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Systematic Review

Correlation Between Transmission Prevention and Incidence of Filariasis: A Systematic Review

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ABSTRACT

Introduction: Filariasis, a chronic infectious disease caused by filarial worms and transmitted by mosquitoes, remains a global public health issue, affecting 120 million people in 72 countries. Indonesia, with cases spread across 34 provinces, is one of the endemic countries. Preventive measures such as eliminating mosquito habitats, preventing mosquito bites, and implementing Mass Drug Administration (MDA) programs in endemic areas are essential to achieve filariasis elimination. This literature review aims to explore the correlation between these prevention practices and the incidence of filariasis to support elimination efforts.

Material and Methods: Secondary data were sourced from databases including Google Scholar, PubMed, ResearchGate, SpringerLink, ScienceDirect, PLOS One, and Neliti. Using keywords such as prevention practices, Mass Drug Administration (MDA), risk factors, going out at night, bed nets, anti-mosquito repellent, wire netting, and filariasis, 30 research journals meeting the inclusion criteria and quality assessment were obtained.

Results: The study results showed correlations between filariasis incidence and various prevention practices: 72.22% of studies (13 journals) with avoiding going out at night, 73.33% (11 journals) with using anti-mosquito repellent, 75% (12 journals) with using bed nets, 68.75% (11 journals) with using wire netting, and 92.31% (12 journals) with participating in Mass Drug Administration (MDA) programs.

Conclusion: There were a correlation between no go out at night, the habit used of anti-mosquito repellent the used of bed net, wire netting, and taking Mass Drug Administration (MDA) programs with filariasis incidence.

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INTRODUCTION

Filariasis remains a significant public health issue globally. Based on the WHO's data, lymphatic filariasis affects 120 million people across 81 tropical and subtropical countries. One billion individuals are at risk, 947 million are in jeopardy, and 40 million suffer from permanent disfigurement due to this disease [1]. In 2021, 9354 chronic cases of filariasis were recorded spread across 34 provinces in Indonesia [2]. Filariasis endemic areas include district/city units which are determined based on survey results of microfilaria prevalence data showing a microfilaria rate (microfilaria rate) ≥ 1%. In 2017, there were 236 districts/cities with filariasis endemic in Indonesia. Some areas outside Java, for example in Kalimantan, are also endemic for filariasis [3,4].

Filariasis is a chronic infectious disease caused by filarial worms and transmitted by various mosquitoes, including Mansonia, Anopheles, Culex, Aedes, and Armigeres. The three species of worms responsible for filariasis are Wuchereria bancrofti, Brugia malayi, and Brugia timori. In Indonesia, over 70% of filariasis cases are caused by Brugia malayi. Adult worms reside in the lymphatic ducts and nodes, causing recurrent fever and lymphatic inflammation. In

advanced stages, the disease can lead to permanent disfigurement, such as lymphedema in the legs, arms, breasts, and genitals (scrotal lymph and hydrocele) [5].

Factors that support the transmission of filariasis are the presence of mosquitoes and the presence of person with positive microfilariae. Efforts to practice prevention need to be carried out to prevent transmission by eliminating the mosquito's habitat as a vector; preventing mosquito bites such as wearing long sleeves, bed nets while sleeping, not leaving the house at night, using mosquito repellents, and closing ventilation with wire netting; finding and treating person with positive microfilariae; as well as conducting mass treatment in endemic areas. The prevention practices used in this study were the habit of not leaving the house at night, the habit of using mosquito repellents, the habit of using bed nets, the habit of using wire netting in ventilation, and the practice of taking mass prevention drugs.

In Wulandari's research, it was explained that prevention practices that show correlation with the incidence of filariasis are the habit of using anti-mosquito repellents (p-value = 0.031), while the habit of going out at night (p-value = 0.670), the habit of using bed nets (p-value = 1.000), and using wire netting on ventilation (p-value = 0.133) showed no correlation with the incidence of filariasis [6]. In contrast to Nurhayati *et al* [7] study, the habit of using anti-mosquito repellents (p-value = 0.002), the use of bed nets (p-value = 0.002), the use of wire netting (p-value = 0.002) and the habit of being outside the house at night (p-value = 0.040) correlation with the incidence of filariasis. In contrast, Roziyah's study found an association between the use of bed nets while sleeping (p-value = 0.005) and the incidence of filariasis, while the use of wire netting on ventilation (p-value = 0.422) did not show correlation with the incidence of filariasis [8]. In a study by Marhtyni *et al*, [9] it was found that there was a correlation between the practice of taking mass prevention drugs (p-value = 0.044) and a decrease in the prevalence of microfilariae. In contrast to the study by Komaria *et al*, [10] it was explained that Mass Drug Administration (Indonesia term: POPM) was not have correlation with the incidence of filariasis.

