

Meta analysis: Relationship of behavior on the use of nets and the use of anti-mosquito medicine with the incidence of malaria

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Keywords

Behavior of using mosquito nets
Behavior of using anti-mosquito drugs
Malaria incidence

Received: 10 January 2025

Accepted: 12 March 2025

Published: 25 May 2025

Abstract

Intestinal sickness is one of the maladies talked about and characterized within the Sustainable Development Objectives (SDGs) understanding. Based on the Proclamation of the Government of the Republic of Indonesia Number: 293/MENKES/SK/IV/2009 dated 28 April 2009 the target of malaria eradication in Indonesia is 2030. One of the components that play an imperative part in intestinal sickness transmission is behavior in an exertion to anticipate intestinal sickness in intestinal sickness endemic regions. This paper points to analyze the relationship between the behavior of utilizing mosquito nets and the utilization of mosquito repellent with the frequency of malaria. This study considers a meta-analysis paper with a review observational strategy. Information collection was carried out by analysts by browsing diaries utilizing the Google Scholar information base distributed within the final 5 years and analyzed utilizing Audit Director Adaptation 5.4. The results of 915 studies about malaria agree to the consideration and prohibition criteria were obtained as numerous as 9 diaries. In the behavioral variable using mosquito nets, 9 articles were analyzed with the combined effect size results that there was a relationship between the behavior of using mosquito nets and the incidence of malaria with p -value = 0,00001 and OR = 3,89 (CI 2,32-4,19). In the behavioral variable using mosquito repellent, 6 articles were analyzed with the results of the combined effect size that there was a relationship between the behavior of using mosquito repellent and the incidence of malaria with p -value = 0,25 and OR = 3,89 (CI 2,61-5,79). In conclusion, there is a relationship between the behavior of using mosquito nets and the incidence of malaria and there is a relationship between the behavior of using mosquito repellent and the incidence of malaria.

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I. INTRODUCTION

Malaria is still a world issue, particularly in creating nations so that intestinal sickness is included in one of the focuses talked about and stipulated within the Sustainable Development Objectives (SDGs) agreement, malaria is included within the fifth point of the third objective, to be specific guaranteeing a solid life by finishing the scourge. Malaria, tuberculosis, intestinal sickness and ignored tropical maladies, and combat hepatitis, waterborne infections and other irresistible infections by 2030 [1].

Malaria elimination in 2030 in Indonesia based on the Declaration of the Government of the Republic of Indonesia Number: 293/MENKES/SK/IV/2009 dated 28 April 2009, the accomplishment of end at the district/city level in 2019 was 300 districts/cities. In the 2020-2024 National Strategic Plan for the elimination phase there is a change in the Time Line for malaria

elimination, namely Java and Bali Region, Sumatra, NTB and Sulawesi Region in 2023, Kalimantan and North Maluku Region in 2027, NTT and Maluku Regional in 2028 and Papua Region West and Papua in 2029 [2].

Malaria endemicity distribution map per district/city with high endemic malaria is still concentrated in eastern Indonesia, namely in Papua, West Papua and NTT Provinces and only one province outside the eastern region still has high endemic districts, namely East Kalimantan Province in North Penajam Paser Regency bordering directly with Tabalong Regency [3]. Factors that influence the spread of malaria in Indonesia are behavioral, socio-cultural, physical, chemical, and biological environmental factors. There is an influence between the type of work (gardening, fishermen and laborers working at night) with the incidence of malaria [4]

Prevention of malaria in general that needs to be done includes

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three things, namely education or counseling, chemoprophylaxis and preventive measures against mosquito bites. Environmental modification is useful in reducing *Anopheles* mosquito breeding habitat in the form of improving the drainage system so as to reduce standing water, removing reeds or shrubs and mangroves on the beach, repairing riverbanks to facilitate river flow, eliminating mosquito breeding places such as cans, bathtubs, used tires, cover leaking roofs and tiles and others. Another prevention that can be done is to use insecticides that can be sprayed indoors or coated on mosquito nets [5]. Factors that support the rapid transmission of malaria are poor community behavior such as exercises exterior the domestic at night, resting without a mosquito net and not utilizing mosquito repellent moisturizer whereas resting, hanging utilized dress within the house [6]. According to Murray and Lopez (1996), that there is a change in the percentage of risk factors that affect health status proposed by HL Blum (1988), behavioral factors have the largest proportion, namely 50 percent in influencing health, based on this researchers are interested in examining journals about behavior related to the frequency of jungle fever, to be specific the behavior of utilizing mosquito nets and the behavior of utilizing mosquito repellent.

