coverage in 2017 lower than government targeted (higher than 86%). The purpose of this study was to analyze the determinant factors of compliance with the MDA program. The study was an analytical study with a cross-sectional design and was conducted from May to June 2018. The sample of 106 people was taken from the population living in Cilimus District, Kuningan Regency, using a simple random sampling technique. The independent variables were collected by a constructed questionnaire included age, education level, knowledge, attitude, health promotion, and family support. A questionnaire also measured compliance with MDA as a dependent variable. Data analysis consisted of univariate, bivariate (chi-square and Fisher exact test), and multivariate analyses (multiple logistic regression). The results showed that the variables of knowledge, attitude, MDA health promotion, and family support influence compliance with the MDA (p -value < 0.05). Low knowledge and unawareness of the MDA health promotion proved to be the dominant factors in non-compliance with the MDA program.

Keywords: determinant factors, compliance, Mass Drug Administration

Introduction

Lymphatic filariasis (LF) is one of the oldest and most debilitating neglected tropical diseases that continue to be a significant cause of morbidity in many parts of the world. In 2002, it was estimated that LF is responsible for the loss of 4.4 million Disability Adjusted Life Years (DALYs) in men and over 1.3 million DALYs in women.¹ In 2000, the World Health Organization (WHO) launched the Global Programme to Eliminate Lymphatic Filariasis (GPELF), aiming to eliminate LF as a public health problem by 2020. The GPELF includes two strategies, 1) to interrupt LF transmission by conducting mass drug administration (MDA) in all disease-endemic regions; and 2) morbidity management and disability prevention for infected people.² Mass drug administration aims to treat entire populations at risk of the disease with a combination of albendazole plus ivermectin or albendazole plus diethylcarbamazine administered as a single dose once a year for at least five years.

Mass drug administration has been demonstrating its effectiveness in many filariasis-endemic regions.

Thailand, as an endemic area for LF, over the years 2002 to 2011, conducted extensive MDA with high coverage rates. It delineated LF transmission areas at the sub-village level through periodic and regular monitoring surveys. It demonstrated through its evaluation surveys—the Stop-MDA surveys and Transmission Assessment Surveys (TAS)—below transmission threshold rates that enabled its validation of LF elimination.³

A recent study in India proved that participation in MDA programs was a behavioral factor that can affect the occurrence of filariasis (OR = 1.8 and OR = 13.75).⁴ In Indonesia, after the fifth year of the MDA program in Pekalongan City, the area is no longer included in the filariasis-endemic areas and the transmission parameters have no potential in causing the spread of filariasis. Because the microfilaria rate was 0.32% with an average microfilariae density of 167/mL blood; the antigen prevalence of the calculation was 0%; the infection rate was 0.06%; and the infective rate was 0%.⁵ Therefore, people's awareness and their willingness to participate in the MDA program is the key factor in preventing the filaria-

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sis transmission.

West Java is one of the provinces that has become an endemic area of LF in Indonesia. Nationally, West Java has the fourth-highest number of filariasis cases in 2017, with a total case of 907. These cases were distributed in 11 endemic districts/cities in West Java with a microfilaria rate of more than 1%.⁶ Meanwhile, in 2018, West Java was in the third position as a province with the highest number of chronic cases of filariasis after Papua and East Nusa Tenggara.⁷

One of the regencies in West Java which is a filariasis endemic area is Kuningan Regency. In 2017, there were 30 chronic cases of filariasis that were distributed in 15 districts in Kuningan Regency. Since 2015, Kuningan has participated in MDA programs. The coverage of MDA program in 2017 showed that percentage of people who take a drug from the total population was 78.61%, while the percentage of people who take a drug from the total target was 89%. This result showed that the percentage of people who take a drug from the total population in Kuningan was still below the government's target > 86%.

Cilimus District became an endemic filariasis area in Kuningan, with two cases of filariasis found there. Meanwhile, the percentage of communities in Cilimus taking drugs from the total population was 72.39% (below government target). Cilimus District is the second-highest number of filariasis cases in Kuningan Regency. There were four cases in 2017.

