Determinants of Community Distrust of Drugs Deliverers in the Catchment Areas of Waihaong and Air Salobar Health Centers, Ambon

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Abstract. Lymphatic Filariasis (LF) is a chronic infectious disease caused by worms from the nematode group. Mass drug administration (MDA) for LF is carried out in endemic communities to eliminate lymphatic filariasis. Previous analysis shows that one of the factors associated with community compliance with taking LF drugs was the community's trust towards LF drug deliverers during MDA. This study examined factors associated with community distrust of LF drugs deliverers in the 2018 MDA in the catchment areas of Waihaong and Air Salobar Health Centers, Ambon City. Data used in this study were derived from a cross-sectional study conducted in January 2019 in the catchment areas of Waihaong and Air Salobar Health Centers. The survey involved 964 respondents aged 18–70 living in the study sites. Potential predictors of community distrust of drug deliverers in this analysis were categorized into: (1) Socio-demographic characteristics, i.e., respondents' age, gender, education, occupation, living area, and household income, and (2) Internal factors, i.e., respondents' level of knowledge of lymphatic filariasis and MDA, and sense of obligation to take LF drugs. Logistic regression analysis was employed to examine factors associated with the community's distrust of LF drug deliverers during the 2018 MDA. Our analysis showed that 8.8% of respondents distrust drug deliverers. The odds of distrusting LF drug deliverers amongst respondents with low knowledge of LF and MDA was almost ten times the odds in those with a high level of knowledge (aOR = 9.91, 95%CI: 2.31–42.42, $p = 0.002$). The odds were also significantly higher in those who did not feel obliged to take LF drugs than in those with a strong sense of obligation (aOR = 3.86, 95%CI: 2.02–7.39, $p < 0.001$). Our findings show that interventions are still required to improve the community's knowledge of LF and MDA through different health promotion activities. Efforts to enhance the community's sense of responsibility and mutual obligation to take LF drugs will be beneficial to improve community trust in drug deliverers in MDA and support the goal of LF elimination in Ambon City.

Keywords: Lymphatic filariasis · Distrust · Mass Drug Administration · drug deliverers · knowledge · Ambon

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1 Introduction

Lymphatic Filariasis (LF) is a chronic infectious disease caused by nematodes, i.e., *Wucheriaria bancrofti, Brugia malayi,* and *Brugia timori* [1]. The high number of LF cases worldwide prompted the World Health Organization (WHO) in 2000 to declare a global program to eliminate LF under the theme "The Global Elimination of Lymphatic Filariasis As A Public Health Problem By The Year 2020" [1–3]. In 2019, an estimated 51.4 million people were infected with LF [4], and in 2020 an estimated 863 million people in 48 LF-endemic countries still required mass drug administration (MDA) [5]. One pillar of the global goal to eliminate LF as a public health problem is mass drug administration (MDA) of preventive chemotherapy to all eligible individuals living in an endemic area. Indonesia is one of the endemic countries for LF that started MDA in selected districts in 2002 [6–8]. The aim was to reduce the microfilariae (nematode larva) rate to less than 1% in each district/city [7]. In 2002, there were 6,571 LF cases, however, in 2019 there were 10,758 documented cases in Indonesia [8]. The eastern part of Indonesia had the highest LF cases, particularly Papua Province, which had 3,625 LF cases [7–9].

Ambon City, the capital of Maluku, one of the provinces of eastern Indonesia, is one of the LF endemic areas. In 2016, the microfilaria rate in Ambon was 9.4% [10, 11]. A study conducted by Titaley et al. [12, 13], in the catchment areas of Waihoaing and Air Salobar Health Center of Ambon City 2016 reported a notable difference in the percentages of people receiving and swallowing LF drugs. Although the coverage of LF drugs in the catchment areas of Waihaong Health Center reached 91.9%, the percentage of people swallowing LF drugs was only 58.5%. Similarly, in the catchment areas of Air Salobar Health Center, even though the coverage of LF drugs was 69%, only 49.3% reported swallowing the drugs [12]. Studies showed that community compliance with swallowing LF drugs was related to different factors, including the level of knowledge of LF and MDA [14], the sense of obligation of each individual to take LF drugs [15], as well as the sense of trust in LF drugs deliverers in MDA [1, 14, 15]. In research conducted by Kusi et al. [16] in Kenya, the authors reported that a high level of trust in LF drugs deliverers increased the community's motivation and compliance with swallowing the drugs. A previous study also showed that the trust between the community and the LF drugs deliverers played an essential role in the coverage of LF drugs during MDA [17].

