STATISTICAL ANALYSIS OF DENGUE FEVER (DF) CASES IN RIAU PROVINCE IN 2024

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Abstract

This study aims to analyze the distribution of Dengue Fever (DF) incidence rates per 100,000 population in Riau Province in 2024 and to develop data visualizations in the form of data-driven batik patterns. The method used is a quantitative approach involving descriptive statistical analysis of secondary data obtained from official reports of the Riau Provincial Health Office. The analysis was conducted by calculating measures of central tendency and dispersion, as well as observing distribution patterns using tables and graphs. The results indicate that the DBD incidence rate in Riau Province in 2024 exhibits significant variation, with a minimum value of 7.70 and a maximum of 246.50 per 100,000 population. Most regions fall into the low to moderate categories, while some regions exhibit significantly higher values, resulting in an uneven distribution that is right-skewed. Graphical visualizations reveal a wave-like pattern reflecting data variations across regions. Subsequently, these graphical patterns were transformed into batik motifs through geometric approaches involving translation, reflection, and repetition. The resulting motifs not only possess aesthetic value but also visually represent the data structure. Thus, this study demonstrates that statistical data can be processed into creative and innovative visual forms without losing its informative meaning.
Keywords: Batik Patterns; Dengue Hemorrhagic Fever (DHF); Descriptive Statistical Analysis

1. INTRODUCTION

Dengue Hemorrhagic Fever (DHF) is an infectious disease that remains a public health problem in many tropical and subtropical countries, including Indonesia. This disease is caused by the dengue virus, which is transmitted through the bites of Aedes aegypti and Aedes albopictus mosquitoes. Tropical environmental conditions such as warm temperatures, high rainfall, and increasing population density are factors that support the proliferation of this disease’s vectors, thereby increasing the risk of transmission in the community. Therefore, analysis of DHF epidemiological data is crucial for understanding the disease’s distribution patterns and determining more effective control strategies (Ministry of Health of the Republic of Indonesia, 2022).

Riau Province is one of the regions in Indonesia that is particularly vulnerable to the spread of dengue fever. The relatively humid climate with high rainfall, coupled with rapid urban growth, can support the proliferation of dengue-carrying mosquitoes. Additionally, population density and human activity in urban areas can increase the risk of disease transmission. Dengue fever cases in Riau Province are reported almost every year, with varying numbers of cases across each district and city; therefore, a more in-depth study is needed to determine the distribution patterns and incidence rates of the disease (Riau Provincial Health Office, 2024).

Several studies indicate that the spread of dengue fever cases is associated with environmental and spatial factors in a given region. A study by Giofandi et al. (2023) in the city of Pekanbaru showed that variables such as population density, health facilities, and regional characteristics influence the spatial distribution of dengue fever cases using a Geographically Weighted Regression (GWR) approach. Furthermore, other studies have also shown that rainfall, population density, and environmental conditions are associated with dengue fever incidence across various regions in Indonesia (Siregar, 2020; Wahyuni & Suryani, 2019).

Given this background, a statistical analysis of Dengue Hemorrhagic Fever cases in Riau Province is essential to understand the distribution and incidence of the disease. Therefore, this study aims to statistically analyze Dengue Fever (DF) cases in Riau Province in 2024 to determine the distribution of cases, the percentage, and the patterns of disease spread in each regency/city in Riau Province.

2. MATERIALS AND METHODS

2.1. Study Area

The study area is Riau Province, located in the central part of Sumatra Island, Indonesia. The province consists of several regencies and cities, namely Kuantan Singingi, Indragiri Hulu, Indragiri Hilir, Pelalawan, Siak, Kampar, Rokan Hulu, Bengkalis, Rokan Hilir, Meranti Islands, Pekanbaru City, and Dumai City. Administratively, this region has diverse characteristics, both in terms of population size and territorial distribution.

