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THE RELATIONSHIP BETWEEN INTERNAL QUALITY ASSURANCE OF MALARIA PARASITE EXAMINATION WITH THE QUALITY OF MALARIA PREPARATIONS

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P e n u l i s K o r e s p o n d e n s i

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A B S T R A C T

Internal Quality Assurance of malaria is a mandatory activity carried out by the malaria examination laboratory which includes a whole series of malaria examinations from pre-analytical, analytical, and post-analytical carried out with the aim of obtaining good malaria microscopic examination results in the form of good quality preparations. So far, there has not been much internal quality assurance associated with quality assessment. The purpose of this study was to determine the relationship between internal quality assurance and the assessment of the quality of malaria preparations in the laboratory of RSUD Umbu Rara Meha Waingapu. This type of research is an analytical quantitative approach with a cross sectional design The sample in this study is the total sample. Seven laboratory officers who carried out microscopic examination of malaria were interviewed and observed regarding the implementation of internal quality assurance from the pre-analytical to post-analytical stages, then 23 positive preparations were taken in 2021 and macroscopic and microscopic observations were carried out and an assessment of the quality of malaria preparations was carried out. Statistical analysis using the Pearson test processed using SPSS 25. The results of the study found that the percentage for the implementation of Internal Quality Assurance was 86%, while the percentage of preparate quality was 82%. Based on the Pearson correlation test between the two variables of internal quality assurance and also the quality of malaria preparate obtained a p-value of 0.010 where $p < 0.05$ which means there is a relationship between internal quality assurance and the quality of malaria preparate.

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A B S T R A K

Pemantapan Mutu Internal malaria adalah kegiatan wajib yang dilakukan oleh laboratorium pemeriksa malaria yang meliputi seluruh rangkaian pemeriksaan malaria dari pra analitik, analitik, dan pasca analitik yang dilakukan dengan tujuan mendapatkan hasil pemeriksaan mikroskopis malaria yang baik berupa kualitas preparat yang baik. Selama ini belum banyak dilakukan pemantapan mutu internal yang dihubungkan dengan penilaian kualitas. Tujuan penelitian ini adalah untuk mengetahui hubungan pemantapan mutu internal dengan penilaian kualitas preparat malaria di laboratorium RSUD Umbu Rara Meha Waingapu. Jenis penelitian ini adalah analitik pendekatan kuantitatif dengan desain cross sectional Sampel pada penelitian ini adalah total sampel. Tujuh petugas laboratorium yang melakukan pemeriksaan mikroskopis malaria dilakukan wawancara dan observasi mengenai pelaksanaan pemantapan mutu internal dari tahapan pra analitik sampai pasca analitik, Selanjutnya diambil 23 preparat positif tahun 2021 dan dilakukan pengamatan secara makroskopis dan mikroskopis lalu dilakukan penilaian terhadap kualitas preparat malaria. Analisis statistik menggunakan uji Pearson yang diolah menggunakan SPSS 25. Hasil penelitian didapatkan presentase untuk pelaksanaan Pemantapan Mutu Internal adalah 86%, sedangkan presentase kualitas preparate adalah 82%. Berdasarkan uji korelasi Pearson antara dua variable pemantapan mutu internal dan juga kualitas preparate malaria di dapatkan p-value 0,010 dimana p < 0,05 yang artinya terdapat hubungan antara pemantapan mutu internal dengan kualitas preparate malaria.

INTRODUCTION

Malaria is one of the infectious diseases that is still a health problem in the wider community and affects various aspects of Indonesian life. This commitment to malaria control is expected to be a concern for all of us, not only nationally, but also regionally and globally as produced at the 60th World Health Assembly (WHA) meeting in 2007 in Geneva on malaria elimination (Ministry of Health of the Republic of Indonesia, 2017).

The malaria control program in Indonesia is contained in the Decree of the Minister of Health of the Republic of Indonesia Number: 293 / MENKES / SK / IV / 2009 concerning Malaria Elimination in Indonesia. The goal is to realize a healthy life and free from malaria transmission gradually until 2030. The target area of malaria elimination is carried out gradually from districts / cities, provinces and from one island or several islands to the entire territory of Indonesia. Judgment based on the situation. Malaria and the condition of available resources, with stages namely Thousand Islands (DKI Jakarta province), Bali Island, and Batam Island in 2010. Java Island, NAD Province, and Riau Islands Province in 2015. Sumatra Island (except NAD Province and Riau Islands Province), NTB Province, Kalimantan Island, and Sulawesi Island in 2020. Papua Province, West Papua Province, Maluku Province, NTT Province and North Maluku Province, by 2030 (Ministry of Health, 2013).