In Ambon City, besides the local health center staff, most of the LF drug deliverers in MDA are community health volunteers known as *cadres*. Usually, before MDA implementation, a coordination meeting with all drug deliverers is held by the health centers. In this meeting, various topics are discussed, including the technical aspects of drug distribution, detailed instructions on swallowing LF drugs, possible adverse events that might occur, and what the community needs to do when experiencing any adverse events. The health center's staff carries out monitoring and supervision activities regularly during MDA. In 2018–2019, the Faculty of Medicine University of Pattimura, Ambon conducted a study related to community compliance with taking LF drugs in the catchment area of Waihaong and Air Salobar Health Centers in Ambon City funded by The Task Force of Global Health, Atlanta, USA and in collaboration with the Bruyère Institute (Ottawa, Canada) and the Centers for Disease Control and Prevention (Atlanta, USA) [12]. Using data from the cross-sectional survey, this analysis examined the determinants

of community distrust of LF drugs deliverers in the 2018 MDA. The results of this study are expected to assist program managers in promoting community trust towards LF drug deliverers and improve overall compliance with taking LF drugs during MDA.

2 Materials and Methods

2.1 Study Design and Sites

Data analysed in this study was derived from a cross-sectional survey conducted by the Faculty of Medicine, Pattimura University, Ambon, in the catchment areas of Waihaong and Air Salobar Health Centers in January 2019 [12]. The total catchment area of Waihaong Health Center is 62.9 ha/m^2 and is divided into three villages: Waihaong, Silale, and Urimessing. The distance between the center of Ambon City to Waihaong Health Center is about 0.5 km [18]. The total catchment area of Air Salobar Health Center is about 82.3 km^2 and is divided into two villages: Nusaniwe and Kudamati. The distance between the center of Ambon City to Air Salobar Health Center is about 7 km [19].

2.2 Sampling Method and Data Collection Procedure

The selection of respondents in the survey was carried out using a two-stage cluster sampling method. The primary sampling unit used was hamlet (RW). Twenty hamlets were selected in each study site using the Probability Proportional to Size (PPS), followed by selecting sub-hamlets using a simple random sampling method. Twenty-five respondents per sub-hamlet were selected using a simple random sampling method. More detailed information about the sampling method in this survey has been described in a previous study [20]. This survey interviewed 1110 respondents (508 respondents from Air Salobar and 502 from Waihaong). The respondents were selected based on two criteria: living in the catchment area of Waihaong and Air Salobar Health Centers, and aged between 18–70 years [12]. In this analysis, respondents who admitted that they "had never heard of LF" were excluded from the analysis (n = 46). In total, we only used information collected from 964 respondents.

2.3 Research Instruments and Variables Used in the Analysis

This survey used a structured questionnaire with various questions, including socio-demographic factors (respondent's location of residence, age, gender, respondent's last education level, employment status, and monthly income of the respondent) and questions related to internal factors (community knowledge about LF and sense of obligation in taking the LF drugs during MDA). Questions related to community trust towards drug deliverers were also asked.

The dependent variable used in this study was community distrust of drug deliverers in the MDA. The question was: "How much do you trust the LF drug deliverers in your neighbourhood?". Respondents' answers to this question were classified into five groups, (1) Highly distrusted; (2) Distrusted; (3) Neutral; (4) Trusted; and (5) Highly trusted. In this analysis, the level of trust was classified into two categories: (1) Trusted and (2)

Distrusted. Trust includes respondents' answers stating, "highly trusted" and "trusted", while distrust included "neutral", "distrusted", and "highly distrusted" answers.