This study uses regencies/cities as the unit of analysis, so each area is treated as an observation unit in the statistical analysis. The selection of Riau Province as the study location is based on the availability of 2024 Dengue Fever (DF) case data systematically documented in official reports from relevant agencies. Additionally, the study area's coverage—comprising multiple districts and cities—enables a more comprehensive comparative analysis of disease incidence rates across regions. Consequently, the study area in this research encompasses all districts and cities in Riau Province, with a focus on the distribution of DBD incidence rates per 100,000 residents as the primary indicator analyzed.

2.2. Procedures

The research process began with the collection of secondary data, specifically compiling published epidemiological data on dengue fever in the form of statistical tables. The data was then processed through editing, coding, and tabulation to ensure it was systematically organized and ready for analysis. The data was subsequently analyzed using descriptive statistical techniques, such as frequency analysis, and visualized in the form of bar charts.

Statistical analysis was conducted to identify patterns of dengue fever case distribution in Riau Province, both spatially (across regions) and temporally (over time). The results of this analysis were used to identify high-risk areas, thereby providing insights into priority regions for disease control efforts. Additionally, data interpretation also considers environmental factors and population density that may influence the spread of dengue fever.

The next stage involves transforming statistical data into visual models, where graphical results and case distribution patterns are translated into design elements. The rising and falling trends of cases, fluctuations in incidence rates, and spatial distributions are interpreted as lines, curves, and repetitive motifs. This transformation employs simple mathematical approaches, such as data normalization and mapping values into visual coordinates, resulting in structured geometric patterns.

The resulting visualizations are then implemented into batik motif designs. This process involves pattern repetition, stylization of forms, and adaptation to the aesthetic principles of traditional batik. The resulting motifs not only possess artistic value but also carry scientific meaning as representations of dengue epidemiological data.

2.3. Data analysis

This study employs a quantitative approach using descriptive statistical analysis to examine the distribution of Dengue Fever (DF) incidence rates in Riau Province in 2024. The data used are secondary data obtained from official reports of relevant agencies, presented in the form of statistical tables by district/city.

Data analysis was conducted in several stages. The first stage involved data processing by grouping the DBD incidence rates per 100,000 population for each district/city. The next stage involved calculating descriptive statistical measures, including the mean, minimum, maximum, and range, to describe the overall variation in the data. Additionally, the analysis examined data distribution patterns, including the identification of value clusters and the presence of outliers. This aims to understand the characteristics of data distribution—whether it is uniform or not—and to clearly identify differences between regions.

To support the interpretation of results, data are presented in tabular form and visualized in graphs. Tables are used to provide detailed numerical information, while graphs are used to visually illustrate data distribution patterns. The combination of these two presentation formats allows for a more comprehensive analysis of the data characteristics. Thus, the data analysis in this study focuses on the systematic presentation and interpretation of the distribution of dengue fever incidence figures, thereby providing a clear picture of the variations and patterns in the data across districts/cities in Riau Province in 2024.

3. RESULTS AND DISCUSSION

3.1. Dengue Fever (DF)

Dengue Hemorrhagic Fever (DHF) is an acute viral infectious disease caused by the dengue virus (DENV) serotypes 1–4 of the Flaviviridae family, transmitted primarily by the Aedes aegypti mosquito (the primary vector) and the Aedes albopictus mosquito (secondary vector). This disease is endemic in tropical regions such as Indonesia, with initial symptoms resembling the flu that can progress to a life-threatening condition due to plasma leakage. Dengue Hemorrhagic Fever (DHF) is an acute viral infectious disease transmitted through the bite of the Aedes aegypti mosquito and remains a public health issue in Indonesia, including in Riau Province.

DBD remains a serious public health issue due to the increasing number of cases and its expanding spread from urban to rural areas (Mentari, 2022). This disease is characterized by sudden high fever, bleeding manifestations, thrombocytopenia, and plasma leakage, which can lead to shock and death if not treated promptly (Indonesian Ministry of Health, 2017). Epidemiologically, Indonesia, as a tropical country, has environmental conditions that are highly conducive to the breeding of dengue vectors, particularly during the rainy season when standing water is prevalent (Achmadi, 2019). Clinically, the disease is characterized by high fever, muscle and joint pain, and a drop in platelet count, which can cause bleeding and even shock if not properly managed.