The success in national programs aimed at eliminating Lymphatic Filariasis (LF) could be determined by many factors. Community participation has been found to be one of the major challenges to the success of the MDA program. A lack of community participation hampers program implementation of all drug administration programs rather than only MDA for LF.⁸

A recent study demonstrated that demographic factors (age, sex, income level, and area of residence) were often associated with individual's compliance. The cause of non-compliance was mostly due to fear of side effects,⁹⁻¹¹ lack of awareness of the benefits of MDA, non-attendance of health staff in the villages,¹¹ and the individual has not received MDA education.¹⁰ The purpose of this study is to analyze the determinant factors (education level, knowledge, attitude, socialization, family support) of compliance to MDA for LF in Cilimus District, Kuningan Regency, Indonesia.

Method

This study was an analytic observational using cross sectional design conducted from May to June 2018. Population in this research was all citizens living in Cilimus District, Kuningan Regency. The total population was 15,066 households in Cilimus District. The sampling was done using a simple random sampling tech-

nique. Initially, 106 subjects who met the study's inclusion criteria and approved informed consent were invited to participate in this study. Each sample comes from every different household. The inclusion criteria were as follows: 1) the subject does not suffer from filariasis, 2) the subject is aged 2 to 70 years, 3) he or she does not suffer from severe illness, 4) the woman is not pregnant and should not get pregnant during the MDA program, and 5) he or she is willing to become a sample in this study. The collection of the data was done by face-to-face interviews using a constructed questionnaire. The enumerators were the public health workers who had been previously trained to conduct data collection in the community.

Independent variables and dependent variables were the primary data. Independent variables consisted of age, education level, knowledge, attitude, MDA health promotion, and family support. This study measured knowledge about filariasis and the benefits of the MDA program in preventing the spread of filariasis. The family support variable indicates whether there was support for taking filariasis drugs from family members who live in one house. Families being close to one another are always ready to provide information, rewards, instrumental and emotional support. Family support in the study comes in different forms: encouragement, informing family members about the benefits and risks of medication non-adherence, and reminding family members when the respondents forget to take medication.

The level of education was divided into two categories: In the low education category are included respondents who are either illiterate or graduated from elementary school and junior high school; in the high education category are included respondents who graduated from high school and college. Knowledge and attitude variables were obtained from the score when they answered questions in the questionnaire. The score of knowledge and attitude was then compared with the median value because they were not normally distributed. If the score was less than the median value, the respondent has low knowledge and a negative attitude. Conversely, if the score of knowledge and attitude was higher or equal to the median value, the respondent has a high level of knowledge and positive attitude. The MDA health promotion, as an independent variable, was divided into respondents who have received MDA health promotion and the respondents who were not informed of the health promotion. Family support was grouped into two categories—the respondents who were encouraged by their family members to take filariasis drugs and the respondents who were not assisted by their family. The compliance to MDA for LF as a dependent variable was also measured by a constructed questionnaire. The definition of compliance to MDA in this study was adherence to fi-

lariasis preventive medication until the end of treatment following the Regulation of the Minister of Health of the Republic of Indonesia Number 94 of 2014 concerning filariasis control.

Before conducting data analysis, data management processes are first carried out consisting of editing, coding, processing, and cleaning. The data including univariate, bivariate, and multivariate were analyzed using the chi-square, Fisher exact test, and multiple logistic regression. The Ethics Committee has approved this study from Kuningan Health Science Institute/*Sekolah Tinggi Ilmu Kesehatan Kuningan* (No. 012/EP/STIKKU/2018).

Results

The univariate analysis results (Table 1) showed that, of 106 respondents, most of them received low education (59.4%). For knowledge, respondents with low and high knowledge had almost the same proportion (50.9% and 49.1% respectively). Similarly, the proportion of respondents who had negative and positive attitudes was equal, at 50% of each. The majority of respondents received support from their families to take filariasis drugs (65.1%). Most of the respondents received socialization about filariasis from health workers (70.8%). Most respondents (94.3%) received filariasis drugs. For the dependent variable, majority of the respondents took the preventive drug in the MDA program in 2017.

