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Analysis of malaria control program implementation at the Riau Provincial Health Office

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Abstract

Background: The emergence of malaria outbreaks (Extraordinary Events/KLB) in certified elimination areas in Riau Province highlights persistent programmatic challenges. This study aims to assess the implementation of the malaria control program at the Riau Provincial Health Office, identify key barriers, and propose recommendations to enhance program effectiveness.
Method: This study used a qualitative descriptive design with data collection through in-depth interviews, field observations, and analysis of related documents. Data analysis was carried out using a problem-solving cycle approach and Fishbone diagrams to identify the root causes of the problem.
Results: Showed that the main obstacles in program implementation included low public awareness, limited budget, suboptimal policy implementation, and inadequate cross-sector coordination. The recommendations produced include increasing cross-sector collaboration, technical training for program holders, forming budget policy, intensive education and active community involvement, also strengthening sanitation infrastructure.
Conclusion: The malaria control program in Riau Province requires a sustainable strengthening strategy to maintain malaria elimination status, especially with a community-based approach and increased multi-sector coordination.

Keywords: Malaria; Control Program; Elimination; Public Health; Riau

INTRODUCTION

Malaria is a tropical disease that remains a public health threat worldwide, especially in developing countries. This disease is caused by the Plasmodium parasite which is transmitted through the bite of the Anopheles mosquito. According to a 2023 World Health Organization (WHO) report, there were 249 million cases of malaria worldwide, with 2% of cases occurring in Southeast Asia, including Indonesia. The impact of malaria extends beyond morbidity and mortality to economic, social, and labor productivity losses in endemic areas (1)

In Indonesia, malaria remains a major public health concern. According to data from the Indonesian Ministry of Health in 2023, malaria incidence increased by 30% compared to the previous year, with more than 443,530 positive cases. In an effort to control this disease, the government has set a national malaria elimination target by 2030 through Minister of Health Regulation Number 22 of 2022. This strategy includes vector control, strengthening surveillance, and providing effective therapy, which is aligned with the Sustainable Development Goals (SDGs) targets (2,3). The introduction consists of the urgency of the research, supporting facts from previous studies, gap analysis, the novelty of the research, and research objectives. Written in one chapter without subtitles. At the end of the paragraph, the research objectives are made.

Riau Province is one of the regions that has achieved malaria elimination status in all districts/cities. This is an important achievement that demonstrates the successful implementation of the malaria elimination policy. However, challenges remain in maintaining this status. The extraordinary malaria outbreak (KLB) that occurred in Rokan Hilir and Indragiri Hilir Regencies in 2024 indicates the need to strengthen the elimination maintenance strategy (4). This situation demonstrates that

malaria elimination is not the end goal, but rather an ongoing process that requires dynamic evaluation and policy adaptation (5).

Several factors contributed to the emergence of malaria outbreaks in Riau. Low public awareness of malaria prevention, such as the use of insecticide-treated bed nets also practicing clean and healthy living (PHBS), is a major obstacle. Furthermore, limited resources, such as budgets, communication media, and cross-sector collaboration, also hamper the optimization of malaria control programs. This is exacerbated by geographical challenges and difficult accessibility in some rural areas of Riau (6).

This study was conducted to analyze the implementation of the malaria control program at the Riau Provincial Health Office, focusing on identifying key issues and developing of improvement strategies. A descriptive qualitative approach was used to understand the complexity of program implementation and uncover the root causes of the various obstacles encountered. Empirical data-based analysis is needed to evaluate the sustainability of elimination programs, especially in the context of local social, geographic, and policy dynamics (7).

In addition to evaluating the implementation of existing programs, this research also aims to generate practical recommendations that can be implemented by policymakers. These recommendations include strengthening human resource capacity, increasing budgets, providing sanitation infrastructure, and local communities involvement. Therefore, the research findings are expected to serve as a reference for developing more adaptive and effective policies to manage malaria challenges in the future (8).