Based on the explanation above, it shows that there are differences in research results between transmission prevention practices (the habit of not leaving the house at night, using bed nets, using mosquito repellents, using wire netting for ventilation, and taking POPM medicine) and the incidence of filariasis. The World Health Organization recently proposed 2030 as the new target year for elimination of lymphatic filariasis (LF) as a public health problem [11].

While extensive research has been conducted on the various prevention practices to curb filariasis incidence, inconsistencies remain in the correlation results across different studies. Some studies highlight a significant association between practices such as using mosquito repellents, bed nets, and participating in Mass Drug Administration (MDA) programs with reduced filariasis incidence. However, other studies show either weak or no correlation for similar practices. Moreover, the effectiveness of certain preventive measures, like avoiding going out at night and using wire netting on ventilation, varies across different regions and demographic groups. These disparities suggest the need for further investigation to determine the most effective combination of preventive practices tailored to specific endemic regions. Additionally, the long-term impact of MDA programs on filariasis incidence and the reasons for varying outcomes in different geographic areas require deeper exploration. Addressing these research gaps is crucial to developing more targeted and effective filariasis elimination strategies.

MATERIAL AND METHODS

This type of research is a literature review that examines or critically reviews knowledge, ideas, or findings contained in academic-oriented literature and formulates theoretical and methodological contributions to certain topics. This research uses a systematic review approach.

Data Source Selection Criteria

The data used in this research is secondary data. Secondary data is data obtained not from direct observation, but the data obtained from research that has been conducted by previous researchers. Secondary data sources are primary or original books and reports contained in articles or journals (printed and/or non-printed). Subjects are people who live in filariasis endemic areas (Table 1).

Literature Collection Procedure

The method used for collecting literature involved electronic databases, specifically online searches through Google Scholar, PubMed, ResearchGate, SpringerLink, ScienceDirect, PLOS One, and Neliti. The keywords used for Indonesian-language national journals included prevention practices, POPM, risk factors, not going out at night, bed nets, mosquito repellent, wire mesh/net, and filariasis/elephantiasis. For English-language international journals, the keywords were prevention practice, MDA (Mass Drug Administration), risk factor, going out at night, bed net, anti-mosquito repellent, wire netting, and filariasis/elephantiasis.

The method section contains 15-20% of the articles containing research designs and designs, data collection techniques and analysis.

Table 1. Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Text availability	Abstract, Full text	Text without abstract or incomplete text
Source type	Scientific Journals	Newspapers, magazines, reports
Year of publication	2010 and after	Before 2010
Document type	Journal articles	Feature, news, correspondence, editorial
Study design and type of publication	Quasi-experimental studies, controlled and randomized trials, qualitative research, and cross-sectional studies	Systematic review
Language	English, Indonesian	Languages other than English and Indonesian

Data Quality Analysis

In a systematic literature review study, the collected literature or journals will be evaluated using a few data quality assessment questions according to predetermined inclusion criteria.

Data Synthesis

In this literature review study, the authors synthesize data using the narrative method by grouping extracted data from the literature to answer the objectives.

RESULTS

Analysis of Research Results on the Incidence of Filariasis Habit of Not Leaving the House at Night

Several studies have analyzed the correlation between the habit of not leaving the house at night and the incidence of filariasis. Puji Juriastuti et al. (2010) found a significant correlation (p-value = 0.001) in Jati Sampurna Village [12]. This suggests that individuals who stayed indoors at night had a lower risk of contracting filariasis. Similarly, Ardias et al. (2012) noted a correlation (p-value = 0.009) in Sambas district, reinforcing the idea that night-time indoor habits can reduce exposure to mosquito bites, the primary transmission method of filariasis [13]. Syuhada et al. (2012) observed a significant relationship (p-value = 0.002) in Buaran and Tirto sub-districts [14]. Other studies, such as those by Rizky Amelia (2014) and Santoso et al. (2015), also supported this correlation with p-values of 0.006 and 0.040, respectively. These findings suggest that the practice of staying indoors at night reduces the risk of filariasis [15,16].

Using Bed Nets

The use of bed nets has been extensively studied as a preventive measure against filariasis. Bed nets act as a physical barrier, preventing mosquitoes from reaching individuals during their most vulnerable time—sleep. Ardias et al. (2012) reported a significant correlation (p-value = 0.023) in Sambas district [13]. Similarly, Jontari et al. (2016) found a correlation (p-value = 0.002) in West Sumatra Province [17]. Sularno et al. (2017) also observed a relationship (p-value = 0.039) in Tirto sub-district, Pekalongan district. These findings were supported by Komaria et al. (2016), who found a correlation (p-value = 0.001) in Talang Kelapa and Sembawa sub-districts [10,18]. Overall, the use of bed nets appears to be an effective measure in reducing the incidence of filariasis by significantly lowering the chances of mosquito bites during sleep.