Bivariate analysis shown in Table 2 indicated that the variables of knowledge (OR = 25; 95% CI = 3.255–199.75), attitude (OR = 4.8; 95% CI = 1.484–15.76), family support (OR = 3.23, 95% CI = 1.163–8.945), and MDA health promotion (OR = 11.53; 95% CI = 3.64–36.428) had significant relationship with compliance to the MDA program. With regard to the variables of age and level of education, there was no significant relation-

ship with compliance to MDA (p-value > 0.05).

After bivariate analysis, five variables can enter into the multivariate model (p-value ≤ 0.25). These variables include age, level of knowledge, attitude, family support, and the MDA health promotion. From the multivariate analysis process with multiple logistic regression, the results of the final multivariate model were obtained as shown in Table 3.

The final model of multivariate analysis by multiple logistic regression demonstrated that the level of knowledge (p-value = 0.015) and MDA health promotion (p-value = 0.004) had p-value ≤ 0.05. Therefore, the level of knowledge (OR = 13.68; 95% CI = 1.648–113.565) and MDA health promotion from health workers (OR = 5.95, 95% CI = 1.754–20.196) were the dominant variables affecting compliance to MDA program (p-value ≤ 0.05).

Table 1. Characteristic of Respondent and Compliance with the Mass Drug Administration Program

Variable	Category	n	%
Age	> 43 years	46	43.4
	≤ 43 years	60	56.6
Level of education	Low	63	59.4
	High	43	40.6
Level of knowledge	Low	54	50.9
	High	52	49.1
Attitude	Negative	53	50.0
	Positive	53	50.0
Family support	No	37	34.9
	Yes	69	65.1
MDA health promotion	No	31	29.2
	Yes	75	70.8
Compliance to MDA	Do not take drugs	19	17.9
	Take drugs	87	88.1

Note: MDA = Mass Drug Administration

Table 2. Relation of Respondent Characteristic and Compliance with the Mass Drug Administration Program for Lymphatic Filariasis in Kuningan Regency

Variable	Category	Compliance with MDA						p-value	OR (95% CI)
		Did not Take Drugs		Took Drugs		Total			
		n	%	n	%	n	%		
Age	> 43 years old	12	26.1	34	73.9	46	100	0.055	2.672 (0.957–7.461)
	≤ 43 years old	7	11.7	53	88.3	60	100		
Level of education	Low	13	20.6	50	79.4	63	100	0.379	1.603 (0.557–4.612)
	High	6	14.0	37	86.0	43	100		
Level of knowledge	Low	18	33.3	36	66.7	54	100	0.0001	25.00 (3.255–199.747)
	High	1	1.9	51	98.1	52	100		
Attitude	Negative	15	28.3	38	71.7	53	100	0.004	4.836 (1.484–15.760)
	Positive	4	7.5	49	92.5	53	100		
Family support	No	11	29.7	26	70.3	37	100	0.016	3.226 (1.163–8.945)
	Yes	8	11.6	61	88.4	69	100		
MDA health promotion	No	14	45.2	17	54.8	31	100	0.0001	11.529 (3.64–36.428)
	Yes	5	6.7	70	93.3	75	100		

Notes: MDA = Mass Drug Administration; OR = Odds Ratio; CI = Confidence Interval

Table 3. Final Model of Multivariate Analysis by Multiple Logistic Regression

Variable	p-value	Exp (B)	95% CI
Level of knowledge	0.015	13.679	1.648–113.565
MDA health promotion	0.004	5.952	1.754–20.196

Notes: MDA = Mass Drug Administration; CI = Confidence Interval

Discussion

An information bias might occur in this study when asking about attitude variables. During the study, the respondents were sometimes hesitate to answer the questions, because of a fear for a bad score if the answers given were not appropriated. So, there was a possibility that the answers given by the respondents were not sincere. Therefore, authors explained repeatedly to respondents to answer truthfully and answer according to what was experienced by respondents and not compete to get the highest score. This information bias can be a weakness in this study. The strength of this study was the examination of the effect of predisposing/enabling (age, education level, knowledge, and attitude), reinforcing (family support), and enabling (MDA health promotion) factors that influence people's behavior to adhere to the MDA program.