This research is expected to develop improved management strategies to maintain malaria elimination in Riau Province. The resulting recommendations are not only relevant to Riau but can also be applied to other regions facing similar challenges. With a collaborative and evidence-based approach, sustainable malaria elimination can be achieved as part of efforts to improve the overall health of the Indonesian people.

METHOD

This study used a descriptive qualitative design to analyze the implementation of the malaria control program at the Riau Provincial Health Office. This design was chosen to gain a deeper understanding of the situation, identify problems, and develop evidence-based recommendations. Data were obtained through in-depth interviews with key informants, namely the head of the Disease Prevention and Control division, the head of the Infectious Disease Prevention and Control section, and the malaria program holder. Data were also collected through direct observation at residency locations and document reviews, including the Riau Provincial Health Profile, government agency performance reports, and malaria-related policies.

Data processing was conducted using a problem-solving cycle approach, encompassing situation analysis, problem identification, and prioritization using the Urgency, Seriousness, Growth (USG) method with matrix-based. In-depth analysis was conducted using Fishbone (Ishikawa) diagram to identify the root causes of the problem. Data validity is maintained through triangulation method by combining the results of interviews, observations, official documents and also peer debriefing on January 2025. This research process took place from November to December 2024 at the Riau Provincial Health Office, which geographically has unique challenges related to the accessibility and distribution of health resources.

RESULTS

Based on the results of observations and interviews, several main problems were found. First, the low level of public awareness in malaria prevention, such as the use of insecticide-treated mosquito nets also clean and healthy living behaviors (PHBS). Second, limited funding for malaria elimination maintenance programs, including net procurement and health promotion activities. Third, policy implementation is not yet optimal, including limited cross-sectoral coordination. Geographical factors also pose

a barrier, particularly in remote areas difficult to reach by health programs (9,10)

Selecting priority problems using the USG method, the malaria outbreak problem in Rokan Hilir and Indragiri Hilir Districts has the highest score, so it is the main priority for handling. This problem was identified as a result of several factors, including low public awareness, limited communication media, and a lack of cross-sector coordination. A fishbone (Ishikawa) diagram was used to map the root causes of the problem in depth (8).

Based on the situation analysis and identified root causes, an intervention plan was designed to address the key constraints identified.

Table 1. Determining Problem Priorities

No.	Problems	U	S	G	Scoring	Priority
1	Malaria Outbreak cases in Riau Province	5	5	4	14	1
2	Chikungunya outbreak cases in Riau Province	4	4	4	12	2
3	Dengue Fever outbreak cases in Riau Province	4	3	4	11	3
4	Hepatitis A outbreak case in Riau Province	3	4	3	10	4
5	Pertussis outbreak cases in Riau Province	3	3	3	9	5