The spread of dengue fever cases is closely linked to environmental factors, population density, community mobility, and clean and healthy living habits. The geographical characteristics of an area can influence the level of transmission risk (Giofandi et al., 2023). Environmental factors play a significant role in the spread of dengue fever, particularly rainfall, temperature, and humidity, which affect the mosquito life cycle (Nugraha et al., 2021). Environments with many pools of clean water provide an ideal breeding ground for mosquitoes. Additionally, community behavioral factors such as a lack of awareness regarding draining and covering water storage containers, as well as disposing of unused items, contribute to the problem. Furthermore, population density also increases the risk of dengue transmission

(Mentari, 2022). Thus, dengue is the result of a complex interaction between biological, environmental, and social factors.

3.2. Epidemiological Implications in the Statistical Analysis of Dengue Fever Cases in Riau Province in 2024

In statistical analysis, an understanding of the definition, causes, and impacts of dengue fever serves as a crucial foundation for interpreting data. The distribution patterns of cases derived from statistical analysis can reflect the influence of environmental factors, population density, and community behavior. Areas with high incidence rates generally have environmental conditions that support vector proliferation, while fluctuations in case numbers over time may be linked to seasonal changes. Therefore, the results of statistical analysis are not merely numerical but also carry profound epidemiological significance. This understanding further serves as the foundation for transforming data into batik motifs, where disease spread patterns are represented in a visual form that holds both scientific and aesthetic value.

Region-based analysis is essential for identifying areas with high or low risk, enabling health interventions to be carried out in a more targeted and effective manner. Based on the data analysis, there are variations in the incidence rate of Dengue Hemorrhagic Fever (DHF) per 100,000 residents across each district/city in Riau Province in 2024. These variations indicate differences in the risk levels of DHF incidence between regions. To provide a more detailed overview, the data is presented in the following table.

Table 1. Analysis of Dengue Fever Data in Riau Province in 2024

No	County/City	Number of Cases - Dengue Fever Incidence Rate per 100,000 Population
1.	Kuantan Singingi	39.90
2.	Indragiri Hulu	7.70
3.	Indragiri Hilir	11.00
4.	Pelalawan	14.60
5.	Siak	34.90
6.	Kampar	28.10
7.	Rokan Hulu	27.90
8.	Bengkalis	124.00
9.	Rokan Hilir	20.30
10.	Kepulauan Meranti	16.20
11.	Kota Pekanbaru	46.00
12.	Kota Dumai	246.50
13.	Riau	43.90

Based on data on the incidence rate of Dengue Hemorrhagic Fever (DHF) per 100,000 residents in 2024 in Riau Province, there is a significant variation among districts and cities, with a provincial average of 43.90 per 100,000 residents. This average can serve as a benchmark for comparing risk levels across regions. From an epidemiological perspective, variations in incidence rates between regions reflect differences in environmental factors, population density, and the effectiveness of disease control programs (Achmadi, 2019).

According to the Riau Provincial Health Office (2024), from January to May 2024, there were 860 cases of Dengue Hemorrhagic Fever (DHF) in Riau. Of these DHF cases, the highest number was recorded in Pekanbaru City with 257 cases, followed by Dumai City with 173 cases and one death, followed by Bengkalis Regency with 118 cases, Kampar Regency with 63 cases, Rokan Hulu with 29 cases, Pelalawan with 45 cases, Indragiri Hulu with 19 cases, Kuansing with 32 cases, Indragiri Hilir with 31 cases, Siak with 57 cases, and Rokan Hilir with 29 cases. Meanwhile, the region with the lowest number of dengue fever cases is Kepulauan Meranti Regency, with seven cases. In 2024, the highest number of dengue fever cases was recorded in January, with a total of 201 cases. In February, the number dropped to 200 cases. Meanwhile, in March, there were 175 dengue fever cases in Riau. Then, in April, dengue fever cases tended to decrease to 125 cases, and in May, they rose again to 159 cases. However, last April, although the number of cases decreased, there was one fatality.

