

Assessing Inequality in Health Service Accessibility Based on Hospital Distribution in Indonesia

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ABSTRACT

Background: The distribution of health facilities is an essential indicator to improve public health services in Indonesia. However, the country's archipelagic geography and uneven population density create challenges in ensuring equal access. This study aimed to analyze hospital distribution in Indonesia based on provinces and main islands to evaluate inequality in health service accessibility.

Subjects and Method: A comparative descriptive study was conducted using secondary data. Hospital data were obtained from the Hospital Information System (SIRS) of the Ministry of Health (2024), and population data were retrieved from the Central Statistics Agency (BPS) report (2023). A total of 3,209 hospitals were identified across 38 provinces and grouped into seven island clusters: Java, Sumatra, Sulawesi, Kalimantan, Papua, Maluku, and Bali–Nusa Tenggara. The population-to-hospital ratio was calculated, and hospital distribution was further analyzed by province, island, and hospital class.

Results: Java accounted for the largest number of hospitals (1,622) due to its high population and better infrastructure. In contrast, Eastern regions such as Papua (73) and Maluku (53) showed limited availability. Inequalities were also found in hospital classes, where advanced hospitals (Class A and B) were concentrated in Java, while peripheral regions were dominated by Class C and D facilities. This disparity forces residents in remote areas to travel long distances for adequate care.

Conclusion: Unequal hospital distribution highlights the urgent need for equitable health infrastructure development and strategic resource allocation policies to ensure fair access to health services across Indonesia.

Keywords: accessibility, healthcare facilities, hospital distribution

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BACKGROUND

Equal distribution of health facilities is one of the important indicators in efforts to improve the quality of health services for all levels of society (Hu et al., 2019; Tao et al., 2021). In Indonesia, the issue of the distribution of hospitals is of particular concern, given the

geographical characteristics of this country which consists of more than 17,000 islands with diverse topographic conditions and population densities and varied in each province (Buaq and Lorensius, 2022). Hospitals, as an advanced health facility, have a strategic role in supporting health services that cannot be

provided by primary health facilities, such as puskesmas or clinics. Therefore, the distribution of hospitals equitable distribution is essential to ensure equal access to quality health services (Kobashigawa et al., 2022).

However, Indonesia still faces major challenges in equitable distribution of hospitals. Analysis of the distribution of health facilities shows significant disparities between areas with high populations and more developed infrastructure, such as Java, compared to remote areas outside Jawa (Achmad and Prayitno, 2020; Makmuri, 2017). This disparity involves not only the number of hospitals, but also the quality of the facilities and services provided. For example, remote areas often rely solely on primary health centers, such as puskesmas, for emergency inpatient services, due to the difficulty of accessing hospitals (Noor et al., 2021). This condition places a large burden on primary health facilities and has the potential to worsen health disparities in Indonesia.

Accessibility to health services in Indonesia is greatly influenced by challenging geographic conditions, such as the remoteness of small islands, limited transportation infrastructure, and extreme topography in some areas (Myers et al., 2015; Leosari et al., 2023). This inequality in access is often a consequence of the disparity in development between the Western Region of Indonesia (especially Java-Bali) and the Eastern Region of Indonesia. As stated by Laksono et al. (2016), this inequality not only includes the availability of health service facilities, but also concerns medical equipment and technology, as well as the uneven distribution of health workers in each region.

Thus, an in-depth analysis of the distribution of hospitals by class throughout Indonesia is an important step to understand the root of the problem and propose targeted solutions. This study not only provides an overview of the geographical distribution of

hospitals, but also serves as a basis for evaluating the availability of health services in meeting the needs of the population fairly and evenly.

SUBJECTS AND METHOD

1. Study Design

This study uses a descriptive comparative design that aims to describe and compare the distribution of hospitals in Indonesia based on provinces and main islands. This study was performed by analyzing secondary data obtained from the Hospital Information System (SIRS) of the Ministry of Health of the Republic of Indonesia and the report of the Central Statistics Agency (BPS) in 2023 (BPS Indonesia, 2024). According to these sources, the total number of hospitals is 3,209. The focus of the study is to identify disparities in the number of hospitals, hospital classification, and the ratio of the number of hospitals to the population in various regions of Indonesia.

