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Original Research

Factors Affecting the Occurrence of Filariasis in East Lampung, Indonesia

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ABSTRACT

Background: East Lampung is an endemic area for filariasis. Survey results since 2004, showing Sekampung and Sekampung Udik sub-districts, indicate a microfilaria rate of filariasis above 1%. In 2024, 11 chronic filariasis patients were found. This research aims to analyze the influence of living habits, mosquito breeding sites, family support, the role of health workers, and the role of community leaders on the incidence of filariasis. **Methods:** This research type is quantitative with a case-control design. The research sample consisted of 44 respondents. The sampling technique used was purposive sampling. Data collection methods included interviews and observations using questionnaires and observation sheets as guidelines. Data analysis consisted of univariate, bivariate, and multivariate analyses. **Results:** Bivariate analysis showed the influence of living habits (p-value 0.043), mosquito breeding sites (p-value 0.004), family support (p-value 0.035), the role of health workers (p-value 0.027), and the role of community leaders (p-value 0.019) on the incidence of filariasis. Multivariate analysis revealed that living habits dominantly influence the incidence of filariasis with a p-value of 0.011. **Conclusions:** There is an influence of lifestyle habits on the incidence of filariasis, mosquito breeding, family support, the role of health workers, the role of community leaders on the incidence of filariasis in East Lampung Regency with the most influential variable, namely lifestyle habits, which dominantly affect the incidence of filariasis in East Lampung Regency.

Keywords: Filariasis; living habits; mosquito breeding; family support; community health workers; community leaders

1. INTRODUCTION

Based on data from the World Health Organization (WHO), in 2023, more than 657 million people in 39 countries worldwide are still at risk of lymphatic filariasis and require preventive chemotherapy to stop the spread of this parasitic infection. In 2023, 51 million people have been infected.[1]

Nationally, the number of filariasis cases in Indonesia since 2014-2023 has tended to show a decline, this is due to public access to information on the disease being quite good, people's habits in behaving in a clean and healthy way have increased. The practice of preventing the emergence of disease agents such as filariasis has been widely carried out by the community through periodic monitoring of mosquito larvae, eradication of mosquito nests and encouragement of the community to pay attention to environmental cleanliness every year is quite high. In addition,

the government has improved the service sector through easy accessibility of the community to health services, the role of the community in responding to emergency health conditions has been quite good, indicated by the involvement of the government sector and others in efforts to improve health. However, this condition is inseparable from several negative impacts that continue to arise due to the occurrence of filariasis, such as economic, health and social. In 2014, there were 14,932 confirmed cases, until 2023 there were still 7,955 cases in Indonesia, although the percentage of cases showed a decrease of 49.5%.[2]

In Lampung Province, in 2023, the highest number of filariasis cases was recorded in East Lampung with 11 cases, Central Lampung with 7 cases, Bandar Lampung with 2 cases and North Lampung and Tanggamus with 1 case each. Based on secondary data review, in East Lampung Regency (2023), the East Lampung region is endemic to filariasis. This is in accordance with the results of a survey since 2004 which showed that Sekampung and Sekampung Udik Districts showed a microfilaria rate of filariasis above 1%. In 2024, 11 chronic filariasis sufferers were found, spread across 9 health center areas, namely Sekampung 1 sufferer, Tanjung Harapan 1 sufferer, Pugung Raharjo 2 sufferers, Sidorejo 2 sufferers, Jabung 1 case, Sumber Rejo 1 sufferer, Sukaraja Nuban 1 sufferer, and Purbolinggo 1 sufferer.[3,4]

The occurrence of disease is influenced by several factors, including the presence of disease-causing agents, susceptible hosts, and environmental conditions. According to a study by Hidayat (2022), filariasis is caused by filarial worms and transmitted through mosquito bites.[5] Various human-related factors contribute to its transmission, such as lifestyle habits—including the use of wire mesh, waste management practices, use of mosquito repellent, and the habit of hanging clothes indoors.[6,7] In addition, environmental factors like the presence of mosquito breeding sites, as well as social factors such as family support and the involvement of health workers and community leaders in promoting environmental health, also play a significant role.