Using Mosquito Repellents

The habit of using mosquito repellents has shown mixed results in its correlation with the incidence of filariasis. Mosquito repellents, which often contain compounds like DEET, create an invisible barrier that deters mosquitoes from approaching. Ardias et al. (2012) found a significant relationship (p-value = 0.007) in Sambas district, while Syuhada et al. (2012) reported a correlation (p-value = 0.012) in Buaran and Tirto sub-districts [13,14]. However, Jontari et al. (2016) did not observe a significant correlation (p-value = 0.500) in West Sumatra Province. This indicates that while repellents can be effective, other factors such as proper application and environmental conditions may influence their efficacy [17]. Similarly, Purnama et al. (2017) found no significant relationship (p-value = 0.497) in Muara Pawan sub-district [19]. Despite these mixed results, some studies suggest that mosquito repellents can play a role in reducing filariasis incidence when used correctly and consistently.

Using Wire Netting for Ventilation

The correlation between the use of wire netting for ventilation and the incidence of filariasis has been studied with varying results. Wire netting can prevent mosquitoes from entering homes, thereby reducing the risk of filariasis transmission. Puji Juriastuti et al. (2010) found a significant correlation (p-value = 0.005) in Jati

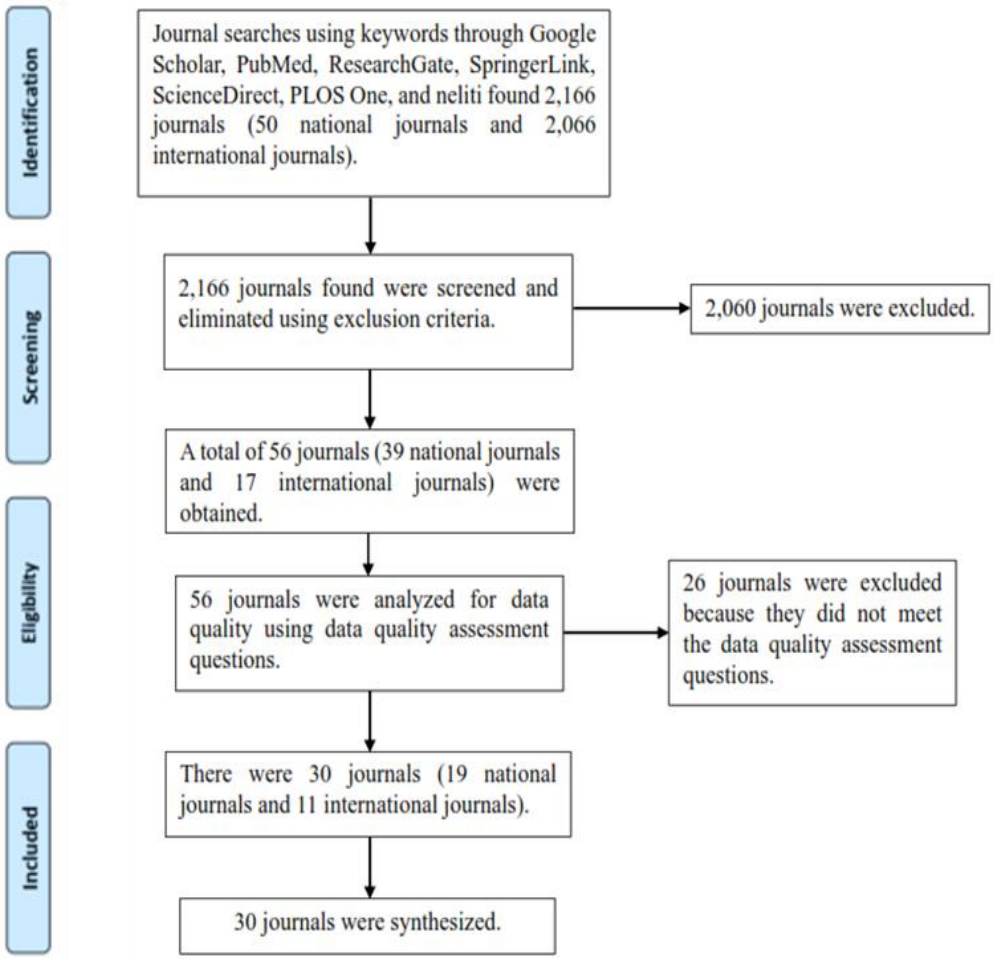


Fig. 1. PRISMA Flow Chart

Sampurna Village [12]. This suggests that homes equipped with wire netting have a lower incidence of mosquito entry and, consequently, a lower risk of filariasis. Ardias et al. (2012) also reported a relationship (p-value = 0.013) in Sambas district [13]. However, Komaria et al. (2016) did not find a significant correlation (p-value = 0.530) in Talang Kelapa and Sembawa sub-districts [10]. This may be due to differences in the quality of the netting or maintenance practices. Similarly, Jontari et al. (2016) observed no significant relationship (p-value = 0.023) in West Sumatra Province [17]. These mixed findings indicate that while wire netting may reduce filariasis risk, its effectiveness can vary based on other factors.

Taking POPM Medicine

The practice of taking mass drug administration (POPM) medication has shown a strong correlation with the reduction of filariasis incidence. POPM involves distributing medication to entire populations in endemic areas to treat and prevent filariasis. Rizky Amelia (2014) found a significant relationship (p-value = 0.005) in East Tanjung Jabung district [15]. This suggests that regular drug administration can dramatically reduce the presence of microfilariae in the population. Santoso et al. (2015) reported a correlation (p-value = 0.048) in Pangku-Tolole Village [16]. Simonsen et al. (2010) observed a significant decrease in microfilariae with repeated mass drug administration (p-value < 0.001) [20]. Similarly, King et al. (2018) found that a three-drug regimen was effective in reducing filariasis incidence (p-value = 0.02) [21]. These findings suggest that regular administration of POPM medication is a crucial factor in controlling and reducing filariasis incidence by targeting the parasite at multiple stages of its lifecycle.

These research results collectively highlight the importance of various preventive measures in reducing the incidence of filariasis. By understanding the effectiveness of these practices, communities can better implement strategies to combat this disease.

DISCUSSION