This study proved that knowledge of MDA plays a key role in determinating compliance with the MDA program, which was also demonstrated in previous studies.^{10,11} Adhikari, in his study at an endemic district of Nepal, concluded that respondents who understood the side effects during an MDA campaign had a lower prevalence of non-compliance compared to those who have not understood (9.4% vs. 33.2%, p-value < 0.001).¹² Likewise, a study in Burdwan District of West Bengal, India, showed that the lack of community awareness regarding MDA activity is also an influencing factor of compliance to the MDA program with 16.88% of the respondents unaware of the MDA.¹³ Hussain within the study in India revealed that the cause of non-compliance is lack of awareness of the benefits of MDA.¹¹

According to the theory of Lawrence Green, health behavior can be influenced by three main factors, which are (1) predisposing factors manifested by knowledge, attitudes, beliefs, values, and so on; (2) enabling factors manifested by the physical environment, availability of health facilities such as health services, medicines, latrines, and so on; and (3) reinforcing factors manifested by the attitudes and behavior of health workers or other officers, which are reference groups of community behavior. Knowledge was included in the predisposing factor as it can determine compliance with the MDA program. Knowledge can be influenced not only by the respondent's formal education level but also by accessing information on the MDA program. The information

could either be obtained on social media (Facebook, Instagram, Twitter, etc.), print media (newspapers, magazines), electronic media (television, internet, radio, etc.), or more importantly by healthcare workers.¹⁰ Despite having low education level, the respondents increased their knowledge by seeking information about filariasis through various media sources or at least having heard information about filariasis. This knowledge, ultimately, is the most significant factor that affects the decision of participants.

Apart from knowledge, attitude toward MDA is also a major factor that will determine respondents' behavior. In this study, half of the respondents demonstrated a positive attitude, and half showed a negative attitude. This study also indicated that the respondents' attitudes had a significant relationship with compliance to the MDA program, consistent with previous studies. The study in India found out that the subjects who did not consume the medication feared experiencing side effects and they "don't have faith in a tablet".¹⁴ Perceived vulnerability, perceived severity, perceived benefits, and perceived barriers were determinants of adherence to the MDA program based on a study conducted by Widjanarko, *et al.*¹⁵ In general, the majority of respondents had a good perception and most of them felt the need to take preventive medicine for filariasis.¹⁵

Several MDAs in various countries have encountered the mistrust of the communities in the MDA program. These include suspicions that the drugs are being used to poison children, being used as birth control, and even cause erectile dysfunction.⁸ Another reason for non-compliance was not receiving the drug, not being ill, or feeling healthy. Cabral, *et al.*,¹⁰ stated that some previous studies showed about two-thirds of infected people remain asymptomatic; thus, they did not see the benefits of treatment. Also, individuals do not see any morbidity caused by filariasis in their immediate surroundings. For this reason, they did not follow the instruction they received.¹⁰

Furthermore, the most popular reason for drug non-compliance in the MDA program is the fear of side effects, which was reported in prior studies.^{8,11,16,17} In the Pabean area, Indonesia, the respondents, most of whom were batik factory workers, were afraid of suffering from dizziness, nausea, and muscle pain after taking the drugs, which may prevent them to continue their work at the factory later.¹⁶ The percentage of people who experienced side effects was tiny which should not be the biggest concern. Therefore, the information on side effects should be well explained in any educational program to help the people understand and overcome their unnecessary fear of side effects; and recognize the importance of taking the drugs to protect not only themselves but also their family members.

The study conducted by Ojha, *et al.*,¹⁸ showed that the national LF program in Nepal provided additional health education to drug distributors about drug dosage. So they obtained clear information about potential drug side effects and what they should do if they find a drug side effect case in the population. Comprehensible information on drug side effects was also shared with the community in Nepal. People were advised to go to the nearest health facility immediately if they experienced nausea, fever, headache, dizziness, or other symptoms after taking the drug.