The independent variables included: (1) Socio-demographic characteristics: respondent's living area (Waihaong/Air Salobar), age (18–25/26–35/36–45/46–55/56–65/ > 66 years old), sex (male/female), the education level (no schooling/primary/junior high/high school/university), occupation (not working/working), and household income according to the Regional Minimum Wage (less than/equal/more than regional minimum wage). The regional minimum wage for Maluku Province was Rp. 2,604,961,- [21]; and (2) Internal factors, including respondents' level of knowledge about LF and MDA (high/moderate/low) [22], and the sense of obligation to take LF drugs (high/moderate/low). For each knowledge question, a score was given to each answer: one point if the answer was correct and zero if otherwise. All scores were summed, and each respondent's percentage of correct answers was calculated. This percentage was then grouped into three categories of knowledge level: (1) low: < 55%; (2) moderate: 56%-75%, and (3) high: 76%–100%).

2.4 Data Analysis

In the initial stage, univariate analyses were carried out to describe the characteristics of all variables used, followed by the bivariable and multivariable logistic regression analyses to identify factors related to community distrust of LF drug deliverers. Bivariate analysis was conducted to examine the relationship between community distrust of drugs deliverers with each potential predictor. Multivariate analysis was carried out using the "backward elimination" method to obtain factors significantly associated with community distrust of LF drugs deliverers in MDA using a significance value of 0.05. The health center catchment area and education level variables were selected *a priori* and retained to be controlled in the final model despite their significance level. All data analysis was carried out using STATA/MP v.17.

2.5 Research Ethics

This research was approved by the Ethics Committee of the Faculty of Medicine, Pattimura University (Number: 046/FK-KOM.ETIK/VIII/2021). All respondents interviewed in the survey were requested to sign an informed consent form after receiving an explanation from the interviewer.

3 Results

Overall, the results showed that of the 964 respondents interviewed, 8.8% of respondents reported having a sense of distrust of LF drug deliverers (9.5% in Waihaong and 8.1% in Air Salobar). Table 1 shows the frequency distribution of all variables analyzed in this study. Amongst the socio-demographic factors, a higher percentage of male respondents expressed their sense of distrust (11.8%) than female respondents (7.1%). In the internal factors, the percentage of respondents who distrusted LF drug deliverers increased along with the decline in respondents' level of knowledge about LF and MDA. The percentage

Table 1. Frequency distribution of respondents based on the variables analyzed in this study (n = 964)

Variable	n	%	Trust in LF drugs deliverer in MDA			
			Distrusted		Trusted	
			n	%	n	%
Socio-demographic factors						
Health Center catchment area						
Waihaong	482	50.0	46	9.5	436	90.5
Air Salobar	482	50.0	39	8.1	443	91.9
Age (year)						
18–25	157	16.3	19	12.1	138	87.9
26–35	190	19.7	10	5.3	180	94.7
36–45	222	23.0	18	8.1	204	91.9
46–55	187	19.4	19	10.2	168	89.8
56–65	152	16.0	10	6.6	142	93.4
>66	56	5.8	9	16.1	47	83.9
Sex						
Male	355	36.8	42	11.8	313	88.2
Female	609	63.2	43	7.1	566	92.9
Education level						
Academy/University	253	26.24	29	22.46	224	88.54
Senior high school	536	55.60	42	7.84	494	92.16
Junior high school	101	10.58	7	6.86	95	93.14
No schooling/elementary	73	7.57	7	9.59	66	90.41
Occupation						
Not working/housewife	58	6.0	6	10.3	52	89.7
Working	906	94.0	79	8.7	827	91.3
Income						
<average minimum wage*	376	39.0	36	9.6	340	90.4
=average minimum wage	226	23.4	19	8.4	207	91.6
>average minimum wage	362	37.6	30	8.3	332	91.7
Internal factor						
Level of knowledge						
High	131	13.59	2	1.53	129	98.57

(*continued*)

