

Relational Analysis Between Pharmaceutical Service Quality and Medications Adherence: A Cross-Sectional Study of Malaria Patients in Papua

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ABSTRACT

Malaria elimination is a national priority program that has been set as a target for prevention in the form of elimination by 2030 in the National Medium-Term Development Plan 2019-2024. Malaria elimination intervention has been arranged, including the process of diagnosis, treatment, and chemoprevention. Medication adherence is an important thing in malaria elimination programme. This study aimed to analyze the relationship between the quality of pharmaceutical services and medication adherence of malaria patients in public primary health care in Serui City, Papua, as one of the districts with high malaria endemicity. This study was a cross-sectional study conducted using 5 5-dimensional questionnaire of pharmaceutical service quality and the MMAS-8 questionnaire. This study found out that reliability, responsiveness and empathy dimensions related to medication adherence of malaria patients in Serui Kota primary public health care (P-value < 0.05). The intervention to increase medication adherence of malaria patients can be performed through these dimensions so that the malaria eradication programme can be implemented well, especially in high-endemicity areas.

KEYWORDS: Malaria, Medication Adherence, Papua, Pharmaceutical Services

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I. INTRODUCTION

Malaria is still a health problem that has an impact on the decline in the quality of human resources which causes various social and economic problems so that integrated and sustainable prevention efforts are needed. Malaria elimination is a national priority program that has been set as a target for prevention in the form of elimination in 2030 in the National Medium-Term Development Plan 2019-2024.

Malaria remains a major global public health challenge, with millions of cases reported annually, leading to significant morbidity and mortality. Despite widespread implementation of evidence-based interventions such as insecticide-treated nets (ITNs), indoor residual spraying (IRS), and mass drug administration programmes, achieving universal coverage and effective utilization remains difficult due to socio-cultural, behavioural, and structural constraints (Firdaus et al., 2025). Based on the data of WHO (2023), between 2021 and 2022, increased malaria cases and incidence were seen in several countries of the South-East

Asia Region, including Indonesia. Indonesia also became the 2nd largest malaria case in the Asia Region in 2022.

Based on data from the Ministry of Health (2025), positive cases of malaria and the death rate due to malaria in Indonesia have increased every year from 2021 to 2024. Of the total 443,550 positive cases of malaria, 86% of cases were reported from Papua province. This makes all provinces on the island of Papua areas with high endemicity from all regions in Indonesia. National malaria cases are contributed by 14 districts/cities in Papua, namely Keerom, Jayapura district, Mimika, Sarmi, Mamberamo Raya, Boven Digoel, Asmat, Yapen Islands, Waropen, Jayapura City, Mappi, Biak Numfor, Yahukimo, and Nabire. This is a concern for the Indonesian, especially Papua government and society to make Indonesia a malaria-free country.

Efforts to eradicate malaria have been carried out globally and nationally. These efforts include the process of diagnosis, treatment and chemoprevention. Pharmacists play a specific role in the treatment section. Malaria treatment regimens vary based on the type of malaria. Patients must comply with the treatment time and the amount of

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medication to be taken as prescribed so that malaria drug resistance does not occur. As we know, resistance to chloroquine as the main antimalarial is the result of patient non-compliance in malaria treatment (Achan et al., 2024).

The role of pharmacists has evolved, expanding beyond traditional dispensing to active involvement in healthcare activities. Pharmaceutical services are one of the important pillars in the health care system that focuses on the use of appropriate, safe, and effective drugs to support the success of patient therapy. Pharmaceutical services in primary public health facilities are an important aspect in overcoming the problem of medication adherence in malaria patients (Wahyudin & Nufus 2022). Pharmacists and pharmaceutical technicians have an important role in handling diseases that require immediate or long-term treatment, have a high prevalence or are also life-threatening, one of which is malaria (Muchid et al., 2008).

This study aimed to analyse the relationship between the quality of pharmaceutical services and medication adherence of malaria patients in public primary public health care in Serui City, Papua, as one of the districts with high malaria endemicity.

II. METHODS

A. Inclusion and Exclusion Criteria

A total of 305 participants participated in this study. All of whom were at least 18 years old and had indicated that they had a malaria-positive diagnosis, were prepared to take part in the study, and had given their oral consent to be interviewed, were recruited for the study. In the course of doing this research, essential data pertaining to demographics were gathered.

Participants who were under the age of 18 or who suffered from mental health conditions were excluded from the study.

B. Study Design and Sampling

A cross-sectional investigation was executed to evaluate the quality of pharmaceutical services concerning medication adherence of malaria patients at Serui Kota primary public health care.