The region with the highest rate is Dumai City, with an incidence rate of 246.50 per 100,000 residents—approximately 561% of the provincial average. This figure indicates a very high transmission rate and has the potential to trigger an Outbreak if not managed optimally. The high number of cases in urban and coastal areas is often linked to population mobility, housing density, and suboptimal environmental sanitation (Ministry of Health of the Republic of Indonesia, 2017).

Bengkalis Regency ranks second with a rate of 124.00 per 100,000 residents, or approximately 282% of the provincial average. This figure is classified as very high and indicates a strong concentration of transmission risk in the area. Research in Riau indicates that spatial factors such as rainfall, settlement density, and environmental distribution influence the increase in dengue fever cases (Giofandi et al., 2023).

Pekanbaru City, as the provincial capital, has an incidence rate of 46.00 per 100,000 residents, or approximately 105% of the provincial average. This figure is slightly above average and indicates that urban areas with high socioeconomic activity face a greater potential risk of dengue fever transmission. Population density accelerates contact between humans and the Aedes aegypti mosquito vector, thereby increasing dengue virus transmission (Achmadi, 2019).

Kuantan Singingi Regency recorded a rate of 39.90 per 100,000 residents, or approximately 91% of the provincial average. Siak Regency recorded 34.90 (79%), Kampar 28.10 (64%), and Rokan Hulu 27.90 (63%). These areas fall into the moderate-risk category. In a public health approach, areas with rates approaching the provincial average require strengthened health promotion and community empowerment through the 3M Plus program (Notoatmodjo, 2018).

Rokan Hilir Regency has a rate of 20.30 (46%), Kepulauan Meranti 16.20 (37%), Pelalawan 14.60 (33%), Indragiri Hilir 11.00 (25%), and Indragiri Hulu 7.70 (18%) of the provincial average. These figures indicate a low-risk category. Nevertheless, areas with low figures still have the potential to experience an increase in cases if there are seasonal changes and increased rainfall that support vector breeding (Indonesian Ministry of Health, 2017).

Statistically, the range of data between the highest figure (246.50 in Dumai) and the lowest (7.70 in Indragiri Hulu) indicates a very large disparity. This suggests an uneven distribution of cases and the possibility of a high standard deviation. In epidemiological analysis, substantial variation across regions necessitates interventions based on local risk (Achmadi, 2019).

Overall, this statistical analysis indicates that dengue fever remains a serious public health issue in Riau Province in 2024, particularly in areas with morbidity rates far above the average, such as Dumai and Bengkalis. Therefore, enhanced epidemiological surveillance, strengthened mosquito breeding site eradication, and continuous public education are needed to reduce dengue incidence rates (Giofandi et al., 2023; Indonesian Ministry of Health, 2017).

In public health studies, the incidence rate per 100,000 population is used as an indicator to describe the level of disease occurrence within a population. This indicator allows for comparisons between regions with different population sizes, making the analysis more objective (Notoatmodjo, 2018). Using a descriptive statistical approach, incidence rate data can be analyzed to determine the mean, range, and comparisons between districts/cities within a province.

Statistical analysis of 2024 dengue fever data in Riau Province is crucial to identify which areas are above or below the provincial average. Differences in morbidity rates across regions may indicate disparities in risk factors, the effectiveness of mosquito breeding site elimination programs, and the level of community participation in the 3M Plus campaign (Ministry of Health of the Republic of Indonesia, 2017).

Overall, the data in the table indicate disparities in the distribution of dengue fever incidence rates among districts and cities in Riau Province in 2024. To visually clarify these differences, the dengue fever incidence data are presented in the following graph.