2. Population and Sample

The data in this study includes all hospitals registered in Indonesia and the total population in each province. The research sample is in the form of data on the number of hospitals obtained from the SIRS of the Ministry of Health and data on the number of population taken from the BPS report in 2023. Population data is used to calculate the ratio of population to hospitals in each province, which is an indicator of the accessibility of health services.

3. Research Variables

This study involves two main types of variables, namely categorical and continuous variables. Categorical variables include hospital classification (class A, B, C, D, D Pratama, and Unclassified) and geographic location grouped by province and main island in Indonesia. Continuous variables include the number of hospitals per province, the population in each province, and the ratio of population to hospitals.

4. Operational Definition of Variables

The number of hospitals is defined as the total number of health facilities recorded in the Hospital Information System (SIRS), grouped by province and island. Hospital classification refers to the category of hospitals based on class A (advanced and complete services), B, C, D, D Pratama (basic services for remote areas), and Unclassified.

The population-to-hospital ratio is calculated as the ratio of the number of residents to the number of hospitals in each province.

Geographical location is defined as the division of regions based on the seven main islands in Indonesia, namely Sumatra, Java, Kalimantan, Sulawesi, Maluku, Papua, Bali, and Nusa Tenggara.

5. Study Instrument

The research instrument uses secondary data from two main sources. Data on the number of hospitals was obtained through the Hospital Information System (SIRS) of the Ministry of Health of the Republic of Indonesia in 2024, which records the existence and classification of hospitals by province and island. Meanwhile, data on the number of residents in each province was obtained from the report of the Central Statistics Agency (BPS) in 2023.

6. Data Analysis

Data were analyzed using a comparative descriptive approach to examine disparities in hospital distribution. For island-based analysis, provincial hospital data were aggregated to show facility distribution per island. The proportion of each hospital class was calculated as the number of hospitals of that class divided by the total hospitals, multiplied by 100%. The population-to-hospital ratio was obtained by dividing the population of each province by its number of hospitals. Results are presented in tables, graphs, and thematic maps to visualize distribution patterns and highlight areas with high disparities as a basis for policy recommendations.

This study analyzed the distribution of hospitals in Indonesia by province, island cluster, and hospital class. The findings reveal substantial geographic disparities in both the number and type of hospitals across regions. The analysis covers total hospital counts, population-to-hospital ratios, and the composition of hospital classes (A, B, C, D, and D Pratama). The results are presented through tables, figures, and thematic maps to illustrate regional variations and identify areas with limited access to healthcare facilities.

According to data obtained from the Ministry of Health of the Republic of Indonesia (2024), there are striking inequalities in the number and class distribution of hospitals among provinces and island groups. Java Island exhibits the highest hospital concentration, particularly in East Java Province, which has the largest number of hospitals ($n=436$) (Figure 1A). Other provinces, such as West Java and Central Java also demonstrate relatively high hospital counts, reflecting the concentration of population and healthcare infrastructure in this region.

In contrast, the eastern regions, such as Papua, Maluku, and Nusa Tenggara, display a markedly smaller number of hospitals, particularly in the higher classes (A and B). For instance, Papua Island has only 73 hospitals and Maluku has 53, both dominated by Class C and D hospitals, while Class A hospitals are entirely absent. The limited presence of referral and specialized hospitals in these regions indicates a critical gap in access to advanced healthcare services.

As illustrated in Figure 1B, the inter-island comparison highlights the dominance of Java in terms of hospital availability, followed by Sumatra. Other island clusters such as Kalimantan, Sulawesi, Maluku, and Papua have substantially fewer hospitals, with the average number per province far below that of Java. These findings emphasize a pronounced imbalance in healthcare infrastructure across

RESULTS

Indonesia, where densely populated and economically developed regions have greater access to hospital services compared with peripheral and remote areas.