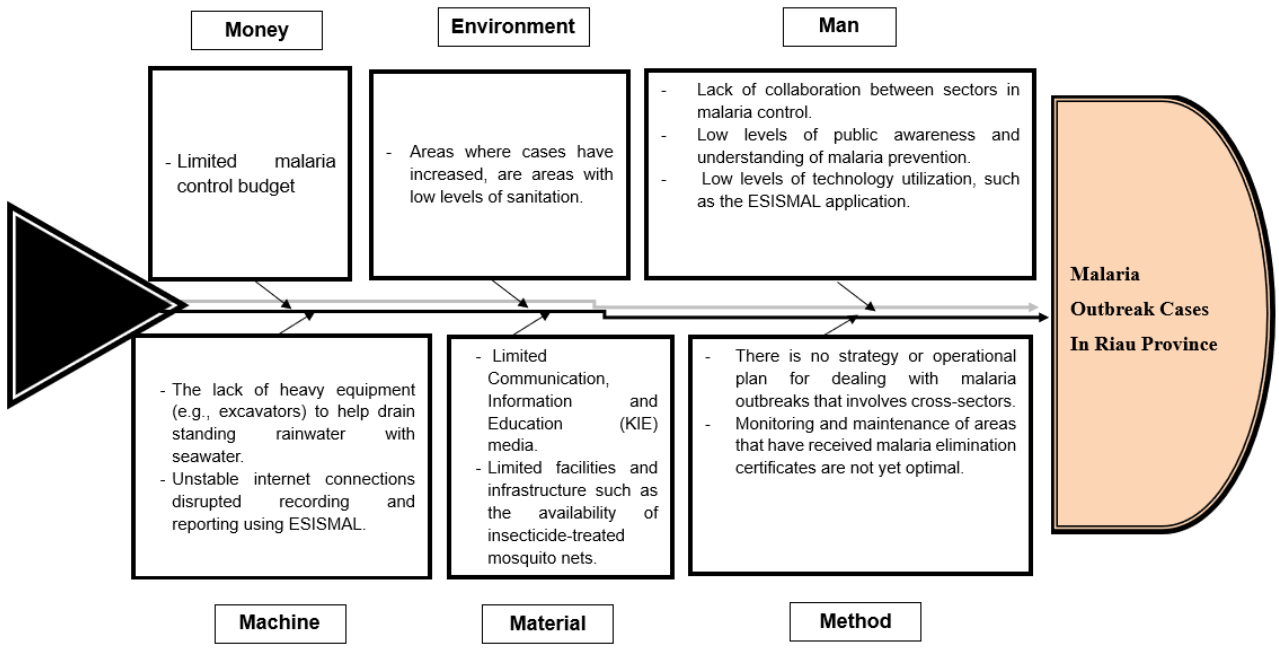

Figure 1. Fishbone Diagram (Ishikawa Analysis) of the Causes of Malaria Outbreaks in Riau Province

Human Resource Capacity Building and Cross-Sector Coordination: Based on the fishbone diagram problem analysis in the "Man" aspect, the formation of a cross-sector team involving various sectors within the Health Office, local governments, and community organizations is necessary. Technical training on the use of the ESISMAL application for digital recording and reporting of malaria programs also needs to be conducted. This capacity building will enable the program to run more efficiently and generate more accurate data (11)

Strengthening Operational Policies and Strategies: Based on the analysis of the fishbone diagram problem in the Method and

Environment aspects, local governments need to develop specific operational strategies to address malaria outbreaks, involving various sectors such as education, transportation, and the private sector. Routine monitoring and evaluation in districts/cities that have received elimination certificates must also be carried out to ensure that malaria-free status is maintained (8).

Provision of Resources and Budget: Based on the analysis of the fishbone diagram problem in the Money and Material aspects, budget limitations are one of the main obstacles that hinder program implementation. Increasing funding allocation through advocacy with policymakers can help procure insecticide-treated mosquito nets, educational media, and sanitation infrastructure in vulnerable areas. Collaboration with the private sector can also support the provision of logistical needs (12).

Increasing Community Awareness and Participation: Based on the fishbone diagram problem analysis in the Market aspect, health promotion activities need to be increased, both through print, electronic, and social media. Intensive community education on the importance of PHBS and the use of insecticide-treated mosquito nets can reduce the risk of malaria transmission. The involvement of local community leaders is also important to build trust and increase community participation (9).

Sanitation Infrastructure and Technology Improvement: Based on the fishbone diagram problem analysis in the Environment and Machine aspects, the provision of sanitation facilities such as waste disposal systems, communal toilets, and waterlogging management need to be prioritized. On the other hand, the use of technology such as Very Small Aperture Terminals (VSAT) can improve connectivity in remote areas to facilitate recording and reporting using ESISMAL (13).

DISCUSSION

The research results show that the success of malaria elimination depends not only on achieving certification, but also on ongoing maintenance efforts. Key factors such as cross-sector coordination, community engagement, and policy support must be continuously strengthened. Regular program evaluation, coupled with increasing the technical capacity of human resources, can prevent future outbreaks. In addition, the use of technology such as ESISMAL for recording and reporting malaria data can increase the efficiency of program management (8).

Human Resource Capacity Building and Cross-Sector Coordination

The formation of a cross-sectoral team involving various divisions within the Health Office, local governments, and community organizations aims to enhance inter- and cross-sectoral collaboration in malaria control. This synergy between officers creates malaria prevention and control activities based on epidemiological and entomological data, thereby breaking the chain of transmission (6).