The success of East Nusa Tenggara Province as the first Eastern Region of Indonesia whose districts / cities succeeded in achieving malaria elimination where there were 3 districts / cities that succeeded in malaria elimination, namely Manggarai Regency, East Manggarai Regency, and Kupang City. Manggarai Regency succeeded in achieving malaria elimination in 2019, while East Manggarai Regency and Kupang City succeeded in malaria elimination in 2020. In addition, there are 14 districts/cities in NTT with medium endemic

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districts/cities, and 3 high endemic districts/cities. High malaria endemic districts are still concentrated on Sumba Island, namely East Sumba Regency, Central Sumba Regency and West Sumba Regency (Kupang Regent Regulation of East Nusa Tenggara Province, 2021).

The principle of decreasing cases is to check the malaria blood as much as possible to find all parasites in the human body and be treated according to standards until complete. The endemicity map in 2020 amounted to 15,341 cases spread across the mainland of Sumba Island. There was a decrease in cases in 2021 to 9,396 cases. Annual Incidense Parasite (API) on the mainland of Sumba in three Endemic Districts >1. East Sumba has an API of 6.57 with an Annual Blood Examination Rate (ABER) of 15% from 2020 with an examination achievement of 35,890 and in 2021 increased to 40,522 examinations with a positive malaria rate in 2020 of 1,639 cases, increasing to 1,718 cases in 2021 (Kupang Regent Regulation of East Nusa Tenggara Province, 2021) (Sekunda and Doondori, 2017).

In improving the quality of malaria testing, it is necessary to map malaria laboratory networks. The malaria laboratory network is a network of laboratories that carry out services to patients suspected of malaria according to their level starting from examinations at the basic health service level to the central level to support control programs towards malaria elimination. The quality of malaria laboratory services is very necessary in finding malaria cases (Ariyanti, E., et., 2013) Thisis very dependent on the competence and performance of laboratory officers at each level of health facilities. Strengthening quality malaria testing laboratories is carried out through network development and quality strengthening of malaria examination laboratories starting from the service level of Puskesmas laboratories, hospitals, and private health laboratories to cross-test reference laboratories at the District/City, Provincial and Central levels (Health, 2020).

One of the most important things in the correctness of laboratory test results is Internal Quality Assurance (PMI). Internal Quality Assurance of malaria examination laboratories is a series of management efforts carried out in the form of continuous detection, prevention and supervision activities in order to obtain appropriate and thorough malaria examination results (Health, 2020) The stages of laboratory microscopic examination in question are pre-analytical, analytical and post-analytical stages. At every stage there is always an opportunity for mistakes to occur, both mistakes that cannot be avoided and mistakes that are difficult to avoid. Errors that occur in the pre-analytical stage are the largest reaching 68%, while errors at the analytical stage are 13% and in post-analytics around 19%, therefore every laboratory is required to improve and maintain the quality of performance by implementing continuous PMI (Usman, Ahmed Siddiqui and Lodhi, 2015)

RESEARCH METHODS

Research Type and Design

The type of research used in this study is a type of analytical observational research using *the Cross Sectional Study design.* The design was chosen because it was in accordance with the purpose of the study, namely knowing about the Correlation of Internal Quality Stabilization of Microscopic Examination of Malaria with the Quality of Malaria Preparations.

Place and Time of Research

This research was carried out at the Clinical Pathology Laboratory Installation of the Umbu Rara Meha Waingapu Regional General Hospital. This research was designed and carried out in February-August 2022.

Sampling Techniques

The sample of this study is the total sampling obtained by conducting interviews and observations on laboratory officers at RSUD Umbu Rara Meha Waingapu using a questionnaire containing questions regarding the implementation of Internal Quality Assurance of microscopic examination of malaria from the pre-analytical, analytical and post-analytical stages, and then a preparation

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assessment was carried out on all malaria positive preparates in 2021.

Data Analysis

Data analysis in this study aims to determine and analyze the Correlation of Internal Quality Stabilization of Malaria Microscopic Examination with the Quality of Malaria Preparations. The analysis used is univariate and bivariate analysis.