Table 1. (*continued*)

Variable	n	%	Trust in LF drugs deliverer in MDA			
			Distrusted		Trusted	
			n	%	n	%
Socio-demographic factors						
Moderate	443	46.95	20	4.51	423	95.49
Low	390	40.46	63	16.15	327	83.85
Sense of obligation to swallow LF drugs						
High	631	65.46	35	5.55	596	94.45
Moderate	257	26.66	29	11.28	228	88.72
Low	76	7.88	21	27.63	55	72.37

*Average minimum wage: IDR 2,604,961,-

Table 2. Factors associated with the community's sense of distrust of LF drugs deliverers in MDA.

Variable	Univariate				Multivariate			
	OR	95% CI		*p-value*	aOR	95% CI		*p-value*
Socio-demographic factors								
Health Center catchment area								
Waihaong	1.00				1.00			
Air Salobar	0.83	0.53	1.30	*0.427*	1.22	0.75	1.99	*0.404*
Age (year)								
18–25	1.00							
26–35	0.40	0.18	0.89	*0.026*				
36–45	0.64	0.32	1.26	*0.200*				
46–55	0.82	0.41	1.61	*0.568*				
56–65	0.51	0.22	1.13	*0.101*				
>66	1.39	0.58	3.28	*0.452*				
Sex								
Male	1.00							
Female	0.56	0.36	0.88	*0.013*				

(*continued*)

Table 2. (*continued*)

Variable	Univariate				Multivariate			
	OR	**95% CI**		***p-value***	**aOR**	**95% CI**		***p-value***
Socio-demographic factors								
Education level								
Academy/University	1.00				1.00			
Senior high school	0.65	0.39	1.08	*0.098*	0.63	0.37	1.07	*0.091*
Junior high school	0.56	0.24	1.34	*0.199*	0.51	0.21	1.26	*0.147*
No schooling/elementary	0.81	0.34	1.95	*0.653*	0.67	0.23	1.90	*0.460*
Occupation								
Not working/housewife	1.00							
Working	0.82	0.34	1.98	*0.673*				
Income								
<average minimum wage*	1.00							
=average minimum wage	0.86	0.48	1.55	*0.630*				
>average minimum wage	0.85	0.51	1.41	*0.540*				
Internal factor								
Level of knowledge								
High	1.00				1.00			
Moderate	3.04	0.70	13.22	*0.136*	2.99	0.68	13.12	*0.146*
Low	12.42	2.99	51.53	*0.001*	9.91	2.31	42.42	*0.002*
Sense of obligation to swallow LF drugs								
High	1.00				1.00			
Moderate	2.16	1.29	3.62	*0.003*	1.68	0.98	2.89	*0.059*
Low	6.50	3.54	11.93	*<0.001*	3.86	2.02	7.39	*<0.001*

* Average minimum wage: IDR 2,604,961,-

of respondents who distrusted LF drug deliverers also increased along with the reduction of the respondents' sense of obligation to take LF drugs (Table 1).

Table 2 shows the univariable and multivariable analysis results of factors related to respondents' distrust of LF drugs deliverers in MDA. Respondent's knowledge of LF and MDA and sense of obligation to take LF drugs were significantly associated with their sense of distrust of LF drug deliverers, even controlling for other variables. The odds of distrust in respondents with 'low' knowledge of LF and MDA were almost ten times the odds of distrust in respondents with a 'high' knowledge (aOR = 9.91; 95%CI: 2.31–42.42; $p = 0.002$). The odds of distrust were also significantly higher in respondents who had a 'low' sense of obligation than those who had a 'high' sense of obligation to take LF drugs during MDA (aOR = 3.86; 95%CI: 2.02–7.39; $p < 0.001$).