The present study found that family support was also one of the factors associated with compliance to MDA. Family support in the study included encouragement, informing family members about the benefits and risks of not taking the medication as instructed, and reminding family members when the respondents forget to take medication. Families are generally close to one another and have a great influence on each other's decisions. They can effectively share their knowledge about MDA and always support or remind respondents to take drugs to prevent filariasis. Hence, to improve MDA compliance in general, it is important to educate other family members to raise their LF awareness.

The MDA health promotion is a wide range of health services, which the main goal is to raise public knowledge about filariasis, together with other actions to contain filariasis. In this study, the MDA health promotion was a determinant factor in compliance to the MDA program, similar to previous studies. In the study of Adhikari, *et al.*,¹² the respondents who were visited by health workers in their homes during the MDA campaign (75.9% vs 24.1% p-value < 0.001, OR_{adj} = 4.85 (95% CI = 2.448–9.594) had significantly higher compliance than those who did not. A study conducted by Marathe in India,¹⁹ showed 255 persons did not consume the drug among them 11.67% of the households had prior information regarding MDA. Information, education, and communication (audiovisual aids) activity reached only 31.67% of households.

Hussain, *et al.*,¹¹ illustrated in his study that the inadequate training of drug distributors, poor health communication activities before the MDA campaign commenced, and the absence of follow-up by health workers following MDA were a few of the operational difficulties encountered during the MDA campaign. Although the MDA health promotion benefits MDA compliance among respondents, it should be well planned and followed up by health workers.¹¹ For successful implementation of MDA programs, good planning, educational campaigns promoting the benefits of MDA, adoption of measures to minimize the impact of adverse effects, and improvement of drug distribution logistics are needed.^{10,20,21}

Additionally, regular and continual health information about MDA should be conducted through interpersonal communication by frontline health workers and mass media communication.²² Likewise, retraining of service providers before MDA activities may help improve the MDA program's outcomes.^{11,22} The results of a study conducted by Silumbwe in Africa,²³ found out that the main factors facilitating the implementation of MDA for filariasis programs were awareness creation through innovative health education programs in the community, creation of partnerships and collaborations, integration with existing programs, creation of morbidity management programs, the motivation of community drug distributors (CDDs) through incentives and training, and management of adverse effects.²³

Conclusion

Low knowledge and unawareness of the MDA health promotion proved to be the most dominant factor in non-compliance to the MDA program.

Recommendation

Based on the findings, it is suggested that the government can improve health promotion programs by conducting counseling activities or distributing brochures and leaflets to the community to increase public knowledge about the benefits of the MDA program for filariasis and for the community to participate actively in the MDA program. Besides, it is hoped that it will further enhance the systematic post-MDA surveillance using TAS for epidemiological assessment of recent LF transmission and monitoring/evaluation activities of the MDA program to find out how the program's obstacles are faced along with formulating solutions to the problems that occur.

Abbreviations

MDA: Mass Drug Administration; TAS: Transmission Assessment Surveys; LF: Lymphatic Filariasis; DALYs: Disability Adjusted Life Years; WHO: World Health Organization; GPELF: Global Programme to Eliminate Lymphatic Filariasis; OR: Odds Ratio; CDDs: Community Drug Distributors.

Ethics Approval and Consent to Participate

This study has been approved by the Ethics Committee from *Sekolah Tinggi Ilmu Kesehatan Kuningan/Kuningan Health Science Institute* (No. 012/EP/STIKKU/2018). Respondents have been informed of the purpose of this study and filled out informed consent as a form of their willingness to participate in this study.

Competing Interest

The author declares that there are no significant competing financial, professional, or personal interests that might have affected the performance or presentation of the work described in this manuscript.

Availability of Data and Materials

Data in this study can be provided by the corresponding author at a reasonable request.

Authors' Contribution

NNA and ISA were involved in conceptualizing the study, searching the literature, and collecting data. NNA performed data analysis. NNA and HTPD compiled and reviewed the manuscript.

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