This was also implemented in Garut Regency to accelerate malaria elimination, involving cross-sectoral coordination involving various sectors such as education, agriculture and fisheries, forestry, public works, the Regional Development Planning Agency (BAPPEDA), and other institutions. Synergy between the health sector and the local government, as policymakers, is key to ensuring optimal intervention strategies and supporting malaria elimination efforts in Garut Regency (14).

Based on research on the analysis of the implementation of the electronic malaria surveillance information system (ESISMAL) in Lahat Regency, the competence of officers in using the application influences the success of the program. Therefore, training that includes hands-on practice is essential. Staff with extensive experience in malaria programs should also receive refresher training on basic malaria training (11).

Strengthening Health Policy and Operational Strategy

In terms of strengthening operational policies and strategies, making a proposal for a strategy or special operational plan for malaria outbreak management involving cross-sectors aims to provide clear steps in managing malaria outbreaks across sectors.

The strategy or operational plan contains policies that can be implemented into Regional Regulations/Regent Regulations, the involvement of Regional Apparatus Organizations (OPD)/cross-sector government or private entities as needed in malaria control (e.g., the fisheries office, forestry and plantation office, PUPR office, and education office), vector control management, reporting flow and management of malaria cases, and the budget used (6,15).

Operational strategies or plans can be implemented by strengthening malaria elimination programs and local-based curative approaches, including preventive measures (vector control by spraying house walls (IRS), using insecticide-treated mosquito nets, and spreading larvicides, environmental control by closing potential mosquito breeding sites and spreading larvae-eating fish seeds, these environmental control measures can be implemented in collaboration with the fisheries, forestry, and plantation services as well as the PUPR service, then protecting oneself from mosquito bites by using closed clothing, sleeping using insecticide-treated mosquito nets, using repellents, and avoiding visiting places with high malaria transmission) and curative measures (treatment using artemisinin combination therapy/ACT, rapid diagnostic test/RDT, administering ACT drugs to malaria-positive patients, and close monitoring of patients with ACT). Furthermore, strengthening the malaria information system through community empowerment by conducting outreach and counseling to the community regarding malaria and actively involving the community as an information medium. And finally, strengthening the commitment and coordination of the central and regional governments in the sustainability of program implementation is carried out by having good and clear coordination between the health service and the local government, as well as modifying the environment and building partnerships with the community to clean up mosquito breeding sites (16).

Furthermore, annual monitoring and evaluation of districts/cities that have received malaria elimination certificates aims to ensure that they are optimally implementing the maintenance phase. Monitoring and evaluation activities are conducted to assess the extent to which malaria control objectives in maintenance phase areas are being achieved and to identify gaps between expectations (targets) and reality (implementation) (17). Regular monitoring and evaluation play an important role in ensuring the effectiveness of efforts to increase community participation, strengthen communication, and ensure the sustainability of control programs. Through this process, policy makers can evaluate the success that has been achieved while identifying various obstacles that may arise during program implementation (18).

Resource and Funding Support

In terms of resource and budget support, increasing the budget for malaria control and maintenance in areas that have received malaria elimination certificates aims to facilitate the smooth implementation of malaria control and maintenance programs in areas that have received malaria elimination certificates. Sustainable financing, political commitment and leadership influence the success of a sustainable malaria control program. The risk of re-emergence of endemic malaria transmission after malaria elimination in many countries is due to unsustainable malaria vector control (12). Therefore, a special budget policy is needed from the APBD with the amount of costs required for malaria elimination according to the stages. Generally, the details of this cost planning are grouped into personnel costs (wages, honorariums), operational costs (accommodation, transportation), facilities and equipment costs (costs of goods, tools, materials) and assessment costs (6).

Increasing Public Awareness and Participation

In matter of increasing public awareness and participation, there is a relationship between behavior and malaria incidence, so it

is recommended that health workers increase formal and regular intensive education about malaria, such as causes, signs and symptoms, transmission methods, complications, prevention methods, and home care for sufferers (19).