There are 18 research journals (15 national journals and 3 international journals) that discuss the correlation between not leaving the house at night and the incidence of filariasis. 13 research journals (72.22%) stated that it was related, while the other 5 research journals (27.78%) did not relate to the incidence of filariasis. The results of existing research indicate that staying indoors during the night can substantially reduce the risk of filariasis. This is likely because the primary vectors of filariasis, mosquitoes, are most active during the evening and nighttime hours. By reducing exposure to mosquitoes during these peak activity times, the likelihood of being bitten and subsequently infected with the filarial parasite decreases. However, the effectiveness of this preventive measure can vary based on factors such as the quality of housing, the presence of other protective measures, and the specific habits of the local mosquito population. This variation in effectiveness is reflected in the mixed results found in the 5 journals that did not observe a significant correlation.

There were 15 research journals (13 national journals and 2 international journals) that discussed the relationship between the habit of using mosquito repellents and the incidence of filariasis. 11 research journals (73.33%) stated that it was related, while the other 4 research journals (26.67%) did not relate with the incidence of filariasis. The existing research suggests that while the use of mosquito repellents can effectively reduce the incidence of filariasis, its success largely depends on factors such as the proper application of the repellents and the specific environmental conditions of the study area. For instance, certain studies found that the repellents' effectiveness varied with the type of repellent used, the frequency of its application, and the local mosquito population's behavior. These factors contribute to the mixed results observed in the research journals, highlighting the need for consistent and correct usage of mosquito repellents to achieve the desired protective effect.

There are 16 research journals (12 national journals and 4 international journals) that discuss the correlation between the use of bed nets and the incidence of filariasis. 12 research journals (75%) stated that they were related, while the other 4 research journals (25%) did not relate with the incidence of filariasis. The results of existing research suggest that the use of bed nets can effectively reduce the incidence of filariasis by creating a physical barrier that prevents mosquitoes from biting individuals during their most active periods at night. However, the effectiveness of bed nets can vary based on several factors such as the quality of the netting, whether the nets are treated with insecticides, and the consistency of their use. Studies have shown that properly maintained and regularly used bed nets can significantly lower the risk of mosquito bites and, consequently, the transmission of the filarial parasite. The mixed results observed in some journals may be attributed to differences in study conditions, such as variations in local mosquito population behaviors, environmental factors, and adherence to bed net usage guidelines among the study participants.

There are 16 research journals (13 national journals and 3 international journals) that discuss the correlation between the use of wire net for ventilation and the incidence of filariasis. 11 research journals (68.75%) stated that it was related, while the other 5 research journals (31.25%) did not relate with the incidence of filariasis. The results of existing research suggest that while wire netting can effectively reduce the incidence of filariasis by preventing mosquitoes from entering homes, its effectiveness can vary based on factors such as the quality of the netting, how well it is maintained, and the specific environmental conditions of the study area. Properly installed and maintained wire netting can significantly lower the risk of mosquito entry, thereby reducing the likelihood of mosquito bites and subsequent filarial parasite transmission. However, inconsistencies in these factors may contribute to the mixed results observed in the research journals.