1. Univariate Analysis

Univariate analysis was carried out to see the frequency distribution of each variable, namely Internal Quality Stabilization of Microscopic Examination of Malaria with the Quality of Malaria Preparations on the dependent variable.

1. Bivariate Analysis

Bivariate analysis was carried out to see the correlation between Internal Quality Assurance of Malaria Microscopic Examination with the Quality of Malaria Preparations. Because the data of the two variables are numerical data, a normality test is first carried out with the *Shapiro Wilk* test. The distribution of data is said to be normal if $p > 0.05$. Normal distributed data followed by *pearson* correlation test. A test is expressed as meaningful when $p < 0.05$.

Research Procedure

Seven laboratory officers who carried out microscopic examination of malaria were interviewed and observed regarding the implementation of internal quality assurance from the pre-analytical to post-analytical stages, then 23 positive preparations were taken in 2021 and macroscopic and microscopic observations were carried out and an assessment of the quality of malaria preparate was carried out.

RESULTS AND DISCUSSION

RESULT

This study was conducted in April – June 2022 with a total of 7 laboratory workers and 23 positive malaria preparations in 2021 taken using inclusion criteria. This research was carried out at the Clinical Pathology Laboratory Installation of RSUD Umbu Rara Meha Waingapu by looking at the results of observations on the implementation of internal quality assurance and quality assessment of malaria preparate. The results of the study can be seen in the table below.

Table 1. Research Questionnaire Results

Rating (People)	**Pre Analytics (8)**	**Analytical (9)**	**Pasaca Analytics** (9)	**Mean**	**Percentage** (%)
Good	7	4	7	6	86
Enough	0	2	0	1	10
Less	0	2	0	0	4
Sum	**7**	**7**	**7**	**7**	**100**

Information:

1. Good= Answer Value (7-9)
2. Enough = Answer Value (4-6)
1. Less = Answer Value (1-3)

Data source : Research Data, 2022

From the table above, the percentage of implementation of good Internal Quality Assurance is 86%, Enough 10% and Less 4%.

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Table 2. Quality Assessment of Malaria Preparations

Preparation Assessment	SD Thin (25)	SD Thick (25)	Coloring (25)	Accuracy (25)	Mean	Percentage
Good	14	18	20	23	19	82
Enough	9	5	3	0	5	18
Less	0	0	0	0	0	0
Sum	23	23	23	23	23	100

Information

1. Good= Preparation value (17-25)
2. Sufficient = Preparation value (9-16)
3. Less= Preparation value (1-8)

Data source : Research Results, 2022

From the table above, it was found that the percentage of quality assessment of malaria preparate from 23 preparations was good 82% and sufficient 18%. Before looking at the relationship between Internal Quality Assurance and the Quality of Malaria Preparations, testing of data distribution using the Saphiro Wilk Normality test was first carried out. Statistically, normal distributed data was obtained because Þ > 0.05 where Internal Quality Assurance data was obtained 0.092 and Malaria Preparation Quality data was obtained 0.224.

Table 3. Data Normality Test for Internal Quality Assurance of Microscopic Examination of Malaria with Quality of Malaria Preparation.

	Shapiro- Wilk		
	Statistics	**df**	**Sig.**
Internal Quality Assurance	**,926**	**23**	**, 092**
Preparation Quality	**,944**	**23**	**,224**

Next, to see the relationship between the two variables because the data is normally distributed, then proceed with the Pearson correlation test. In the Pearson correlation test, the Pearson correlation test was obtained with two categories as follows :

Table 4. Relationship between Internal Quality Assurance and Malaria Preparation Quality.

	Mean ± 6,138	**Correlation**	**B- Value**
Internal Quality Assurance	**87,04 ± 6,138**	**0,53**	**0.010**
Preparation Quality Malaria	**84,09 ± 4,078**		

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Based on table 4 above from the Pearson correlation test, it can be seen that the correlation value found a relationship seen from Þ - Value < 0.05, while the correlation value can be concluded a moderate degree relationship between Internal Quality Assurance and the Quality of Malaria Preparations. Statistically it can be shown by a correlation value of 0.523.

DISCUSSION

In this study, the results of the implementation of Internal Quality Assurance from the pre-analytical stage to the post-analytical carried out in the laboratory of Umbu Rara Meha Waingapu Hospital were 86% % and also the Quality of Malaria Preparations in the laboratory of Umbu Rara Meha Waingapu Hospital was 82%. There are three categories of the existing percentage, namely: the Good category if the percentage is obtained > 80%, the Sufficient category if the percentage is obtained 60-79%, while the Less category if the percentage is obtained < 60%. This study both variables received scores with good categories from the implementation of Internal Quality Assurance and also Quality Assessment of Malaria Preparations.