Further analysis of the population-to-hospital ratio demonstrates similar disparities. Provinces in Java, such as the Special Capital Region of Jakarta and Yogyakarta, exhibit a

smaller population per hospital, indicating higher service coverage and easier access to healthcare facilities. Conversely, provinces in eastern Indonesia, including Papua, North Maluku, and East Nusa Tenggara, show significantly higher population-to-hospital ratios, reflecting limited healthcare capacity relative to population size.

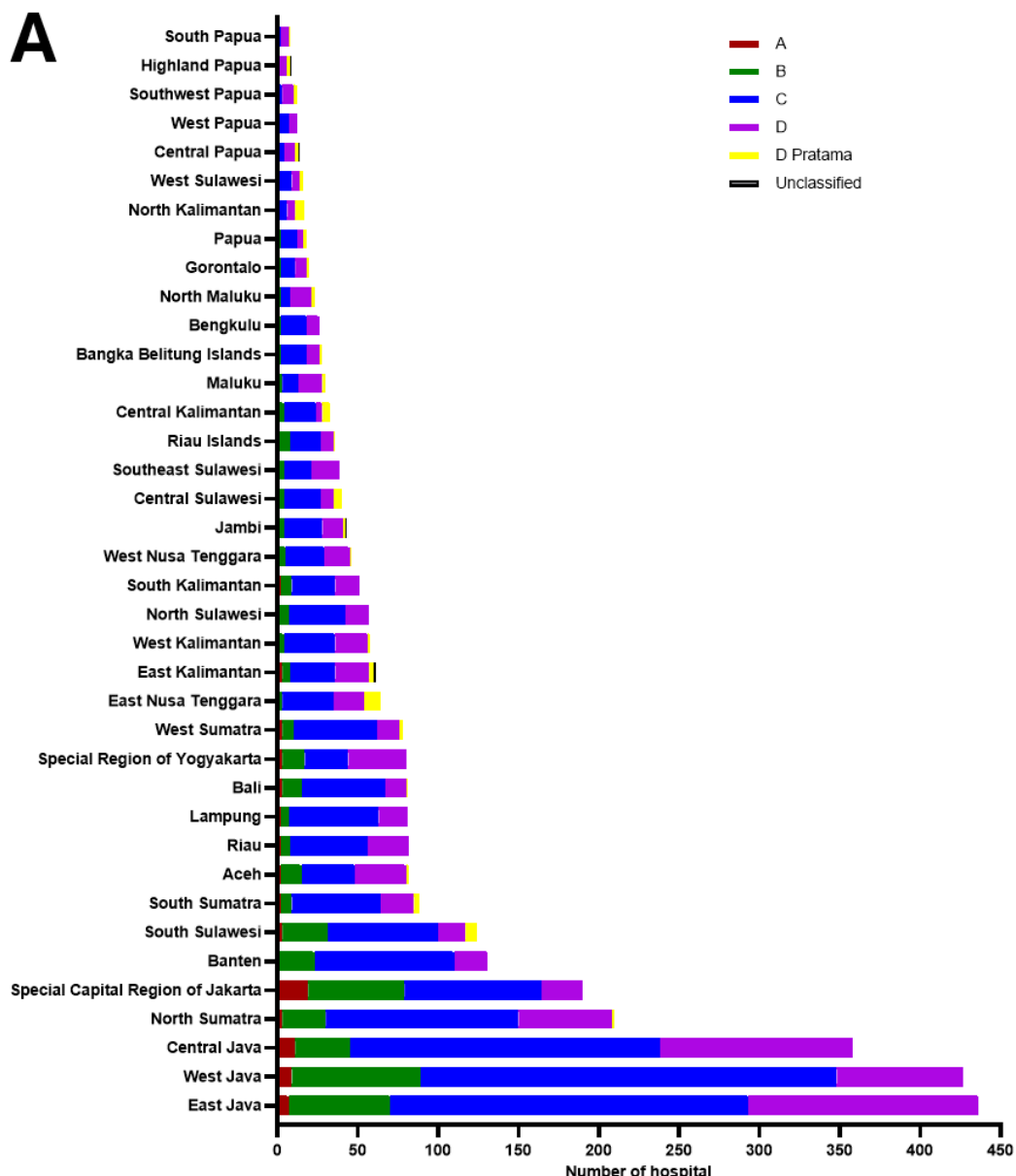


Figure 1A. Distribution of Hospitals in Each Province

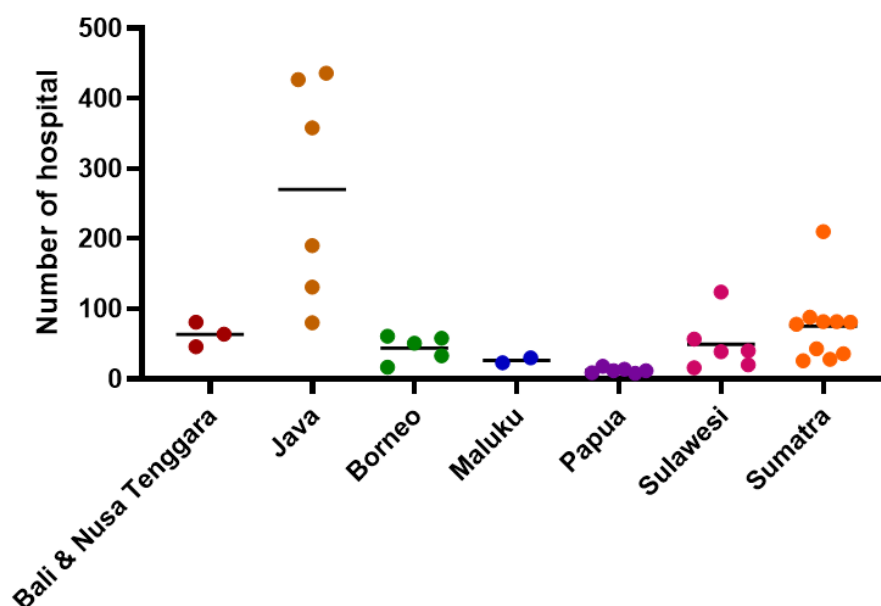


Figure 1B. Distribution number of Hospitals in each region (B)

The distribution of hospitals by class in Indonesia demonstrates substantial inequality, as reflected in data from the Ministry of Health of the Republic of Indonesia (2024). This uneven pattern indicates that the availability of healthcare facilities and service capacity remains highly concentrated in specific regions, particularly in Java and other western parts of the country.

As illustrated in Figure 2A, hospitals in Classes C and D account for the majority of healthcare facilities nationwide, each representing close to 100% of the total number of hospitals. This finding highlights the dominance of basic and intermediate healthcare facilities within Indonesia's hospital system. In contrast, Class A hospitals, which provide advanced and highly specialized medical services, constitute only 47.36% of the total hospital coverage, underscoring the limited presence of tertiary care facilities in many regions. Meanwhile, Class B hospitals account for 89.47% of facilities, signifying their essential role as intermediaries between primary and tertiary healthcare services.

Class A hospitals, characterized by the most comprehensive medical equipment, advanced technology, and full specialist coverage, are largely concentrated in major urban centers and provincial capitals. The Special Capital Region of Jakarta leads with 19 Class A hospitals, followed by Central Java (11 hospitals) and West Java (9 hospitals). Conversely, several provinces in eastern Indonesia, such as Papua, Maluku, and the Nusa Tenggara regions, do not have any Class A hospitals (Figure 2B). This absence of top-tier hospitals highlights a critical imbalance in the distribution of advanced healthcare infrastructure.

A similar pattern is observed in the distribution of Class B hospitals (Figure 2C). These facilities, which provide specialized but less comprehensive services than Class A hospitals, are predominantly located in Java, particularly in the provinces of Jakarta, West Java, and East Java, which have 60, 80, and 63 Class B hospitals, respectively. In stark contrast, provinces in the eastern region, such as Papua, West Papua, and Central Papua, have only one to two Class B hospitals, while several others, including Southwest Papua,

have none at all. This pattern underscores a consistent west–east divide in hospital class distribution, where advanced medical

resources are concentrated in developed and densely populated areas, leaving peripheral regions underserved.