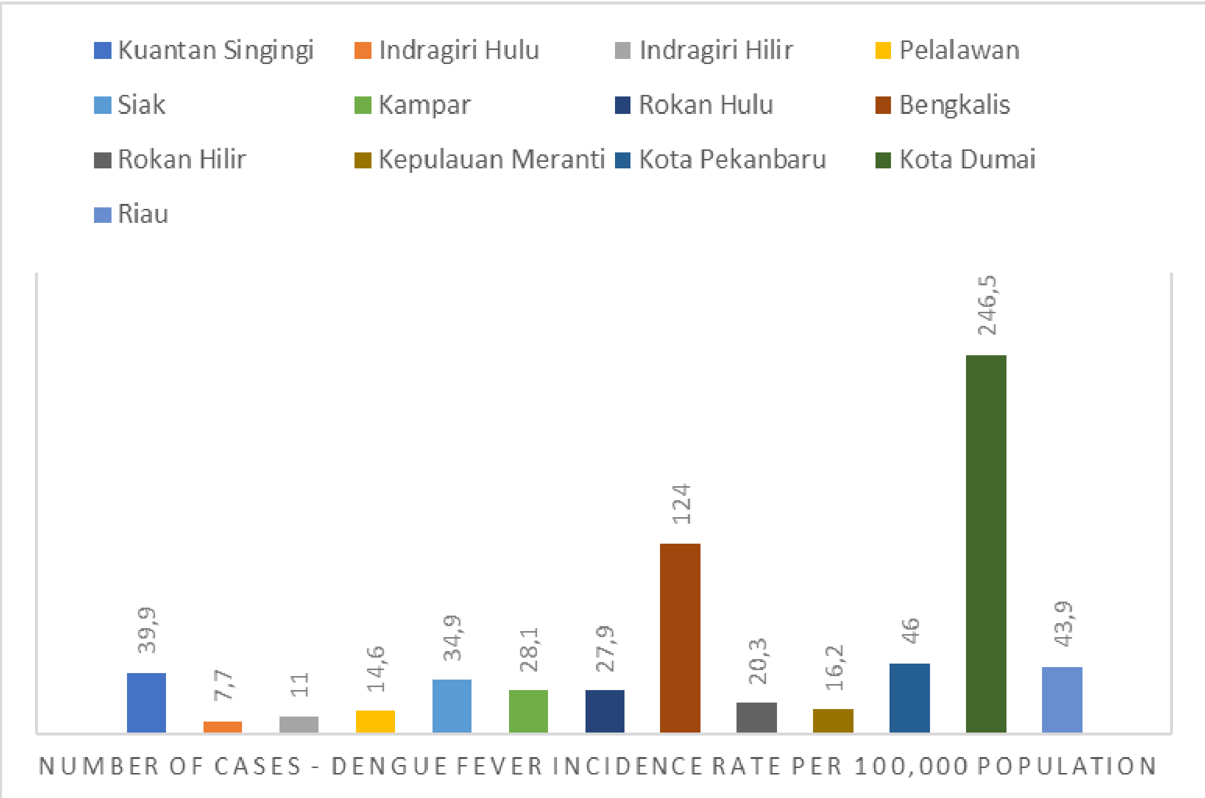

Figure 1. Graph of Dengue Fever Data in Riau Province in 2024

Based on the graph, a clearer distribution pattern emerges, showing a very significant spike in Dumai City compared to other regions. Bengkalis also exhibits a relatively high rate, while most other districts fall within the low to moderate range. This pattern indicates an imbalance in the distribution of dengue fever cases across regions in Riau Province.

More specifically, this pattern indicates that areas with urban characteristics tend to have higher incidence rates compared to other areas. This is due to a combination of factors including population density, community mobility, and environmental conditions that support mosquito breeding. Conversely, areas with low density and more controlled environments tend to have lower incidence rates.

Thus, based on the presentation in the form of tables and graphs, it can be seen that the distribution of dengue fever incidence rates in Riau Province in 2024 shows wide variation with fairly clear differences between regions—whether in the form of low, moderate, or high values—thereby providing an overall picture of the general pattern of dengue fever case distribution.