Judging from the average answers from the questionnaire given to laboratory officers of Umbu Rara Meha Waingapu Hospital, there is not a single pre-analytical stage that is ignored in the implementation of Internal Quality Assurance in the work of microscopic examination of malaria. The pre-analytical stage as the initial stage of the series of malaria examination activities is an important component that will affect the next stage. At the pre-analytical stage it can affect the magnitude of errors in the examination results by 68%, if at this stage it is done properly and correctly according to existing work instructions, the examination results obtained can be ascertained to be correct (Usman, Ahmed Siddiqui and Lodhi, 2015)

In assessing the quality of malaria preparations, researchers assess based on direct observations and are also assisted by the assessment of malaria crosscheckers contained in the *e-sismal* application used by district *crosscheckers* in assessing preparations from health facilities. The assessment aspect is the manufacture of thin blood preparations, thick blood preparations, coloring and the accuracy of determining the species. From these aspects, the percentage of preparation quality is 82%.

The effect of poor preparation will cause errors in issuing laboratory results, further resulting in misdiagnosis and therapy to patients. Poor preparation results are usually in the form of preparation sizes that are too thick, uneven, dirty, too thick coloring or wrong in reading the results. This is in accordance with the results of previous research fridolina et al (2013) which stated that the accuracy of malaria diagnosis is influenced by the availability of examination tools and materials and the quality of qualified human resources will produce good preparations (Mau and Murhandarwati, 2015)

Internal Quality Assurance carried out in the laboratory is very important and must be carried out by laboratory personnel to ensure their performance and to ensure the ability of examination as well as the sensitivity and specificity of laboratory diagnosis (Ministry of Health, 2020)

The results of the analysis of the relationship between the internal quality assurance of malaria examination and the quality of malaria preparations that have been carried out show that there is a significant relationship between the internal quality assurance of malaria examination and the quality of malaria preparations produced in the laboratory. The results also answer that Ha's hypothesis is acceptable. Microscopic examination of malaria is still the *gold standard* for the definitive

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diagnosis of malaria. Malaria examination is carried out by making thick and thin blood preparations to ensure three things, namely; the presence or absence of malaria parasites (positive / negative), malaria species and stages, and also parasite density (Ministry of Health, 2013)

There is a significant relationship between the application of good PMI and the quality of malaria preparations produced, it can be concluded that human resources who comply with standard operating procedures and applicable rules in this case are carrying out a series of internal quality assurance in the laboratory will produce good quality malaria preparations, which help good diagnosis for patients so that the therapy provided by doctors as clinicians is appropriate. The laboratory will also not find obstacles and problems because all series of work in the laboratory are in accordance with applicable Operational Standards (Ministry of Health, 2013)

Based on the results of the Pearson correlation test, it can be seen that the correlation value is found to have a relationship seen from Þ - Value < 0.05, while the correlation value can be concluded that there is a moderate degree of relationship between Internal Quality Assurance and the Quality of Malaria Preparations. Statistically it can be shown by a correlation value of 0.523 which means that there is a meaningful relationship. The higher the correlation value, the higher the degree of relationship between the variables studied.

Carrying out internal quality assurance is a mandatory part for laboratory officers, when internal quality assurance is carried out properly and correctly, the resulting examination results are of good quality. In Kandidus' research in 2017 stated that internal quality stabilization is directly proportional to the results of the examination produced in this case the quality of malaria preparations (Riyono, 2007).

CONCLUSION

Judging from the results of the research conducted, the researcher can draw the following conclusions:

1. The percentage for the implementation of Internal Quality Assurance by laboratory officers working at Umbu Rara Meha Hospital from the pre-analytical, analytical and post-analytical stages is 86%, while the percentage of preparation quality in the laboratory of Umbu Rara Meha Hospital based on the components of thick blood preparations, thin blood preparations, staining and species accuracy is 82% of the 23 slides in the laboratory in 2021.

2. Based on the results of the Pearson correlation test between two variables of internal quality assurance with the quality of malaria preparations, Þ-Value 0.010 was obtained where <0.05 which means there is a relationship, with a correlation value of 0.523 which means there is a relationship with a moderate degree.

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