There are 13 research journals (5 national journals and 8 international journals) that discuss the correlation between the practice of taking MDA and the incidence of filariasis. 12 research journals (92.31%) stated that they were related, while one other research journal (7.69%) did not relate to the incidence of filariasis. The results of existing research suggest that the practice of mass drug administration (MDA) is highly effective in reducing the incidence of filariasis. This strong correlation can be attributed to the ability of MDA to target the parasite at multiple stages of its lifecycle, thereby significantly decreasing the presence of microfilariae in the population. However, the slight variation in results across studies could be due to differences in adherence to the medication regimen, the specific drugs used, and the coverage of the drug administration program. Overall, the findings underscore the importance of regular and comprehensive administration of MDA in endemic areas to control and eventually eliminate filariasis.

CONCLUSION

The practice of taking mass drug administration (POPM) medication, as well as other preventive measures, has shown significant effectiveness in reducing the incidence of filariasis. The studies reviewed highlight that regular administration of POPM medication can dramatically reduce the presence of microfilariae in the population. Various research

findings support the correlation between preventive measures, such as staying indoors at night, using mosquito repellents, utilizing bed nets, and installing wire netting, and the reduction in filariasis incidence.

The consistency and quality of these preventive measures play a crucial role in their effectiveness. For instance, staying indoors during peak mosquito activity times, properly applying mosquito repellents, and maintaining bed nets and wire netting are critical factors in lowering the risk of mosquito bites and subsequent infection. The research collectively underscores the importance of comprehensive and regular preventive strategies, including mass drug administration, to control and eventually eliminate filariasis.

In conclusion, targeted interventions and consistent preventive practices are key to combating this disease. Continued research and community education are essential to enhance the implementation and adherence to these measures, ultimately aiming to reduce and eradicate filariasis in endemic areas.

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CONFLICT OF INTEREST

The authors declare there is no conflict of interest.

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Table 2. Results of Data Synthesis of national and international Journals

No	Researcher	Title	Year & Method	Sample	Research Summary
1	Puji Juriastuti, Maya Kartika, I Made Djaja, Dewi Susanna [12]	Faktor Risiko Kejadian Filariasis di Kelurahan Jati Sampurna	2010 *Case control study*	31 case samples and 62 control samples	There is a correlation between the use of wire net for ventilation (p-value = 0.005) and the habit of not leaving the house at night (p-value = 0.001) with the incidence of filariasis in Jati Sampurna Village, while the use of bed nets (p-value = 0.246) is not correlated with incidence of filariasis.
2	Ardias, Onny Setiani, Yusniar Hanani D [13]	Faktor Lingkungan dan Perilaku Masyarakat yang berhubungan dengan Kejadian Filariasis di Kabupaten Sambas	2012 *Case control study*	32 case samples and 32 control samples	There is a correlation between the habit of not leaving the house at night (p-value = 0.009), the use of mosquito repellent (p-value = 0.007), the use of wire net ventilation (p-value = 0.013) and the use of bed nets (p-value = 0.023) with the incidence of filariasis in Sambas district.