3.3. Discussion

Based on the results of the data analysis presented in tables and graphs, the incidence rate of Dengue Hemorrhagic Fever (DHF) per 100,000 residents in Riau Province in 2024 shows a varied distribution across districts/cities with a fairly wide range of values. The lowest recorded value was 7.70, while the highest reached 246.50, indicating a highly significant difference between the minimum and maximum values. This wide range suggests that the data distribution is not homogeneous and highlights disparities among regions regarding DBD incidence rates.

Upon further examination, the provincial average of 43.90 is higher than most district/city values, indicating that the data distribution is not evenly centered around this average. Most regions have incidence rates in the low to moderate range, approximately 10 to 40, forming a relatively concentrated primary data cluster. The presence of this cluster indicates that most regions share characteristics that are not significantly different from one another. Such a distribution pattern in statistical analysis is known as a non-uniform distribution and can be influenced by spatial variations in public health data (Giofandi et al., 2023).

On the other hand, there are several regions with values significantly higher than the main cluster, namely Dumai City and Bengkalis Regency. These values can be categorized as outliers due to their position far from the general data distribution. The presence of these outliers influences the overall shape of the distribution, causing the data distribution to become asymmetric and skewed to the right (right-skewed distribution). Such asymmetric distribution patterns are commonly found in epidemiological data, where a small portion of regions exhibit values significantly higher than those in other regions (Brady et al., 2012).

Furthermore, when examining the data distribution pattern, there is a tendency for morbidity values to form specific groups or clusters. The first group consists of regions with low values (below 20), the second group falls within the moderate range (around 20 to 50), and the third group comprises high values (above 100). This grouping indicates a non-random distribution structure, but rather a specific pattern that can be observed through both tables and graphs. Such grouping patterns are frequently used in epidemiological analysis to identify data distribution characteristics more systematically (WHO, 2023).

Presenting data in graphical form provides a clearer picture of these patterns, particularly in visually highlighting differences between regions. The graph shows a very sharp spike at a specific value, which contrasts with most other regions that tend to be at lower and relatively close positions. Thus, graphs serve as a tool to identify distribution patterns, data trends, and the presence of extreme values more intuitively.

Furthermore, this asymmetric distribution characteristic indicates that relying solely on the mean is insufficient to describe the overall condition of the data. In this context, a deeper understanding of data distribution—such as the median or other measures of dispersion—is necessary to ensure a more representative interpretation. This aligns with the principle of statistical analysis stating that measures of central tendency must be considered alongside measures of dispersion to obtain a more accurate picture (Walpole et al., 2012).

Overall, the analysis results indicate that the incidence of dengue fever in Riau Province in 2024 exhibits wide variation, with an uneven distribution and the presence of extreme values that influence the data distribution pattern. Presentation in tabular form provides accurate numerical details, while graphs help clarify the distribution pattern visually. The combination of both provides a more comprehensive understanding of the data characteristics, resulting in a more thorough and in-depth interpretation.

3.4 Implementation of Dengue Fever Statistical Data as a Batik Motif

The batik motifs produced in this study represent a visualization of epidemiological data transformed into batik designs based on repetitive patterns. The data used consists of the incidence rate of Dengue Hemorrhagic Fever (DHF) per 100,000 residents in the regencies and cities of Riau Province. This transformation aims to integrate public health statistics with batik motif design, allowing numerical data to be visually represented in the form of textile patterns.

In this study, the data transformation process involved several stages: interpretation of statistical values, grouping of case levels, conversion of data into visual elements, and the formation of batik repetition patterns. Each motif element in the batik has a direct correlation with the epidemiological data values being analyzed. The resulting batik motifs exhibit distinctive visual characteristics, namely the presence of repeating wave patterns. These patterns are formed from curves generated based on variations in dengue fever incidence rates.