Then, community-based approaches should be further optimized. Through ongoing education and active community involvement, the risk of malaria cases can be reduced. The role of local community leaders, such as village heads and health workers, is crucial in educating the public about malaria prevention. In addition, social media-based communication strategies can be used to reach younger generations, who are often missed in conventional health promotion activities (9).

In emergency situations such as the outbreaks in Rokan Hilir and Indragiri Hilir, swift and integrated policies are needed to prevent further spread. The involvement of the education sector in supporting malaria health promotion in schools is also an important recommendation to increase understanding from an early age (5,9)

Sanitation Infrastructure and Technology Improvements

Regarding Sanitation Infrastructure and Technology Improvements, maintaining malaria elimination status in Riau Province also requires adequate infrastructure support. Providing sanitation facilities such as communal latrines and rainwater harvesting, managing stagnant water, and maintaining a proper irrigation system are crucial steps in preventing the development of malaria vectors. In addition, cross-sector collaboration, such as with private companies, can be used to build infrastructure in remote areas that are difficult for the government to reach (6).

Improved internet connectivity and technology are essential, especially in areas experiencing outbreaks. Real-time and accurate case reporting can support the government in producing fast and efficient policies or decisions. The use of satellite communication networks or very small aperture terminals (VSAT) in remote villages has proven to bring numerous benefits to communities, particularly in terms of improving access to information. Furthermore, satellite technology can connect remote villages to the rest of the world through internet access, enabling access to information and services across the entire Republic of Indonesia (NKRI) (13).

In the national context, the results of this study provide an important lesson that malaria elimination requires an approach that is not only top-down but also bottom-up. This means that active participation from local communities must go hand in hand with strong policies from the central and regional governments. With this synergy, malaria elimination status can be maintained, and Riau Province can serve as a model for other regions in Indonesia for sustainable infectious disease control efforts (20).

CONCLUSIONS

This study shows that although Riau Province has achieved malaria elimination status, maintaining this status remains challenging. The 2024 malaria outbreaks in Rokan Hilir and Indragiri Hilir highlight weaknesses in public awareness, resource allocation, policy implementation, and cross-sectoral coordination. Fishbone analysis further points to gaps in human resource capacity, sanitation support, and technology use for malaria data.

Strengthening malaria elimination efforts requires more effective cross-sector collaboration, improved technical capacity, and stronger policy and budget support. Increased community engagement—through continuous education and involvement of local leaders—is also essential. With these improvements, Riau Province can sustain its elimination status and potentially serve as a national model for long-term infectious disease control.