3	Yudi Syuhada, Nurjazuli, Nur Endah W [14]	Studi Kondisi Lingkungan Rumah dan Perilaku Masyarakat sebagai Faktor Risiko Kejadian Filariasis di Kecamatan Buaran dan Tirto Kabupaten Pekalongan	2012 *Case control study*	52 case sample and 52 control sample	There is a correlation between the use of mosquito repellent (p-value = 0.012), the habit of not leaving the house at night (p-value = 0.002), and the use of wire net ventilation (p-value = 0.003) with the incidence of filariasis in Buaran and Tirto, Kab. Pekalongan, while the use of bed nets (p-value = 0.446) did not show a correlation with the incidence of filariasis in Buaran and Tirto sub-district, Pekalongan district.
4	Ike Ani Windiastuti, Suhartono, Nurjazuli [22]	Hubungan Kondisi Lingkungan Rumah, Sosial Ekonomi, dan Perilaku Masyarakat dengan Kejadian Filariasis di Kecamatan Pekalongan Selatan, Kota Pekalongan	2013 *Cross-sectional study*	80 case sample and 80 case control	There is a correlation between the habit of not leaving the house at night (p-value = 0.010) and the use of mosquito repellents (p-value = 0.006) with the incidence of filariasis in Kec. South Pekalongan, Pekalongan City, while the use of wire net ventilation (p-value = 0.277) was not correlated with the incidence of filariasis in Pekalongan Selatan sub-district, Pekalongan City.
5	Triwibowo Ambar Garjito, Jastal, Rosmini, Hayani Anastasia, Yuyun Srikandi, Yudith Labatjo [23]	Filariasis dan Beberapa Faktor yang Berhubungan dengan Penularannya di Desa Pangku-Tolole, Kecamatan Ampibabo, Kabupaten Parigi-Moutong, Provinsi Sulawesi Tengah	2013 *Cross sectional study*	207 sample	There is a correlation between the habit of not leaving the house at night (p-value = 0.033) and the incidence of filariasis in Pangku-Tolole Village, Ampibabo subdistrict, Parigi-Moutong district, Central Sulawesi Province.
6	Rizky Amelia [15]	Analisis Faktor Risiko Kejadian Penyakit Filariasis	2014 *Case control study*	17 case sample and 17 control sample	There is a correlation between the use of wire net ventilation (p-value = 0.034), the habit of not leaving the house at night (p-value = 0.006), the use of mosquito repellent (p-value = 0.002), and the practice of taking POPM medication (p- value = 0.005) with the incidence of filariasis.
7	Nurhayati, Ismael Saleh, Elly Trisnawati [7]	Faktor Risiko Kejadian Filariasis di Wilayah Kerja Puskesmas Sungai Kerawang Kecamatan Batu Ampar Kabupaten Kubu Raya	2014 *Case control study*	24 case sample and 48 control sample	There is a correlation between the use of wire net ventilation (p-value = 0.001), the use of mosquito repellent (p-value = 0.002), the use of bed nets (p-value = 0.002), and the habit of not leaving the house at night (p-value = 0.040) with the incidence of filariasis in the working area of the Sungai Kerawang Community Health Center, Batu Ampar sub-district, Kubu Raya district.
8	Jontari Hutagalung, Hari K, Supargiyono, Hamim S [17]	*Risk Factors of Lymphatic Filariasis in West Sumatera Province, Indonesia, 2010*	2014 *Case control study*	91 case sample and 91 control sample	There is a correlation between the use of bed nets (p-value = 0.002) and the use of wire netting for ventilation (p-value = 0.023) with the incidence of filariasis in West Sumatra Province, while the use of anti-mosquito repellent (p-value = 0.500) and the habit of not leaving the house at night (p-value = 0.226) is not correlated with the incidence of filariasis.