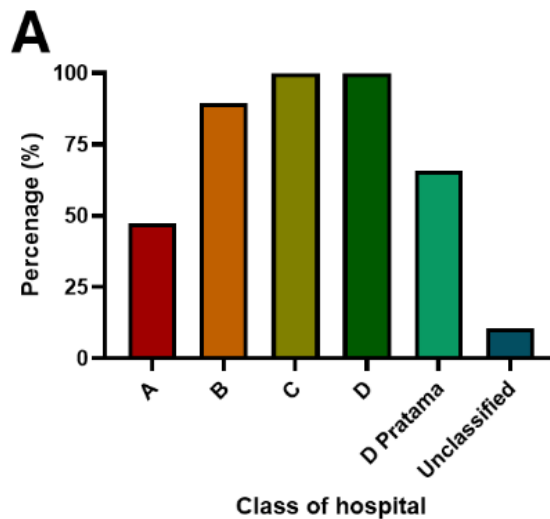


Figure 2. Percentage of hospitals by class stratification (A)

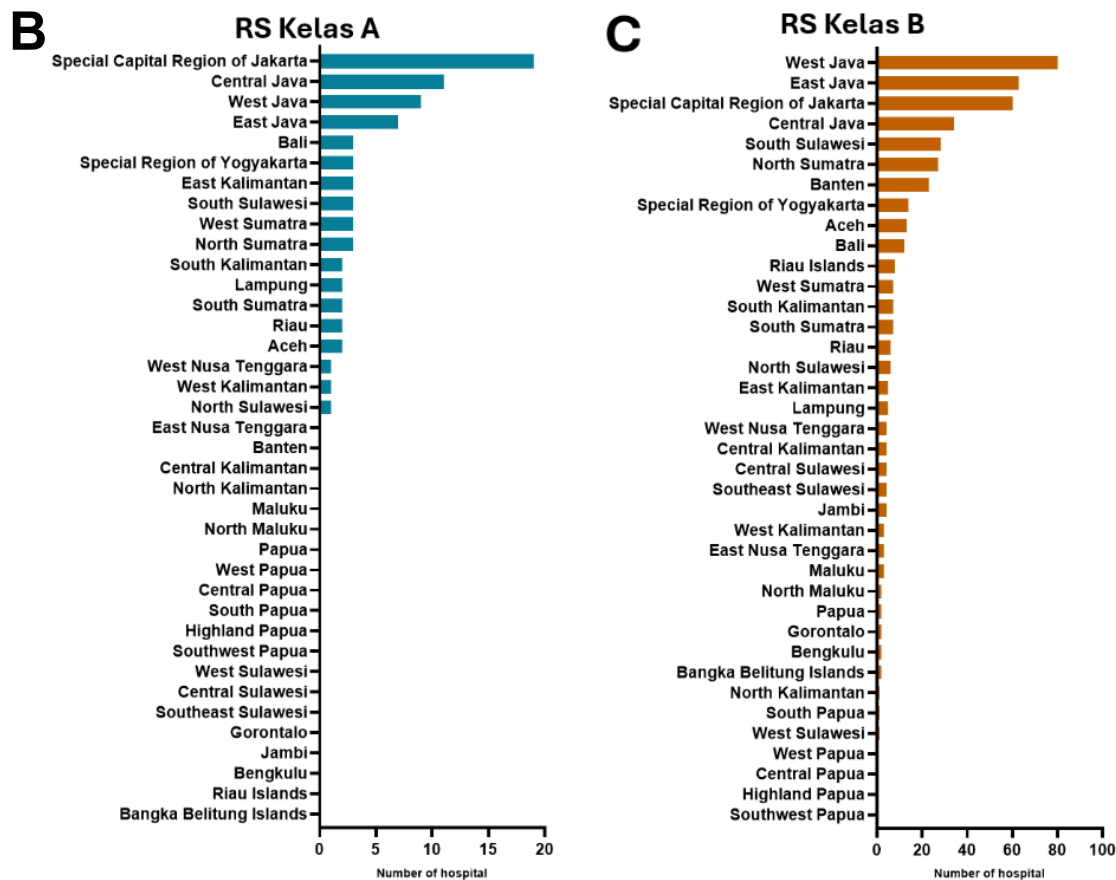


Figure 2. Distribution of Class A stratification hospitals (B) and B stratification hospitals in each province (C)