4 Discussion

This analysis showed that some community members living in the catchment areas of Waihaong and Air Salobar Health Center reported that they distrusted LF drug deliverers during MDA. Furthermore, we found that knowledge about LF and MDA and a sense of obligation to take LF drugs were determinants of respondents' distrust. Respondents with a low level of knowledge about LF and MDA or a low sense of obligation to take LF drugs were more likely to distrust LF drug deliverers. These results are expected to help develop evidence-based interventions to improve the community's trust in LF drug deliverers during MDA. Improved trust in LF drug deliverers, the majority of whom are *cadres*, will benefit not only the LF elimination program but also other health-related programs in Ambon City.

The important role of trust, including in the LF elimination program, has been reported in different studies [22–23]. Previous analysis using the data from the same cross-sectional survey showed a significant association between compliance and trust in LF drug deliverers [20]. This shows the strong need to improve the community's trust of *cadres* during MDA, which will benefit the LF elimination program in these catchments areas. The current analysis showed a significant association between the trust in drug deliverers and knowledge of LF and MDA. Respondents with a low level of knowledge were more likely to distrust the drugs deliverers compared to those with a moderate and high level of knowledge on LF and MDA. This finding was supported by study results conducted by Fitriana D [24], who reported that insufficient knowledge of LF can hinder elimination targets as it affects attitudes in supporting the elimination programs.

A qualitative study on the trust of *cadres* in Ambon City showed that some community members distrust *cadres* as they were perceived as having inadequate health-related knowledge and did not look confident while performing their tasks [25]. This demonstrates the need to ensure that LF drug deliverers, predominantly *cadres,* have good knowledge and understanding of LF and MDA. This could be done by conducting adequate training and refresher training programs with LF drug deliverers before the MDA. A study by Hendri J et al. [26], showed that the training of *cadres* increased the acceptance of LF drugs. The training program should cover different aspects of LF and MDA, including practical communication skills that could be used by drug deliverers during their interaction with the community [23]. These communication skills will help LF drug deliverers to provide essential information clearly and confidently [26]. According to Muhaimin's research cited in Maulida et al. [27], good communication is the basis for community participation, as it will inspire everyone to contribute actively to achieving the goals of LF elimination. The development of educational materials or communication guidelines will also benefit drug deliverers during their socialization activities [28]. Additionally, improving awareness that all drug deliverers have been trained will help increase the community's trust in the *cadres* and the MDA process. Various communication channels, including social media, could be used to show the training process.

Our analysis shows a significant association between trust in LF drug deliverers and respondents' sense of obligation to take LF drugs. This feeling could be fostered, for example, by involving different members of the community from across different sectors. The involvement of religious and community leaders in the MDA might promote

the sense of the community's moral obligation to actively contribute to the government program. Iswanto et al. [29], reported that an individual's obligation to take LF drugs reflected his positive attitude in responding to the LF elimination program. As the moral obligation arises within an individual to take part in the MDA, there may be a close link with exposure to LF-related education and other health promotion programs.

One of the advantages of this study is the use of a large sample size allowing the inclusion of various factors related to trust in LF drugs deliverers. As the study represents the two study sites, program holders can use these results to tailor appropriate interventions to improve trust in the community. Some limitations should be noted. As in other cross-sectional studies, the results did not reflect the causal relationship between variables. The information provided was also not validated and solely depended on respondents' recall; however, the survey was carried out shortly after completing the 2018 MDA, so we expect limited recall bias. The survey did not explore the personnel who delivered LF drugs in the MDA, although most of them were *cadres* based on our understanding of the MDA.

In summary, this study shows a significant association between trust in LF drug deliverers in MDA and the level of knowledge and sense of moral obligation to take LF drugs. This reflects the importance of health promotion interventions to improve community awareness and knowledge of LF and its elimination program. Apart from educational activities delivered by health workers through different contact opportunities or communication channels, efforts to ensure that drug deliverers have adequate knowledge of LF and MDA and practical communication skills are vital. Our study also shows that improving the sense of moral obligation to take LF drugs could lead to an improved sense of trust. Improved awareness that taking LF drugs in MDA is part of the shared responsibility to maintain and improve the community's health will help to build trust to eventually benefit LF elimination efforts in the catchment area of Waihaong and Air Salobar Health Centers, and the area of Ambon City in general.

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