From the identification of the problem carried out, through secondary data review and previous research/research review, the researcher concluded that there is a research gap that can be used as justification in reviewing research on "Factors related to the incidence of filariasis in East Lampung Regency" where the approach examines the determinants of individual characteristics including lifestyle habits such as the behavior of using mosquito nets, the use of anti-mosquito drugs, consumption of filariasis drugs, household waste management, the use of wire mesh on home ventilation, and the social environment including family support, the role of health workers, the role of community leaders and the physical environment, namely mosquito breeding grounds for filariasis incidents.

This study aims to analyze the relationship between lifestyle habits, the presence of mosquito breeding sites (mosquito breeding sites), the social environment, and the incidence of filariasis in East Lampung Regency, which has significant implications for disease control efforts. By understanding the associated risk factors, we can design more effective prevention strategies. For example, if a strong correlation is found between the presence of standing water around residential areas and an increase in filariasis cases, mosquito nest eradication programs can be focused on these areas. Furthermore, data on community lifestyle habits, such as environmental hygiene and the use of mosquito nets, can be used to develop more relevant health education campaigns. Furthermore, it is hoped that the research results will provide a strong basis for public policymaking related to filariasis control. Local governments can allocate more appropriate budgets to activities proven effective in reducing the risk of filariasis transmission.

2. METHODS

The type of research used in this study is quantitative, using a case-control approach, which is an analytical study concerning how risk factors are studied using a retrospective approach. The study was conducted in the working areas of the Sekampung, Sukaraja Tiga, Tanjung Harapan, Pugung Raharjo, Sidorejo, Sumberejo, and Way Mili health centers in East Lampung Regency, and was carried out from March 3–18, 2025, and continued from April 14–28, 2025. The sampling technique in this study was purposive sampling. The research variables consisted of independent variables, namely factors that influence the incidence of filariasis, including lifestyle habits, mosquito breeding grounds, and the social environment, and dependent variables, namely the incidence of filariasis. Data analysis was carried out univariately, bivariately (chi-square), and multivariately (logistic regression test).

The population in this study was all subjects within the study area. The study population was divided into two groups: filariasis cases and controls in East Lampung Regency. The sample in this study consisted of a subset of filariasis cases in East Lampung Regency in 2023–2024, and the population of East Lampung Regency, with a total sample size of 44 respondents. The sample consisted of 11 chronic filariasis sufferers in East Lampung Regency, while the control sample consisted of 33 respondents. The case-to-control ratio used was 1:3, based on the health research methods manual.

The research ethics review was conducted by the Health Research Ethics Committee of General Ahmad Yani Regional General Hospital, Metro City, where it was declared "Ethically Appropriate" based on a statement letter Number: 370/574/KEPK-LE/LL-02/2025 on February 27, 2025, signed by the Chairperson of the KEPK General Ahmad Yani Regional General Hospital, Metro. This research ethics review was conducted as an effort to comply with the Regulation of the Minister of Health of the Republic of Indonesia Number 75 of 2020, which states that health research must respect the dignity of humans, as in this research, the research subjects. The principles that are considered include doing good (beneficence), not harming (non-maleficence), and justice (justice). In addition, other principles are considered, including informed consent (approval form), maintaining confidentiality and identity (Permenkes No. 75, 2020).

3. RESULTS

3.1 Characteristics of Respondents

Based on the results of the study, from 44 data points, information about the characteristics of respondents can be seen in the following Table 1.

Based on the study, it is known that out of 44 respondents, most of them, namely 30 respondents (68.2%) have an age range of 20-35 years, there are 6 respondents (13.6%) have an age range of 36-45 years, there are 6 respondents (13.6%), have an age range of 46-55 years and there are 2 respondents who are >56 years old (4.5%). The results of the study (Kermelita et al., 2023) the number of new cases of filariasis during the period 2011-2020 was 32 people. The highest distribution was in the 46-55 year age group with a total of 14 people (43.75%) and the lowest distribution was in the age group under 11 years with a total of 1 person (3.13%). The characteristics of age tend to fluctuate for all age categories except for the 12-16 year age category, 17-25 and 26-35 which were stable at 0 cases. The 56-66 age category shows quite varied fluctuations from year to year.