From the comes about of the beginning ponder by analyzing a few literary works within the frame of investigate diaries on the relationship between the behavior of utilizing mosquito nets and the rate of jungle fever, it was found that from 6 inquire about diaries that bolstered the relationship between the behavior of utilizing mosquito nets and the rate of jungle fever, the [1, 7, 8, 9]. while the research that does not support there are 3 articles, namely the research of [10].

Other research on the behavior of using mosquito repellent, there are 4 supporting articles, namely the [11, 10]. The realities of the investigate crevice of investigate comes about related to components related to the frequency of jungle fever will be mapped and analyzed through meta-analysis. Inquire about with meta-analysis could be a strategy utilized to summarize the discoveries of two or more ponders with the point of combining, looking into and summarizing past investigate. In expansion, by utilizing meta-analysis, different questions can be examined based on information that has been found from the comes about of past ponders that have been distributed and one of the prerequisites required in conducting a meta-analysis is an appraisal of the comes about of comparative inquire about.11

II. METHOD

This think about employments a meta-analysis inquire about plan with a relationship meta-analysis approach. The types and methods used by researchers to conduct quantitative test-

ing are based on research articles that have been published in scientific journals. Meta-analysis is utilized to analyze experimental thinks about that have been carried out by past analysts, quantitative investigate comes about, research results in a form that can be compared such as mean, correlation coefficient and odds-ratio.

The stages of the research, namely:

A. Identify research questions

Identification of research questions is a question that is used as a basis for conducting a review.

Research protocol

The inquire about convention could be a nitty gritty arranging that incorporates the scope of the ponder, strategies, criteria for evaluating quality (consideration and avoidance criteria), the scale of the inquire about to be carried out.

B. Search strategy

The look technique is carried out alluding to the convention that has been made and decides the area or source of the Google Researcher database for looking information.

Data extraction

Information extraction can be carried out after the convention handle has been carried out utilizing the PRISMA strategy.

Data synthesis

Synthesize results using meta-analysis techniques (forest plot). The populace in this think about were articles or national diaries related to the inquire about title, to be specific the behavior of utilizing mosquito nets and the utilize of mosquito repellent with the frequency of intestinal sickness. The inquire about test comprised of 9 inquire about articles related to the relationship of behavior utilizing mosquito nets and 6 investigate articles relating to the relationship between utilizing mosquito repellent and the frequency of intestinal sickness in understanding with foreordained consideration criteria. The strategy of deciding the test by selecting a test among the populace agreeing to the criteria decided by the imminent analyst so that the test can speak to the characteristics of the populace that have been known already. The free factors in this ponder were the behavior of utilizing mosquito nets and utilizing mosquito repellent. Whereas the subordinate variable is the frequency of intestinal sickness. In the fixed effects model it is assumed that the variability among various studies is solely based on the opportunity factor; This means that if the research is carried out indefinitely, the same result will be obtained. In this model, inter-study variability is ignored or considered non-existent, there is only

intra-study variability in the form of variability based on chance factors.