Table 2. Continued

9	Santoso, Aprioza Yenni, Reni Oktarina, Tri Wurisastuti [16]	Efektivitas Pengobatan Massal Filariasis Tahap II Menggunakan Kombinasi DEC dengan Albendazole terhadap Prevalensi Brugia Malayi	2015 *Cross sectional study*	1.209 sample	There is a correlation between the practice of taking POPM drugs (p-value = 0.048) and the incidence of filariasis in East Tanjung Jabung district.
10	Zainul Ikhwan, Lucky Herawati, Suharti [24]	Faktor Lingkungan, Perilaku, dan Kejadian Filariasis di Kabupaten Bintan, Kepulauan Riau	2016 *Case control study*	33 case sample, 65 control sample	There is a correlation between gauze on ventilation (p-value = 0.048), use of bed nets (p-value = 0.036) and the incidence of filariasis, while the use of mosquito repellent (p-value = 0.195), the habit of not going out at night (p-value = 0.086) not related to the incidence of filariasis in Bintan district, Riau Archipelago.
11	Rahayu Hasti Komaria, H.A Fickry Faisya, Elvi Sunarsih [10]	Analisis Determinan Lingkungan Fisik dan Perilaku Preventif terhadap Case Filariasis di Kecamatan Talang Kelapa dan Kecamatan Sembawa Kabupaten Banyuasin	2016 *Case control study*	29 case sample and 58 control sample	There is a correlation between the habit of not leaving the house at night (p-value = 0.038) and the incidence of filariasis, while the use of wire net for ventilation (p-value = 0.530) and the practice of taking POPM medication (p-value = 0.763) are not correlated with the incidence filariasis in Talang Kelapa and Sembawa sub-district, Banyuasin district.
12	Kristian Yudhianto, Lintang Dian Saraswati, Praba Ginandjar [25]	Faktor Risiko Kejadian Filariasis Kecamatan Tirto, Kabupaten Pekalongan	2017 *Cross-sectional study*	18 persons with positive microfilariae and 54 persons with negative microfilariae	There is a correlation between the use of bed nets (p-value = 0.039) and the incidence of filariasis in Tirto sub-district, Pekalongan district.
13	Wary Purnama, Nurjazuli, Mursid Raharjo [19]	Faktor Lingkungan dan Perilaku Masyarakat yang Berhubungan dengan Kejadian Filariasis di Kecamatan Muara Pawan, Kabupaten Ketapang, Provinsi Kalimantan Barat	2017 *Case control study*	32 case sample and 32 control sample	There is a correlation between the habit of not leaving the house at night (p-value = 0.043) and the incidence of filariasis in Muara Pawan sub-district, Ketapang district, West Kalimantan Province, while the use of mosquito repellent (p-value = 0.497) and the use of wire net ventilation (p-value = 0.364) were not correlated with the incidence of filariasis.
14	Suryo Sularno, Nurjazuli, Mursid Raharjo [18]	Faktor-Faktor yang Berhubungan dengan Kejadian Filariasis di Kecamatan Buaran, Kabupaten Pekalongan	2017 *Case control study*	37 case sample and 37 control sample	There is a correlation between the habit of not leaving the house at night p-value = 0.020) and the practice of taking POPM medication (p-value = 0.002) with the incidence of filariasis in Buaran sub-district, Pekalongan district, while the use of bed nets (p-value = 1.000), the use of mosquito repellent (p-value = 1.000) and the use of wire net ventilation (p-value = 0.786) are not correlated with the incidence of filariasis.
15	Sandra Dewi Lestari, Sofwan Indarjo [26]	Analisis Pengetahuan, Sikap, dan Praktik Pencegahan Filariasis di Kelurahan Kertoharjo Kota Pekalongan tahun 2016-2017	2017 Studi Deskriptif	35 sample	There is a correlation between the use of mosquito repellent (p-value = 0.001) and the use of bed nets (p-value = 0.001) with the incidence of filariasis, while the habit of not leaving the house at night (p-value = 0.841) is not correlated with the incidence of filariasis in the Kertoharjo Urban village, Pekalongan city in 2016-2017.
16	Yehud Maryen, Hari Kusnanto, Citra Indriani [27]	*Risk Factors of Lymphatic Filariasis in Manokwari, West Papua*	2017 *Case control study*	72 case sample and 72 control sample	There is a correlation between the use of bed nets (p-value = 0.002) and the incidence of filariasis in Manokwari, West Papua, while the habit of not leaving the house at night (p-value = 0.010) is not correlated with the incidence of filariasis.
17	Eti Kurniawati, Sugiarto, Teguh Prastyo [28]	Faktor Risiko Kejadian Filariasis di Wilayah Kerja Puskesmas Sabak Barat Kabupaten Tanjung Jabung Timur Provinsi Jambi tahun 2017	2018 *Case control study*	51 case sample and 51 control sample	There is a correlation between the use of mosquito repellent (p-value = 0.015), the use of wire net ventilation (p-value = 0.003), and the habit of not leaving the house at night (p-value = 0.047) with the incidence of filariasis.