Tabel 1. Characteristics of respondents (n=44)

Variables	Frequency	Percentage
Age		
20 - 35 years	30	68.2
36 - 45 years	6	13.6
46 – 55 years	6	13.6
>56 years	2	4.5
Gender		
Female	28	63.6
Male	16	36.4
Education background		
Elementary school	14	31.8
Junior high school	12	27.3
Senior high school	15	34.1
Bachelor's degree	3	6.8
Respondent's occupation		
Farmer	20	45.5
Housewife	14	31.8
Self-employed	6	13.6
Teacher/honorary	2	4.5
Trader	2	4.5
Income		
Rp. 1,000,000 – Rp. 2,000,000	41	93.2
Rp. 2,100,000 – Rp. 3,000,000	3	6.8

Based on the results of the analysis of the influence of gender on the incidence of filariasis, it is known that out of 11 respondents in the case group, there were 6 respondents (54.5%) who were female, and out of 33 respondents in the control group, the majority, namely 22 respondents (66.7%) were female. The results of the analysis obtained that the gender variable had a p-value of 0.492 (> 0.05), so it was concluded that the respondent's gender variable did not affect the incidence of filariasis in East Lampung Regency.

In terms of respondents' educational background, out of 44 respondents, the majority, namely 15 people (34.1%) were high school graduates, there were 14 people (31.8%) who graduated from elementary school and 12 people (27.3%) who graduated from junior high school, 3 people (6.8%) had a bachelor's degree.

In terms of respondents' occupations, it is known that out of 44 respondents, 20 respondents (45.5%) work as farmers, 14 respondents (31.8%) do not work or are only housewives (IRT), 6 respondents (13.6%) work as

self-employed, 2 respondents (4.5%) work as honorary teachers and 2 respondents (4.5%) as traders.

In terms of respondent income, out of 44 respondents, the majority, namely 41 people (93.2%) had an income of IDR 1,000,000 to IDR 2,000,000. Based on the results of the analysis of the influence of lifestyle habits on the incidence of filariasis (Table 2), it is known that from 11 respondents in the case group, there were 4 respondents (36.4%) who had good lifestyle habits, from 33 respondents in the control group, there were 25 respondents (75.8%) who had good lifestyle habits.

Based on the results of the analysis of the influence of mosquito breeding sites on the incidence of filariasis, it is known that from 11 respondents in the case group, there were 3 respondents (27.3%) after observation, it was known that the condition of the mosquito breeding site was in the low risk category, while from 33 respondents in the control group, there were 25 respondents (75.8%) known based on observations of the residential environment to have a low-risk mosquito breeding site

Based on the results of the analysis of the influence of family support on the incidence of filariasis, it is known that from 11 respondents in the case group, there were 3 respondents (27.3%) stating that family support was good, while from 33 respondents in the control group, there were 22 respondents (66.7%) stating that family support was good.

Table 2. The influence of lifestyle habits, mosquito breeding sites, family support, role of health workers, and role of community leaders on the incidence of filariasis

Variable	Incidence of filariasis						*p*-value	OR	Confidence Interval 95%
	Case		Control		Total				
	n	%	n	%	n	%			
Lifestyle									
Good	25	75.8	4	36.4	29	65.9	0.043	5.469	1.265 - 23.640
Poor	8	24.2	7	63.6	15	34.1			
Total	33	100.0	11	100.0	44	100.0			
Mosquito breeding ground									
Low Risk	25	75.8	3	27.3	28	63.6	0.004	8.333	1.733 - 39.161
High Risk	8	24.2	8	72.7	16	36.4			
Total	33	100.0	11	100.0	44	100.0			
Family support									
Good	22	66.7	3	27.3	25	56.8	0.035	5.239	1.176 - 24.178
Poor	11	33.3	8	72.7	19	43.2			
Total	33	100.0	11	100.0	44	100.0			
The role of health workers									
Good	28	84.8	5	45.5	33	75.0	0.027	6.720	1.468 – 30.762
Poor	5	15.2	6	54.5	11	25.0			
Total	33	100.0	11	100.0	44	100.0			
The role of community leaders									
Good	25	75.8	4	36.4	29	65.9	0.019	5.469	1.265 - 23.640
Poor	8	24.2	7	63.6	15	34.1			
Total	33	100.0	11	100.0	44	100.0			

Based on the results of the analysis of the influence of the role of health workers on the incidence of filariasis, it is known that from 11 respondents in the case group, there were 5 respondents (45.5%) stating that the role of health workers was good, while from 33 respondents in the control group, there were 28 respondents (84.8%) stating that the role of health workers was good.

Based on the results of the analysis of the influence of the role of community leaders on the incidence of filariasis, it is known that from 11 respondents in the case group, there were 4 respondents (36.4%) stating that the role of community leaders was good, while from 33 respondents in the control group, there were 25 respondents (75.8%) stating that the role of community leaders was good.