C. Instruments

The questionnaire was disseminated among adult malaria patients who were 18 years of age or older. The questionnaire was used to assess the quality of pharmaceutical services and medication adherence. The quality of pharmaceutical services questionnaire used a questionnaire from Purwono et al (2021) with modifications, so it was necessary to perform validity and reliability tests. The questionnaire consists of 5 dimensions, where each dimension contains 8 questions. This questionnaire uses a Likert Scale, namely strongly agree, agree, disagree, and disagree. The quality of service is described through the gap

value between reality/perception and patient expectations. The gap value is obtained based on the formula:

$$\text{Gap} = \text{perception/expectation}$$

To quantify medication adherence, the MMAS-8 questionnaire was used, which has been validated and translated into Indonesian in the study (Novitasari, 2017). The MMAS-8 questionnaire consists of 8 questions. This questionnaire uses the Guttman scale, namely, the respondent's answers are limited to "Yes" or "No". The answer "Yes" is given a "0" and the answer "No" is given a score of 1 on favourable questions (questions number 1,2,3,4,6,7). For unfavourable questions (question number 5), the answer "Yes" is given a score of 1, and the answer "No" is given a score of 0. Question number 8 is given a score of 1 for "never", 0.75 for "occasionally", 0.5 for "sometimes", 0.25 for "often", and 0 for "always" (Kishor et al., 2024). Patients are said to have high compliance if they get a score of 6-8 and have low compliance if they get a score of 0 -5 (Gube, 2018).

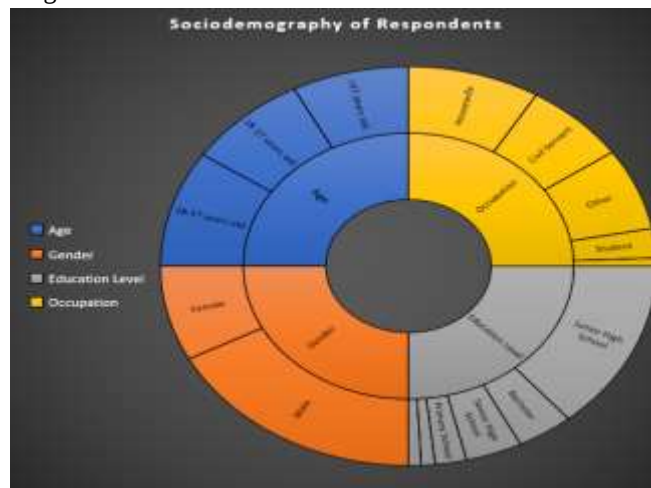
D. Statistical Analysis

The results were presented in percentages (%), and the average (mean), along with the standard deviation (SD), was provided. The statistical analysis was performed using SPSS software version 22. Cronbach's alpha was used to assess the internal consistency and reliability of the questionnaire items. This indicates how well the items in the questionnaire correlate with each other.

Frequencies were calculated for demographic characteristics to understand the distribution of the sample. Bivariate analysis was conducted using the Pearson Chi-Square test to identify significant relationships between demographic and supply variables (quality of pharmaceutical services), against the dependent variable (medication adherence). Pearson Chi-square and *p*-values were used to determine the strength and significance of these relationships.

III. RESULT AND DISCUSSION

The sociodemographics of respondents were described in diagram below



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The respondents were distributed by age, which was categorized into 118-27 years old (31.8%), 28-37 years old (37.7%) and older than 37 years old (30.5%). The majority of gender respondents were female (69.2%). The occupation was subsistence of housewife (34.4%), followed by civil servant (26.9%), other (26.6%), students (9.5%), and Indonesian military (2.6%). Significant percentage (55.4%) of respondents had junior high school education.

Malaria is a mosquito-borne infectious disease that ranks among the major world health challenges affecting people in several developing countries in the world. Several potential factors engaged malaria cases in prior studies. The potential factors include socio-demography (ages and occupation), housing characteristics (traditional home construction and open structure house), behavior characteristics (cross-border travel, outdoor agricultural work at night, and malaria preventive activities), environmental factors (elevation, temperature, lower relative humidity, higher rainfall and increased vegetation for the 30 days prior diagnosis and living more than 5 minutes away from a healthcare facility) (Smith et al., 2021), nutritional status (Idris et al., 2022), epidemiological factors (population density, human development index, and basic reproductive number) (Villena et al., 2024), genetics factor (plasmodium, anopheles and human) (Kimenyi et al., 2025) (Naidoo et al., 2025).

The speculation about gender differences in malaria incidence is that females utilize public health facilities more often than males, regardless of whether or not they have symptoms of malaria. This could be due to the fact that in most parts of the world females have the primary responsibility of caring for others in the household, in addition to potentially being pregnant, and may end up being “coincidentally” tested and diagnosed for malaria when their primary reason for visiting the health facility was either to seek care for a child who was ill or attend antenatal care. Behavior and biological factor differences between female and males are that females of reproductive age being more likely to sleep under a bed net, alcohol and tobacco consumption, and post-pubertal hormonal changes leading to increased attractiveness to mosquitoes (Okiring et al., 2022).