The inequality in hospital class distribution is further reflected in the population-to-hospital ratio across provinces, which serves as an indicator of accessibility to healthcare services (Figure 3). The analysis reveals significant interprovincial disparities, suggesting that the availability of hospital services is not aligned with population needs across the

country. Provinces with high population density but limited hospital numbers face heavier service burdens, leading to potential overcrowding and unequal access to care. This imbalance highlights the need for more equitable planning and redistribution of healthcare infrastructure to ensure fair access across all regions.

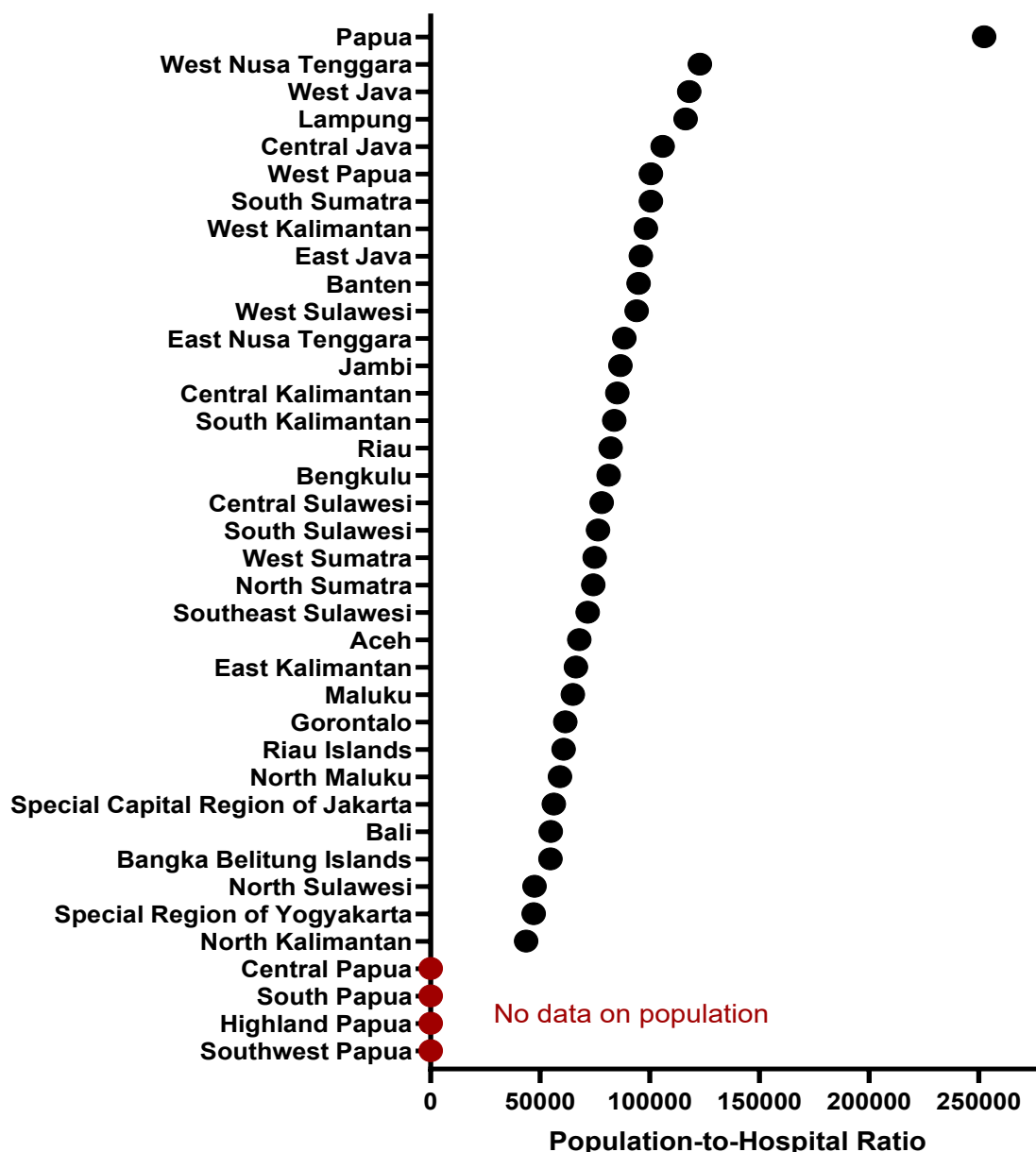


Figure 3. Ratio of the number of hospitals to the population for each province

According to Figure 3, Papua exhibits the highest population-to-hospital ratio, with one hospital serving approximately 252,367 people

far exceeding the national average. In contrast, North Kalimantan has the lowest ratio, at

43,517 people per hospital, suggesting relatively better hospital accessibility in that province. This stark difference indicates that residents in Papua face greater challenges in accessing hospital-based healthcare, likely due to geographic barriers, lower population density, and limited infrastructure.

Regionally, Java, Indonesia's most populous island, shows a relatively high service burden despite having the largest number of hospitals. West Java and Central Java record ratios of 117,904 and 105,844 people per hospital, respectively, demonstrating that rapid population growth in urban areas continues to strain healthcare capacity. Meanwhile, provinces in Sulawesi and Kalimantan, such as North Sulawesi, show more favorable ratios, with only 47,400 people per hospital, indicating better service coverage relative to population size.

However, the eastern provinces, including Papua and West Nusa Tenggara, which record ratios of 252,367 and 122,739 people per hospital, respectively continue to experience limited hospital access. These areas face unique challenges, including difficult terrain, dispersed populations, and uneven economic development. Furthermore, incomplete population data from newly formed provinces such as Southwest Papua, Highlands Papua, South Papua, and Central Papua hinders a comprehensive understanding of healthcare needs in these regions. Overall, the analysis of population-to-hospital ratios reinforces the spatial inequality observed in hospital distribution, emphasizing the need for targeted policies to improve healthcare equity and infrastructure development in underserved regions of Indonesia.

