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Malaria knowledge and self-medication practices among the local community of Papua

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Abstract

Purpose: Papua Province is Indonesia's largest contributor to malaria cases, accounting for 81% of the national malaria burden. These cases are concentrated in City of Jayapura, Jayapura Regency, Keerom, Mimika, Sarmi, Mamberamo Raya, Asmat, Boven Digoel, and the Yapen Islands. Given this high concentration, there is an urgent need for accelerated efforts to reduce malaria cases, particularly in these areas, to improve the overall malaria situation in Papua. Self-medication behavior plays a crucial role in malaria treatment, but fostering the desired knowledge and behavior around self-medication is challenging. This study surveyed the understanding of malaria and self-medication practices among the local population of Papua. **Methods:** The survey involved 100 respondents in areas with access to doctors and community health centers (Puskesmas) in Harapan Village, Jayapura Regency. **Results:** While there is strong knowledge about malaria transmission, significant gaps remain in safe self-medication practices, such as improper medication use and storage. These findings highlight the need for better public education on the importance of following medical instructions and seeking timely medical consultation when self-medication fails. **Conclusion:** Despite having relatively better access to a public health center, the local Papuan community still exhibits unsafe self-medication practices for malaria treatment. There is an urgent need to improve malaria treatment literacy and educate the community on proper treatment behaviors to ensure more effective malaria control.

Keywords: health promotion; knowledge; malaria; malaria literacy; self-medication practices

INTRODUCTION

Self-medication for malaria treatment is a prevalent practice, especially in regions where access to healthcare is limited or where individuals seek immediate relief from symptoms. Self-medication can be a double-edged sword, defined as the individual's initiative to diagnose and treat their health issues using modern, herbal, or traditional medicines without professional guidance [1,2]. On one hand, it empowers individuals to take charge of their health; on the other, it poses risks such as misdiagnosis and improper drug use. The World Health Organization (WHO) highlights that this behavior can lead to the irrational use of medications, contributing to issues like antimicrobial

resistance (AMR) when effective treatments become ineffective due to misuse [3]. In countries like Indonesia, where malaria is endemic, the potential for self-medication to lead to poor treatment outcomes is particularly concerning, especially as a significant portion of the population lacks a proper understanding of the disease and its appropriate treatment options [4].

Knowledge plays a crucial role in health-seeking behavior, shaping how individuals recognize and respond to the disease [2]. Understanding malaria—its symptoms, transmission, and treatment—is essential for effective self-medication. Comprehensive knowledge enables individuals to differentiate between self-treatable conditions and those requiring professional medical intervention [5]. However, in many communities, including urban areas in Papua, there is a gap in awareness about the dangers of unsafe self-medication. The ability to correctly identify symptoms and select appropriate medications relies heavily on prior education and experience [6]. As the risk of drug resistance increases, enhancing malaria literacy through targeted education becomes vital. This approach can empower communities to make informed decisions about their health and reduce reliance on potentially harmful self-medication practices [7].

Little is known about how knowledge about malaria impacts the appropriateness and safety of self-medication practices. The influence of modern drug availability and traditional practices on self-medication behaviors remains underexplored. This gap suggests a need for a study to understand the dynamics between malaria knowledge and self-medication, particularly in regions with high malaria incidence. Our study aims to explore unsafe self-medication practices and the related community knowledge underlying such practices.

METHODS

Study was located in Kampung Harapan, the home to the Lukas Enembe Stadium, known as Kota NICA during the Dutch administration from 1944 to 1962, where the Dutch government established free education and boarding and monhly stipends to three vocational schools for agriculture, animal husbandry, and forestry exclusively for indigenous Papuan students. The kampung is situated 8.9 kilometers from Sentani International Airport, a distance that can be covered in about 18 minutes by car. One Puskesmas Utama Utama is accessible to all people in the Kampung. Kampung Harapan in Jayapura Regency was selected due to its relatively better accessibility to healthcare facilities and public services than other Papua regions. Suppose the situation in Kampung Harapan is considered more fortunate than other areas. In that case, the overall conditions in Papua may be worse than reported in this study, especially in terms of access to healthcare.

This cross-sectional study [12] was conducted in Kampung Harapan, Jayapura Regency, from March to July 2023, with 100 community members selected between the ages of 17 and 50 who consented to participate. Data was based on a questionnaire of 15 items, which was developed based on the research team's consensus on unsafe self-medication practices and common inadequate knowledge representing the community. If respondents answer "yes," it indicates inadequate knowledge. The same applies to the practice of self-medication.

The analysis included tables of respondent characteristics, item ranking of the percentage of unsafe self-medication practices and inadequate knowledge of malaria-related issues, and cross-tabulation linking knowledge and unsafe self-medication practices with odds ratio and p-value.