Based on the results of the analysis in the Table 3, it was decided that the dominant lifestyle variable influenced the incidence of filariasis considering that the

lifestyle variable had the largest exp (B)/OR value, namely 18.923, and a p-value of 0.011. It was concluded that lifestyle habits predominantly influenced the incidence of filariasis in East Lampung Regency.

Table 3. The variables that most influence the incidence of filariasis

Final modeling	*p*-value	Odd Ratio	95% Confidence Interval for EXP (B)/OR	
			Lower	Upper
Lifestyle	0.011	18.923	1.940	48.601
The role of health workers	0.017	15.138	1.642	39.593

4. DISCUSSION

The results of this study indicate that filariasis predominantly affects individuals in the productive age group (20–55 years). This finding is consistent with research by Rahmat et al. (2020), who reported that filariasis cases were more common among individuals aged 26–55 years.[8] Other studies have shown that those in the productive age range (15–64 years) experience the highest incidence rate (86.8%). This age-related distribution may be attributed to the relatively low filariasis transmission rates in early and non-productive age groups, as well as the challenges in detecting microfilariae in these populations. People in the productive age bracket are typically engaged in outdoor or work-related activities, increasing their risk of being bitten by mosquito vectors. Filariasis is often detected only after chronic symptoms such as swelling appear, which usually occur after prolonged exposure during the productive years.[9]

According to Kermelita et al. (2023), out of 32 new filariasis cases, the majority were women (62.5%) compared to men (37.5%).[9] Although gender-based incidence rates fluctuate annually, there has been a higher percentage of increase among women in recent years. However, the study also suggests that gender is not a significant risk factor, as both men and women face equal risk of contracting filariasis.[10] Men may be more frequently exposed due to occupational activities, especially during nighttime when vectors like *Anopheles*, *Culex*, and *Mansonia* are most active.[11] However, increasing economic participation by women, especially in rural areas like Bengkulu Province—where women engage in activities such as rubber tapping and wood collection at night—has also elevated their exposure risk. Since the disease vectors are exophilic and exophagic, both genders are equally vulnerable.

A study by Siregar (2021) in North Sumatra found that 67.5% of filariasis cases occurred among individuals with low education levels, compared to 32.5% with higher education.[12] Similarly, Jumiati et al. (2020) reported that out of 80 respondents, only 12.5% of individuals with higher education had filariasis, whereas 87.5% of those with lower education levels were infected.[13] These findings emphasize the correlation between education and filariasis risk.

Jumiati et al. (2020) also analyzed occupational risk, noting that 77.5% of respondents with high-risk jobs contracted filariasis, compared to only 22.5% of those with non-risky occupations.[13] Siregar (2021) reported that 60.4% of respondents were employed, and filariasis was more prevalent among those who worked.[12] These findings highlight occupational exposure as a significant risk factor.

Filariasis is also closely linked to socioeconomic status.[14] Communities with better income levels are more likely to afford adequate housing, sanitation, and healthcare, which can help prevent infection and improve treatment access. In contrast, low-income populations often live in unhygienic conditions, making them more vulnerable. Moreover, higher economic status often correlates with improved education, which plays a role in raising awareness and promoting preventive behaviors.[5]

The current study found that lifestyle habits significantly influenced filariasis incidence, with a p-value of 0.043. The odds ratio (OR) of 5.469 indicates that individuals with good lifestyle habits were 5.4 times more likely to avoid filariasis than those with poor habits. Rahmat et al. (2020) also reported similar findings, where the use of mosquito nets ($p = 0.015$), wire gauze ($p = 0.011$), and mosquito repellents ($p = 0.044$) were significantly associated with reduced filariasis risk.[8] Although many respondents used mosquito repellents, nighttime outdoor activities still posed a risk. Therefore, continuous health education by healthcare workers is essential to promote protective behaviors such as using mosquito nets and repellents, which are accessible and easy to implement.

Mosquito breeding sites were also significantly associated with filariasis incidence (p = 0.004). An OR of 8.333 suggests that individuals living in areas with fewer breeding sites were 8.3 times more likely to avoid infection. This contrasts with findings from Jumiati et al. (2020), who reported no significant relationship between breeding sites and filariasis incidence (p = 0.626).[13] Their study argued that other environmental factors—such as aquatic plants, swamps, and animal presence—may influence mosquito populations and biting behavior.