III. RESULT AND DISCUSSION

A. Meta-analysis of the relationship between the use of mosquito nets and the incidence of malaria

The combined investigate articles produced to 9 articles to analyze the relationship between the behavior of utilizing mosquito nets and the rate of jungle fever, comprising of 6 articles which expressed that they were related and 3 articles which expressed that they were not related. The taking after are the comes about of the meta-analysis of the relationship between the behavior of utilizing mosquito nets and the frequency of jungle fever:

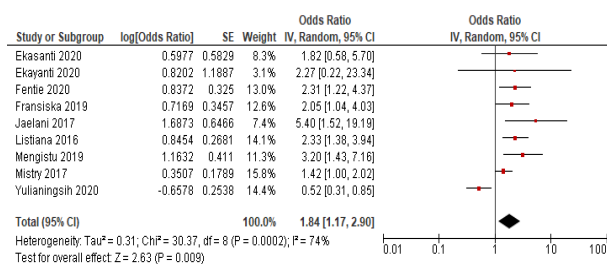


Fig. 1. Forest plot inquire about think about of the relationship between the behavior of utilizing mosquito nets and the rate of intestinal sickness

Figure 1 appears the comes about of information investigation from 9 articles that look at the relationship between the behavior of utilizing mosquito nets and the frequency of jungle fever. The comes about of the examination of the information shown on the woodland plot appear that there's a relationship between the behavior of utilizing mosquito nets and the rate of jungle fever with a p esteem of. The comes about of the information investigation of this ponder demonstrate that there's a relationship between the utilize of mosquito repellent and the rate of intestinal sickness, the comes about gotten are p -OR = 3,89 with 95% certainty interim: 2,61 to 5,79. The combined impact too brought about in a Z esteem of 6,68 and a p esteem of $< 0,00001$. Factually, the combined impact is critical in the event that the p esteem with a tendency for people who do not use mosquito repellent behavior to increase the risk 3,89 times. suffer from malaria compared to people with the behavior of using mosquito repellent.

Six considers analyzed utilizing Revman can be seen that based on the pipe plot there's distribution predisposition. This clarifies that the analyzed considers have a decently wide information variety where within the think about it can be seen that the most elevated impact measure is 6,80 (95% CI 3,00-15,41) and the least is 1,00 (95% CI 0,20-5,05), this clarifies that the variety within the information within the analyzed considers appears

that there's a critical contrast. The higher the heterogeneity, the more extensive the certainty interim, and conversely, the lower the heterogeneity, the narrower the confidence interval. Even though there is a publication bias, the heterogeneity of the research is still moderate, this is because there is one study, namely the Sari research (2016) which produces an effect size value of p OR = 1,000 even though the number of samples is large but the results of the research show an unbalanced behavior trend resulting in a p OR = 1,000. Based on the analysis of the articles included in this meta-analysis, of the 6 articles analyzed, there were 4 articles with a small effect size value between 0,15-0,40 and 2 articles having a high effect size value with a value range of 0,75-1,10. Based on the effect size value of each article, it shows that the effect size value is not too varied so that the analysis uses a fixed effect model, which means that the effect size value of each article does not have a significant difference.

B. Meta analysis of the relationship between the Use of anti-mosquito drugs and the incidence of Malaria

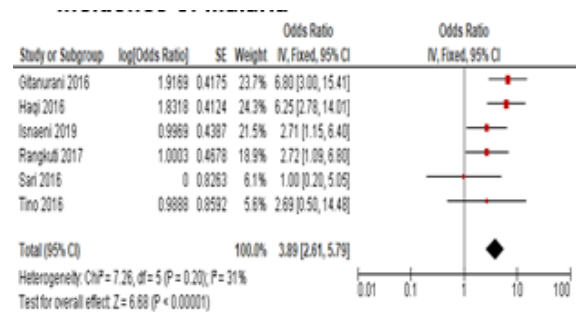


Fig. 2. Forest plot inquire about think about of the relationship between the behavior of utilizing mosquito nets and the rate of intestinal sickness