Figure 2. Batik Pattern Based on Dengue Fever Incidence Data for Riau Province in 2024

Based on the graph of dengue fever incidence rates, it is evident that there are variations in case numbers across regions in Riau Province. The highest rate is found in Dumai City, followed by Bengkalis Regency, while other regions have relatively lower rates. These differences are then classified into several categories of epidemiological risk levels, namely:

a. High category: regions with the highest incidence rates
b. Moderate category: regions with moderate incidence rates
c. Low category: regions with relatively low incidence rates

This classification serves as the basis for determining the size, color, and shape of batik motif elements. Thus, the visual variations in the motifs are not merely decorative but also represent the distribution of epidemiological data.

The batik motif in Figure 2 is a seamless-pattern batik motif created from the visualization of Dengue Fever (DF) morbidity data in Riau Province. In the study of contemporary design and batik, transforming data into visual motifs like this aims to combine the aesthetic value of batik with an educational function, so that scientific information can be conveyed to the public through cultural media (Sari & Pratama, 2021). Philosophically, this motif illustrates the relationship between art, the environment, and public health. The visual elements used serve not only as decoration but also represent specific meanings related to disease spread and regional conditions. Each visual element in the batik motif carries statistical significance related to the incidence of DBD in a given region.

a. The large flower represents the area with the highest number of dengue fever cases, namely the city of Dumai. The flower's larger size compared to other elements illustrates the dominance of case numbers in that area within the epidemiological graph.
b. The wave motif represents areas with high morbidity rates but that are still below the maximum value, such as Bengkalis Regency. The wave shape illustrates the movement or fluctuation of disease data from one region to another. Philosophically, the wave depicts that the spread of disease is dynamic and can change over time.
c. Leaves symbolize nature and the environment. In the context of health, the leaf element symbolizes prevention efforts through environmental hygiene, as environmental conditions significantly influence the proliferation of mosquitoes that transmit dengue fever. The use of the leaf symbol also holds philosophical significance in batik culture as a representation of life and sustainability, which in the context of this study is interpreted as a hope for improved public health conditions.
d. Small flowers represent areas with low morbidity rates. This element depicts relatively few cases that are nonetheless scattered across several regions. In the epidemiology of infectious diseases, this condition can describe sporadic cases—that is, cases that occur in small numbers but still require monitoring within the public health surveillance system.

Overall, this batik motif embodies the philosophy that traditional art can serve as a medium for conveying scientific information. By transforming health data into batik motifs, the public can understand health issues in a more engaging and accessible way. Additionally, this motif conveys a message about the importance of public awareness in preserving the environment and maintaining health to prevent the spread of diseases such as dengue fever. This approach demonstrates that batik serves not only as a cultural heritage but can also function as a data-driven educational and visual communication medium in modern life.

The resulting batik motifs are arranged in the form of a repeating or seamless pattern—that is, a pattern that can be repeated continuously without visible boundaries between motifs. This repeating pattern carries a conceptual meaning related to the dynamics of disease transmission. The repetition of motifs illustrates that infectious diseases such as dengue fever have the potential to re-emerge periodically, particularly under environmental conditions that support the development of disease vectors. Additionally, the repeating pattern represents the interconnectedness of regions within an epidemiological system, as disease spread does not occur in isolation but is influenced by population mobility and environmental conditions across regions.

The results of the batik motif design in this study demonstrate that statistical data can be interpreted into visual forms that possess both aesthetic and informative value. The transformation of numerical data into batik motifs constitutes a form of culture-based data visualization, which can enhance public understanding of health information. This approach also demonstrates that statistics serves not only for numerical analysis but can also be utilized in more creative and contextual scientific communication processes. Furthermore, the integration of epidemiological statistics and batik art contributes to the development of data-driven batik designs, a field that remains relatively underdeveloped in textile design research.

Overall, the batik motifs produced in this study symbolize the relationship between the dynamics of disease spread and community life. Variations in the size, color, and shape of motif elements reflect differences in dengue fever case rates across each region. These motifs serve not only as decorative elements but also as a medium for visualizing epidemiological data, capable of communicating statistical information through a cultural-artistic approach. Thus, these dengue-data-based batik motifs can be viewed as a symbolic representation of disease control efforts, public health awareness, and the integration of science and local culture.