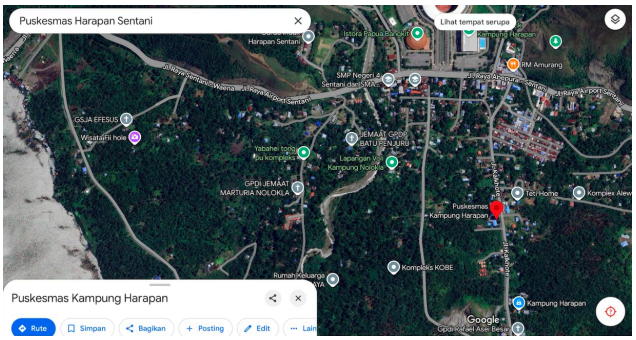

Figure 1. Kampung Harapan and its vicinity

RESULTS

Table 1 shows respondent characteristics. The gender is well balanced. There is a reasonable variation across different groups. This distribution suggests that the study captures various perspectives from different life stages. There is significant diversity regarding working status. The largest group comprises entrepreneurs or people employed in the private sector (33%), then homemakers (30%). Civil servants account for 8%, while students make up 10%. A smaller percentage consists of farm workers (5%), retired individuals (3%), and those not currently working (11%). This variation in employment status ensures that the study reflects a broad spectrum of economic activities and household roles.

Table 1. Respondents characteristics (n = 100)

Variable	(%)
Gender	
Male	44.0
Female	56.0
Age	
17-25	21.0
26-35	33.0
36-45	22.0
46-55	11.0
56-65	9.0
>= 65	4.0
Education	
Elementary, Middle School	20.0
High school, Diploma, Bachelor	80.0
Work	
Farm workers	5.0
Civil servants	8.0
Retired	3.0
Private business	33.0
Housewife	30.0
Students	10.0
Does not work	11.0

Table 2 highlights the varying levels of awareness regarding malaria symptoms. The most commonly recognized symptoms are nausea or vomiting, high fever, and dizziness or headache, which are widely associated with the disease. However, symptoms such as dry cough, enlarged spleen, and back pain are less recognized by the community.

Table 2. Signs and symptoms of malaria

	Signs and symptoms	%
1	Nausea or vomiting	95
2	High fever	89
3	Dizziness/headache	88
4	Sweating and chills	82
5	Muscle aches and weakness	81
6	Back pain	75
7	Enlarged spleen	61
8	Dry cough	42

Table 3 highlights three themes of unsafe self-medication practices, illustrating both positive and negative aspects related to knowledge and behavior. A notable concern is that 85% of respondents report using over-the-counter (OTC) medicine without following the instructions on the packaging or brochure. This behavior reflects poor self-medication practices, as failing to adhere to proper usage guidelines can lead to ineffective treatment or potential harm. Additionally, 78% of respondents store medicines outside their original packaging and not in tightly sealed containers, further indicating unsafe practices that can compromise the efficacy of the medication due to improper storage conditions.

On the positive side, there is a high level of knowledge about malaria transmission, with 97% of respondents correctly identified that malaria is transmitted through the bite of a female Anopheles mosquito. Moreover, 82% understand that parasites from the Plasmodium genus cause malaria. However, despite this solid understanding of malaria, 75% of individuals admit that if self-medication does not work (if they do not get better), they do not consult a doctor.

Despite widespread knowledge about malaria transmission, there remains a concerning gap in safe self-medication practices, where individuals often rely too heavily on self-treatment and delay seeking professional medical advice. Improper medication use and storage are common, leading to potential risks such as worsening health conditions and drug resistance. These findings emphasize the urgent need for improved public education, focusing on adhering to medical instructions and seeking help from health workers when self-medication proves ineffective.

Table 3. Percentage of unsafe self-medication practices and inadequate knowledge about malaria

	Unsafe self-medication practices	%
1	I use over-the-counter medicine without following the instructions on the packaging or brochure.	85
2	I store medicines outside their original packaging and not in tightly sealed containers.	78
	If self-medication does not work (I do not get better), I do not consult a doctor.	75
	Inadequate knowledge about malaria	
1	Is malaria an infectious disease caused by parasites from the Plasmodium genus?	97
2	Is it true that malaria is transmitted through the bite of a female Anopheles mosquito?	82
3	Is it true malaria cannot be prevented or treated.	73
4	Is it true that malaria does not affect learning performance or improve it?	72
5	Is it true that self-medication means treating a disease with medicine without a doctor's prescription?	71
6	Should medicines be bought without a prescription be taken three times a day?	63
7	If the dosage is three times daily, should the medicine be taken every 8 hours?	47
8	Is it true that contraindications are unwanted side effects?	44
9	Should over-the-counter medicines be bought with a doctor's prescription?	43

Table 4 shows inadequate knowledge is often linked to poor health behaviors, such as not consulting

a doctor or improper medication storage. Inadequate knowledge about malaria caused by parasites predicts the poor behavior of not consulting a doctor when self-medication does not work (OR = 3.31 for not consulting a doctor if self-medication fails (P-value = 0.04). Further, self-medication involving medicine without a doctor's prescription shows that poor knowledge about self-medication correlates with poor medication storage practices. However, the P-value suggests the result is not statistically significant (OR = 21.30 for storing medicines improperly (P-value = 3.62).