Dimensions	Gap	Adherence (n=100)	Non-Adherence (n=205)	p-value
Tangibles	Positive (n=221)	69 (31.22%)	152 (68.78%)	0.345
	Negative (n=84)	31 (36.90%)	53 (63.10%)	
Reliability	Positive (n=66)	47 (71.21%)	19 (28.79%)	0.000
	Negative (n= 239)	53 (22.18%)	186 (77.82%)	
Responsiveness	Positive (n=151)	77 (50.99%)	74 (49.01%)	0.000

	Negative (n=154)	23 (14.94%)	131 (85.06%)	
Assurance	Positive (n=234)	70 (29.91%)	164 (70.09%)	0.052
	Negative (n=71)	30 (42.25%)	41 (57.75%)	
Empathy	Positive (n=77)	57 (74.03%)	20 (25.97%)	0.000
	Negative (n=228)	43 (18.86%)	185 (81.14%)	

The pharmaceutical service quality questionnaire used has been tested to be valid and reliable. The results of the validity test showed that the values obtained for 40 questions were more than the r table value = 0.279 so that each question was declared valid. The results of the questionnaire reliability test showed that the Cornbach's Alpha value obtained was 0.931 (> 0.7), so that the questionnaire was declared reliable. In this study, the most positive gaps were found in the assurance and tangible dimensions, while the most negative gaps were found in the reliability and empathy dimensions. The results of the analysis of the relationship between the dimensions of pharmaceutical service quality and patient medication adherence showed that the dimensions of reliability, responsiveness and empathy had a significant effect on medication adherence in malaria patients at the Serui City Health Center (p-value <0.05), while the tangibles and assurance dimensions did not affect medication adherence in malaria patients.

The reliability dimension refers to drug dispensing and the provision of drug information that should be done by the pharmacist when handing over the drug. The provision of drug information must be done completely so that the patient fully understands the drug being consumed. One important thing that must be informed to the patient is the side effects of the drug. The presence of side effects of the drug that arise during treatment can be a factor that makes someone stop taking their medicine. If the patient knows this side effect information, the patient will continue the treatment with the consideration that the therapeutic effect is greater than the side effects that arise. This will increase patient compliance with treatment.

The responsiveness dimension refers to the pharmacist's service when dispensing medication. Whether the pharmacist provides the service quickly, accurately and with initiative or not. Patients who are served excellently will have a greater enthusiasm to recover than those who receive standard or even less service.

The empathy dimension refers to the provision of pharmaceutical services based on empathy for patients. The sense of empathy possessed by pharmacists can be reflected through the widest possible time given to patients to obtain the information needed by patients regarding their medicines

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and the concern to listen and find solutions to patient complaints about their treatment. However, this is sometimes constrained by the limited number of pharmacists to serve patient needs, so that it is not uncommon for patients to not get the opportunity to ask questions or provide complaints regarding their treatment to pharmacists (Phinastika & Nugraha, 2024).

Medication adherence is very important in the treatment of malaria patients. Non-adherence in treatment can cause decreased efficacy in the use of some anti-malarial drugs. One of the anti-malarial drugs that has been resistant is chloroquine. The duration of malaria treatment varies depending on the life cycle of plasmodium and the behavior of the plasmodium (Kemenkes, 2024). *Plasmodium vivax* is particularly difficult to eliminate since it forms dormant liver stages (hypnozoites) that can reactivate weeks to months after the initial infection causing relapses and maintaining ongoing transmission (Rahmalia, 2023).

In Indonesia, malaria eradication and deterrence of reinfection strategy is based on 5 pillars. The fourth pillar is closely related to pharmaceutical work, namely strengthening the health system, health security and leadership to achieve a malaria elimination program based on justice, human rights and leave no one behind. The intervention programmes include: increasing the capacity of healthcare professionals integrated with human resources and strengthening malaria services through integration of primary and referral services. Adequate facilities and infrastructure in health facilities and sufficient and reliable health workers are important components to create good pharmaceutical services. Clinical pharmacy services that must be carried out in health centers are prescription assessment, drug delivery, provision of drug information, Drug Information Services (PIO), counseling, patient rounds/visits (specifically for inpatient health centers), monitoring and reporting of drug side effects, monitoring drug therapy; and evaluation of drug use. Current pharmaceutical services are patient-oriented. Where pharmaceutical services prioritize the needs, preferences, and experiences of individual patients in their drug care. This involves pharmacists who are responsible for the needs, concerns, and expectations of patients related to drugs, with the aim of optimizing drug use and improving patient treatment outcomes (Marinkovic, 2022).

IV. CONCLUSION

Dimensions of pharmaceutical services quality related to the medication adherence of malaria patients in Serui Kota primary public health care, namely reliability, responsiveness and empathy. The intervention to increase medication adherence of malaria patients can be performed through these dimensions so that the malaria eradication programme can be implemented well, especially in high-endemicity areas.

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