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REFERENCES

1. Anderson L, Galatas B. World Malaria Report 2023 [Internet]. Geneva: World Health Organization; 2023 [cited 2024 Nov 13].
2. Dirjen P2P Kemenkes RI. Laporan Kinerja Direktorat Jenderal Pencegahan Dan Pengendalian Penyakit Tahun 2023. Jakarta; 2024 Feb.
3. Kementerian Kesehatan RI. Profil Kesehatan Indonesia 2023 [Internet]. 2023rd ed. Sibuea F, Hardhana B, editors. Jakarta: Kementerian Kesehatan Republik Indonesia; 2024 [cited 2024 Nov 13]. 1–303 p.
4. Pusat Krisis Kesehatan Kemenkes RI. Laporan Harian Pemantauan Krisis Kesehatan [Internet]. Indonesia; 2024 Nov [cited 2024 Nov 14].
5. Dinas Kesehatan Provinsi Riau. Profil Kesehatan Provinsi Riau 2023 [Internet]. Pekanbaru; 2024 Jun [cited 2024 Nov 14].
6. Wahono T, Astuti EP, Ruliansyah A, Ipa M, Riandi MU. Studi Kualitatif Implementasi Kebijakan Eliminasi Malaria di Wilayah Endemis Rendah Kabupaten Pangandaran dan Pandeglang. ASPIRATOR - Jurnal Penyakit Tular Vektor. 2021 Jun 9;13(1):55–68.
7. Rusandi, Rusli M. Merancang Penelitian Kualitatif Dasar/Deskriptif dan Studi Kasus. Al-Ubidiyah: Jurnal Pendidikan dan Studi Islam [Internet]. 2021 [cited 2024 Nov 15];2(1):48–60.
8. Budiarti EM, Pambudi BA. Pengembangan Diagram Ishikawa Sebagai Upaya Peningkatan Mutu Sekolah. JDMP (Jurnal Dinamika Manajemen Pendidikan). 2022 Oct 23;6(2):149–60.
9. Ocvanirista RD, Siswanto, Murniani. Evaluasi Implementasi Kebijakan Eliminasi Program Malaria Pada Puskesmas. Jurnal Penelitian Perawat Profesional (JPPP) [Internet]. 2024 Jun;6(3).
10. Kementerian Kesehatan RI. Peraturan Menteri Kesehatan Republik Indonesia Nomor 22 Tahun 2022 Tentang Penanggulangan Malaria [Internet]. Direktorat Jenderal Perundang-undangan Kemenkumham Indonesia: BN.2022/No.978; Sep 22, 2022 p. 1–103.
11. Nuraini E, Hasyim H, Idris H, Ghiffari A, Anwar C. Analysis of the Electronic Implementation of A Malaria Surveillance Information System (E-SISMAL) in the Lahat District. Bioscientia Medicina : Journal of Biomedicine and Translational Research. 2021 Oct 29;5(11):1078–84.
12. Kaltsum U, Windusari Y, Hasyim H. Pengendalian Vektor dan Eliminasi Malaria: Literature Review. Jurnal Ilmiah Universitas Batanghari Jambi. 2022 Oct 31;22(3):1709.
13. Yadnya MS, Sultan S, Muljono AB, Paniran P, Sasongko S, Nrartha IMA. Program Perawatan Komunikasi Satelit (VSAT) Di Desa Tumpak Lombok Tengah. Jurnal Gema Ngabdi. 2023 Jul 31;5(2):210–4.
14. Astuti EP, Ipa M, Ginanjar A, Wahono T. Upaya Pengendalian Malaria Dalam Rangka Pre-Eliminasi di Kabupaten Garut: Sebuah studi kualitatif. Buletin Penelitian Sistem Kesehatan. 2020 Jan 22;22(4):255–64.
15. Ng'ang'a PN, Aduogo P, Mutero CM. Strengthening community and stakeholder participation in the implementation of integrated vector management for malaria control in western Kenya: a case study. Malar J. 2021 Dec 1;20(155):1–14.
16. Armaita, Hermon D, Barlian E, Dewata I, Umar I. Policy Model of Community Adaptation using AHP in the Malaria Endemic Region of Lahat Regency -

Indonesia. International Journal of Management and Humanities [Internet]. 2020 May 15;4(9):44–8.
17. Adnyani KD, Sumada IM, Wirata G. Evaluasi Program Indonesia Sehat dengan Pendekatan Keluarga (PIS PK) Pada Indikator Hipertensi di Dinas Kesehatan Provinsi Bali. Jurnal Pendidikan Tambusai. 2023;7(3):21972–8.
18. Tomia S, Ali KM, Puasa R, Alhadar H. Kajian Kebijakan Strategi Pelaksanaan Program Eliminasi Malaria. Jurnal Sehat Mandiri [Internet]. 2024 Jun [cited 2024 Nov 13];19(1):46.
19. Rahman I, Hutomo WMP, Sasrianto D, Fabanyo RA. Hubungan Perilaku Dan Ketepatan Penggunaan Kelambu Berinsektisida Dengan Kejadian Malaria. Nursing Arts [Internet]. 2023 Dec [cited 2024 Nov 13];17(2):48–56.
20. Agustina D. Analisis Kebijakan Pelayanan Kesehatan [Internet]. Medan: Fakultas Kesehatan Masyarakat UINSU; 2020 [cited 2024 Dec 17]. 1–64 p.