Based on Figure 2 appears the comes about of information examination from 6 articles that look at the relationship of behavior utilizing mosquito repellent with the rate of jungle fever. The comes about of the examination of the information shown on the timberland plot appear that there's a relationship between the behavior of utilizing mosquito repellent and the rate of intestinal sickness with a p esteem of. The comes about of the information examination of this ponder show that there's a relationship between the utilize of mosquito repellent and the rate of intestinal sickness, the comes about gotten are p -OR = 3,89 with 95% certainty interim: 2,61 to 5,79. The combined impact moreover brought about in a Z esteem of 6,68 and a p esteem of $< 0,00001$. Measurably, the combined impact is noteworthy in the event that the p esteem the null hypothesis is rejected, in other words there is a relationship between the use of mosquito repellent and the incidence of malaria with a ten-

dency for people who do not use mosquito repellent behavior to increase the risk 3,89 times. suffer from malaria compared to people with the behavior of using mosquito repellent. Six ponders analyzed utilizing Revman can be seen that based on the pipe plot there's distribution inclination. This clarifies that the analyzed thinks about have a decently wide information variety where within the ponder it can be seen that the most elevated impact estimate is 6,80 (95% CI 3,00-15,41) and the least is 1,00 (95% CI 0,20-5,05), this clarifies that the variety within the information within the analyzed thinks about appears that there's a noteworthy distinction. The higher the heterogeneity, the more extensive the certainty interim, and on the other hand, the lower the heterogeneity, the smaller the certainty interim. Even though there is a publication bias, the heterogeneity of the research is still moderate, this is because there is one study, namely the Sari research (2016) which produces an effect size value of $p\ OR = 1,000$ even though the number of samples is large but the results of the research show an unbalanced behavior trend resulting in a $p\ OR = 1,000$. Based on the examination of the articles included in this meta-analysis, of the 6 articles analyzed, there were 4 articles with a little impact estimate esteem between 0,15-0,40 and 2 articles having a tall impact measure esteem with a esteem extend of 0,75-1,10. Based on the impact measure esteem of each article, it appears that the impact estimate esteem isn't as well shifted so that the investigation employments a fixed effect show, which implies that the impact measure esteem of each article does not have a critical distinction.

Based on the results obtained in the meta-analysis, it can be seen that the risk factors/trends associated with the incidence of malaria from the 2 variables studied were the behavior of using mosquito nets and the use of mosquito repellents, both of which were associated with the incidence of malaria. It is a fact that occurs in the community that the use of insecticide-treated mosquito nets is better than non-insecticided mosquito nets, but it is necessary to ensure that the community gets sufficient information on its use, for example there are practical instructions on how to use insecticide-treated mosquito nets in every

mosquito net package. There were many complaints from the public about the smell of medicine from insecticide-treated mosquito nets because the proper procedure was not carried out, including the size of the mosquito nets that were too small for some family members who used them, so an innovation from the Health Service was needed to make two mosquito nets into one large mosquito net. In addition, the pattern of using mosquito nets in the community is that they only use it when they can't sleep because many mosquitoes bite but when they don't feel disturbed by mosquitoes because they are used to it and feel hot inside the mosquito net they prefer to sleep without using a mosquito net. The use of mosquito repellent is a common thing in the community, but most of them use it only when going out of the house or in the garden at night so that the exposed body parts are not attacked by mosquitoes. But when at home they rarely use and more often use a fan or only use a sarong/blanket to cover their bodies while sleeping.

IV. CONCLUSION

Based on the comes about of the investigation and discourse, the taking after conclusions can be drawn:

1. There's a critical relationship between the behavior of utilizing mosquito nets on the rate of jungle fever through an investigation of 9 diaries that meet the prerequisites with a $p\ esteem < 0,05$, to be specific $p < 0,00001$ and a pooled chances proportion esteem of 3,12 (95% CI 2.32 - 4.19), so that it can be concluded that individuals who don't utilize mosquito nets have a 3,12 times chance of getting jungle fever compared to individuals who have the behavior of utilizing mosquito nets.
2. There's a noteworthy relationship between the behavior of utilizing mosquito repellent and the rate of jungle fever through an investigation of 6 diaries that meet the prerequisites with a $p\ esteem < 0,05$, specifically $p < 0,00001$ and a pooled chances proportion esteem of 3,89 (95% CI 2.61 – 5.79), so it can be concluded that individuals who don't utilize mosquito repellent have a 3,89 times chance of getting intestinal sickness compared to individuals who have the behavior of utilizing mosquito repellent.

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