However, in some cases, even individuals with better knowledge still exhibit poor self-medication behaviors, highlighting a gap between knowledge and practice that could be addressed through targeted health interventions. For example, a better understanding of proper dosage is associated with poor behavior in not seeking medical consultation. OR = 0.46 for not consulting a doctor (P-value = 0.27). Also, better knowledge (understanding that malaria can be treated) is associated with the poor behavior of not following instructions for over-the-counter medications (OR = 0.17 for using over-the-counter medicines improperly (P-value = 0.17).

Table 4. Odds ratio and p-value of three self-medication practices based on knowledge items.

		Unsafe self-medication practices					
Inadequate knowledge of malaria		I use over-the-counter medicine without following the instructions on the packaging or brochure.		If self-medication does not work (I do not get better), I do not consult a doctor.		I store medicines outside their original packaging and not in tightly sealed containers.	
		Odds Ratio	**P-value**	**Odds Ratio**	**P-value**	**Odds Ratio**	**P-value**
1	Is malaria an infectious disease caused by parasites from the Plasmodium genus?	0.52	0.16	3.31	0.04	2.34	0.17
2	Is it true that malaria is transmitted through the bite of a female Anopheles mosquito?	1.00		1.00		1.00	
3	Is it true malaria cannot be prevented or treated?	10.81	0.17	1.55	0.23	1.80	0.32
4	Is it true malaria does not affect learning performance or improve it?	1.39	0.43	1.20	0.14	1.19	0.58
5	Is it true that self-medication means treating a disease with medicine without a doctor's prescription?	0.64	0.94	5.55	0.22	21.30	3.62
6	Should medicines be bought without a prescription be taken three times a day?	0.90	0.61	2.86	0.23	3.09	0.71
7	If the dosage is three times daily, should the medicine be taken every 8 hours?	1.04	0.06	0.46	0.27	0.34	0.06
8	Is it true that contraindications are unwanted side effects?	1.23	0.22	1.25	1.13	1.58	0.38
9	Should over-the-counter medicines be bought with a doctor's prescription?	5.41	0.54	3.09		0.39	0.09

DISCUSSION

This study highlights a relationship between knowledge and self-medication practices. Improper self-medication remains a common issue, with many individuals not following medication instructions or seeking professional medical help when self-treatment fails, leading to adverse outcomes like drug resistance [13,14]. Interestingly, some studies, such as Sorong, found no significant correlation between knowledge and self-medication behavior among pregnant women, indicating that knowledge alone may not drive proper practices [15]. Other studies in Samarinda and Kampung Harapan show a positive relationship between knowledge and responsible self-medication, suggesting that individuals with higher knowledge levels are more likely to follow safe self-medication practices [16,17]. These findings underscore the importance of education in promoting safer

self-medication behaviors but also hint at the need to address other factors influencing self-care decisions.

The findings also indicate that although knowledge does not directly influence self-medication practices, their behavior is linked to more responsible self-medication. These results contribute to the public health field, especially in managing malaria self-medication. Education about the advantages and disadvantages of malaria self-medication is crucial to ensure that the public has adequate knowledge and exhibits appropriate behavior to prevent improper medication use. Moreover, the recommendation that people should only engage in self-medication after consulting physicians or healthcare staff underscores the importance of medical professionals' involvement in the self-treatment process, which can help reduce the risks of drug resistance and other health complications [18]. Public health education programs need to focus on increasing knowledge and developing attitudes and behaviors that promote safer and more effective medication use.

This study has an important implication for a growing need for a communicative social media approach that accommodates cultural and modern knowledge about malaria, enabling people to learn from both perspectives [19,20]. Self-medication education should prioritize local cultural beliefs and practices while integrating modern health knowledge. This approach ensures that the community feels respected and understood while accessing accurate and up-to-date medical information. By placing health education within the context of literacy that involves professional health workers from nearby health centers, it becomes possible to create a balanced learning environment [21,22]. This collaboration can bridge the gap between traditional practices and evidence-based malaria treatment, fostering trust and improving health outcomes through informed self-medication behavior.

Health promotion for malaria treatment in Papua can be significantly enhanced by adopting a culturally sensitive approach. Understanding local perceptions of malaria, such as the differentiation between types of malaria (tersiana and tropika), is crucial, as many individuals do not view primaquine (PQ) as a legitimate malaria treatment but rather as a supplement [23]. Community engagement through self-care practices, where individuals utilize leftover medications or over-the-counter drugs, highlights the need for education on proper treatment adherence [24]. Additionally, barriers to accessing formal healthcare, such as travel difficulties and unfamiliarity with health services, must be addressed to improve treatment uptake [25,26]. By integrating traditional beliefs and practices with modern health strategies, health promotion can be more effective, fostering a community-driven approach to malaria management that respects local customs and enhances treatment compliance.

CONCLUSION

This study concludes that respondents' inadequate knowledge is related to unsafe self-medication practices. The recommendation includes increasing public knowledge about the advantages and disadvantages of malaria self-medication and educating the public to carry out self-medication by consulting the closest health centers, physicians, or health workers in their close vicinity.

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