Table 2. Continued

18	Yusuf Lensa Hamdan, Suharyo Hadisaputro, Ari Suwondo, Muchlis AU Sofro, Sakundarno Adi [29]	Faktor Lingkungan dan Perilaku yang Berpengaruh terhadap Kejadian Filariasis di Daerah Endemis Kota Pekalongan	2019 *Case control study*	40 case sample and 40 control sample	There is a correlation between the use of bed nets (p-value = 0.000), the use of mosquito repellents (p-value = 0.000), the habit of not leaving the house at night (p-value = 0.003) and the incidence of filariasis in endemic areas of Pekalongan City.
19	Marhtyni, Nismawati Natsir, Nur Intan [9]	Faktor yang Berhubungan dengan POMP Filariasis terhadap Penurunan Prevalensi Mikrofilaria Pasca Pengobatan Massal Tahun ke 5 di Kecamatan Buntu Batu, Kabupaten Enrekang	2019 *Cross sectional study*	257 sample	There is a correlation between the practice of taking POPM medication (p-value = 0.044) and a decrease in the prevalence of microfilariae in Buntu Batu sub-district, Enrekang district.
20	Luthfia Resi Puspaningrum, Elvi Sunarsih [30]	Risk Factor Analysis: Filariasis Events in Sembawa Public Health Center Area at Banyuasin District in 2019	2020 *Case control study*	11 case sample and 22 control sample	There is a correlation between the habit of not leaving the house at night (p-value = 0.050) and the incidence of filariasis, while the use of wire net ventilation (p-value = 0.475), the use of mosquito repellent (p-value = 0.524), and the use of bed nets (p-value = 0.469) not related to the incidence of filariasis at the Sembawa Health Center, Banyuasin district.
21	Fitra Juwita, Widya Hary Cahyati, Ari Yuniastuti [31]	Risk Factors of Filariasis in Brebes Regency	2020 *Case control study*	32 case sample and 32 control sample	There is a correlation between the use of wire net ventilation (p-value = 0.002) and the incidence of filariasis in Brebes district.
22	Agus Rahmat, Devi Rahmayanti, Kurnia Rachmawati [32]	Faktor-Faktor yang Berhubungan dengan Kejadian Filariasis di Kabupaten Barito Kuala	2020 *Case control study*	15 case sample and 30 control sample	There is a correlation between the use of bed nets (p-value = 0.015) and the use of wire net ventilation (p-value = 0.011) with the incidence of filariasis in Barito Kuala district, while the use of mosquito repellent (p-value = 0.441) is not correlated with the incidence of filariasis.
23	Rizka Sofia, Cut Sidrah Nadira [33]	Analisis Risiko Penularan Filariasis Limfatik di Kabupaten Aceh Utara	2020 *Case control study*	67 case sample and 67 control sample	There is a correlation between the use of bed nets (p-value = 0.001), the use of mosquito repellent (p-value = 0.001), and the use of wire netting for ventilation (p-value = 0.001) the incidence of filariasis in North Aceh District, while the habit of not leaving the house at night (p-value = 0.730) is not correlated with the incidence of filariasis.
24	Paul E. Simonsen, Erling M. Pedersen, Rwehumbiza T. Rwegoshora, Mwelecele N. Malecela, Yahya A. Derua, Stephen M. Magesa [20]	Lymphatic Filariasis Control in Tanzania: Effect of Repeated Mass Drug Administration with Ivermectin and Albendazole on Infection and Transmission	2010 *Cross-sectional study*	1.112 residents ≥ 1 year in Kirare.	There is a correlation between the practice of taking MDA medication from the first to second survey (p-value < 0.001), the second to third survey (p-value < 0.001), and the third to fourth survey (p-value = 0.002) with a decrease in microfilariae, while the fourth survey to fifth (p-value = 0.14) were not correlated with a decrease in microfilariae.
25	Alexis Boyd, et al [34]	A community-Based Study of Factors Correlated with Continuing Transmission of Lymphatic Filariasis in Leogane, Haiti	2010 *Cluster Survey*	455 residents in Leogane, Haiti	There is a correlation between the practice of taking MDA medication (p-value = 0.004) and the status of filariasis infection in Leogane, Haiti.
26	Suryanaryana Murty Upadhyayula, et al [35]	A Cohort Study of Lymphatic Filariasis on Socio Economic Conditions in Andhra Pradesh, India	2012 Cohort study	5.394 residents in 30 Village in Karimnagar district, India	There is a correlation between the practice of taking MDA medication (p-value <0.001) and the incidence of filariasis.

Table 2. Continued

27	Ramakrishna U. Rao, et al [36]	A Comprehensive Assessment of Lymphatic Filariasis in Sri Lanka Six Years after Cessation of Mass Drug Administration	2014 *Cross-sectional study*	Elementary school children in grades 1 and 2 in 19 sentinel areas in 8 districts (350 elementary schools per sentinel area)	There is a correlation between the use of bed nets (p-value = 0.012) and the practice of taking MDA medication (p-value = 0.001) with low levels of filariasis antigen.
28	Paul E. Simonsen, et al [37]	Lymphatic Filariasis Control in Tanga Region, Tanzania: Status After Eight Rounds of Mass Drug Administration	2014 *Cross-sectional study*	Elementary school children and communities in 7 districts in Tanga with 200 elementary school children in 2-3 spot areas and 200 residents in 1-2 spot areas in each district.	There is a correlation between after administration of MDA drugs for 8 rounds in the 7th-8th survey (p-value = 0.009) and in the 8th-9th survey (p-value <0.001) with a decrease in Circulating Filarial Antigen (CFA).
29	Christopher L. King, et al [21]	A Trial of a Triple-Drug Treatment for Lymphatic Filariasis	2018 *Controlled Trial*	182 samples aged 18-65 years from 12 villages in Dreikikir District, East Sepik Province, Papua New Guinea.	There is a correlation between the practice of taking MDA drugs in 3 drug regimens compared to giving a single dose of 2 drug regimens (p-value = 0.02) and giving 3 drug regimens is not better than giving 2 drug regimens once a year for 3 years (p-value = 0.004) with the incidence of filariasis.
30	Cédric B. Chesnais, et al [38]	Risk Factors for Lymphatic Filariasis in Two Villages of the Democratic Republic of the Congo	2019 *Community Survey*	820 samples aged ≥ 5 tahun	There is a correlation between the practice of taking MDA medication (p-value = 0.001) and the incidence of filariasis, while the use of bed nets (p-value = 0.468) is not correlated with the incidence of filariasis.