4. CONCLUSION

Based on the results of a statistical analysis of the incidence rate of Dengue Hemorrhagic Fever (DHF) per 100,000 residents in Riau Province in 2024, it can be concluded that the data show considerable variation among districts/cities with an uneven distribution. The significant range between the minimum and maximum values, as well as the presence of extreme values, causes the distribution pattern to be asymmetrical. Most areas fall into the low to moderate categories, while only a few regions exhibit notably high values.

Furthermore, the research findings indicate that presenting data in the form of tables and graphs provides a comprehensive overview of the data distribution patterns. The transformation of statistical data into batik motifs also demonstrates that numerical data can be interpreted as aesthetically pleasing visual representations without losing their informative meaning. Thus, this study not only provides a statistical overview of dengue fever cases but also produces an innovation in data visualization through data-driven batik motif design.

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6. REFERENCES

Achmadi, U. F. (2019). *Epidemiologi Penyakit Menular*. Rajawali Pers.

Brady, O. J., Gething, P. W., Bhatt, S., Messina, J. P., Brownstein, J. S., Hoen, A. G., & Hay, S. I. (2012). Refining The Global Spatial Limits Of Dengue Virus Transmission. *PLoS Neglected Tropical Diseases, 6*(8), e1760. https://doi.org/10.1371/journal.pntd.0001760

Dinas Kesehatan Provinsi Riau. (2024). *Profil kesehatan Provinsi Riau tahun 2024*.

Giofandi, E. A., Purwantiningrum, P., Madino, F., & Lumbantobing, A. (2023). Analisis Faktor Spasial Terhadap Kejadian Demam Berdarah Dengue Menggunakan Pendekatan Geographically Weighted Regression di Kota Pekanbaru, Provinsi Riau. *Jurnal Ilmu Lingkungan, 22*(1), 50–59.

Giofandi, E. A., Purwanto, & Rahmawati, D. (2023). Analisis Faktor Risiko Kejadian Demam Berdarah Dengue di Indonesia. *Jurnal Kesehatan Masyarakat Indonesia, 18*(2), 123–130.

Kementerian Kesehatan Republik Indonesia. (2017). *Pedoman pencegahan dan pengendalian demam berdarah dengue di Indonesia*.

Mentari, S. A. F. B. (2022). Faktor Risiko Demam Berdarah di Indonesia. *Jurnal Manajemen Kesehatan*.

Notoatmodjo, S. (2018). *Kesehatan Masyarakat: Ilmu dan Seni*. Rineka Cipta.

Nugraha, F., et al. (2021). Studi Ekologi Hubungan Kejadian DBD Dengan Faktor Iklim. *Jurnal Ilmu Kesehatan Masyarakat*.

Sari, D., & Pratama, R. (2021). Visualisasi Data Kesehatan Masyarakat Dalam Desain Motif Batik Berbasis Pola Seamless. *Jurnal Desain Komunikasi Visual Indonesia*, *6*(2), 85–94.

Siregar, F. A. (2020). Analisis Epidemiologi Kejadian Demam Berdarah Dengue di Indonesia. *Jurnal Kesehatan Masyarakat*, *15*(2), 120–128.

Syaputra, E., Ahmal, A., & Asril, A. (2020). Perkembangan Motif Batik Bono Sebagai Identitas Kabupaten Pelalawan Berbasis Kearifan Lokal (2013–2020). *Jurnal Pendidikan Tambusai*, *6*(2).

Wahyuni, S., & Suryani, D. (2019). Faktor Lingkungan yang Berhubungan Dengan Kejadian Demam Berdarah Dengue di Wilayah Perkotaan. *Jurnal Kesehatan Lingkungan Indonesia*, *18*(1), 45–52.

Walpole, R. E., Myers, R. H., Myers, S. L., & Ye, K. (2012). *Probability and Statistics For Engineers and Scientists* (9th Ed.). Pearson.