However, the present study aligns with Pertiwi et al. (2019), who reported a significant relationship between mosquito breeding sites and filariasis (p = 0.017, OR = 8.636).[15] These results confirm that lifestyle habits, mosquito breeding sites, family support, the roles of health workers, and community leadership significantly affect filariasis incidence in East Lampung Regency. Among these, lifestyle habits emerged as the most dominant factor ($p = 0.011$), reinforcing the importance of behavioral and social-environmental determinants in disease transmission.

The association between lifestyle habits and filariasis is consistent with findings by Sofia & Nadira (2020), who reported that using mosquito nets and repellents significantly reduced infection risk (p = 0.001) in North Aceh.[16] Poor habits, including failure to avoid outdoor nighttime activities and improper waste and water management, increase vulnerability to infection. Mosquito breeding sites also remain critical. Research by Maifrizal et al. (2023) in Pidie Regency found stagnant water and aquatic vegetation to be major risk factors for vector proliferation.[17] Effective environmental management should therefore be a priority for prevention programs.[18]

Family support was also a significant protective factor (p = 0.035), echoing findings by Jabir et al. (2024), who noted strong associations between family support and participation in Mass Drug Administration (MDA) and hygiene practices.[19] Families not only assist practically but also serve as motivators, promoting awareness and preventive behavior. Health professionals act as educators and facilitators, promoting community behavior change through counseling, advocacy, and monitoring. Leaders often shape collective opinions and behaviors, especially in rural settings, making their involvement essential in outreach and awareness efforts.[20,21]

Multivariate analysis confirmed that lifestyle habits were the most dominant factor influencing filariasis incidence. These findings support the epidemiological triad model, which highlights the interaction between host (behavior), agent (filarial worm), and environment (mosquito habitat). Thus, behavior change interventions and community-based vector control should be prioritized in endemic areas like East Lampung. Overall, this study aligns with existing literature, affirming that behavioral, environmental, and social factors are critical in preventing vector-borne diseases like filariasis. Integrated, multi-sectoral strategies are required to achieve Indonesia's national goal of eliminating filariasis in the near future.

Several limitations should be acknowledged. First, the study employed a case-control design with a relatively small sample size (n = 44), which limits the generalizability of the findings. Second, the use of structured, self-reported questionnaires may introduce response bias, particularly in assessing behaviors and environmental sanitation. Third, the study examined only a limited number of variables—lifestyle habits, mosquito breeding sites, family support, roles of health workers, and community leaders—without considering other important determinants such as knowledge, health history, socioeconomic status, or healthcare access. Finally, as a cross-sectional study, it cannot establish causality, only associations. Future research with larger samples, longitudinal designs, and broader variables is recommended to gain a more comprehensive understanding of filariasis risk factors.

5. CONCLUSION

Based on the results of the study, it can be concluded that most of the factors studied have a significant relationship with the incidence of filariasis in East Lampung Regency in 2025. These factors include living habits, mosquito breeding sites, family support, the role of health workers, and the role of community leaders. Among these, living habits were found to be the most dominant factor influencing the occurrence of filariasis, with a p-value of 0.011. These findings clearly support the study's objectives that certain behavioral, environmental, and social factors play a key role in the transmission and prevention of filariasis in endemic areas.

As a recommendation, there is a strong need to improve community awareness and behavior related to personal and environmental hygiene, especially in high-risk areas. Local health offices are advised to intensify vector control efforts by eliminating mosquito breeding

sites through regular environmental management and larviciding. The role of health workers should be strengthened through capacity building and by increasing their involvement in health education and outreach activities. Additionally, empowering family and community leaders to participate in health promotion initiatives can enhance social support and community compliance. For future research, it is recommended to expand the sample size, adopt a longitudinal design, and include additional variables such as knowledge levels, access to healthcare services, and climate-related environmental factors, in order to gain a more comprehensive understanding of the dynamics of filariasis transmission and prevention.

Ethical Approval

This research has been declared ethically sound based on the statement letter number 370/574/KEPK-LE/LL-02/2025 by the Health Research Ethics Committee of Jend Ahmad Yani Regional General Hospital.

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Competing Interests

All the authors declare that there are no conflicts of interest.

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Underlying Data

Derived data supporting the findings of this study are available from the corresponding author on request.

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