DISCUSSION

Java showed a much larger number of hospitals compared to the other islands. This is inseparable from the fact that Java Island has a much larger population, more developed

infrastructure, and better accessibility than other regions in Indonesia (Kurniawan, 2024; Priatama et al., 2022). As the center of economy, politics, and administration, Java Island has experienced high urbanization, which in turn increases the need for health services. This urbanization has created a conducive environment for the development of hospitals in recent decades, supported by the availability of transportation infrastructure, communication, and medical personnel (Pravitasari, 2015; Wenang et al., 2021; WHO, 2025).

On the other hand, there are disparities in terms of hospital number outside Java island. The main challenges outside Java are limited infrastructure, high logistics costs, and difficult-to-overcome geographical barriers. This affects the distribution of hospitals, especially hospitals with advanced facilities and services (class A and B), which tend to be concentrated in areas with easier access. Eastern Indonesia, such as Papua and Maluku, also faces gaps in the provision of adequate medical personnel, which is a limiting factor in the development of health facilities in these areas (Muharram et al., 2024; Rao and Schmidt, 2023). This inequality is in line with the results of Rodzi (2023), which states that the rate of economic growth and infrastructure development in Indonesia is uneven, with a significant impact on economic, social, and cultural disparities. In this context, the development of hospitals outside Java, especially in areas with a high population-to-hospital ratio, needs to be a priority for national health policy.

In more detail, the differences in hospital distribution based on class also reflect patterns of inequality. In Java, class A and B hospitals are more common compared to other regions. Conversely, in regions such as Nusa Tenggara, Sulawesi, and Sumatra, class D and D Pratama hospitals dominate. This shows that hospitals outside Java tend to focus on basic health services, while advanced services are less

available. This condition has the potential to affect the quality of health services that can be accessed by people in these areas. In an effort to reduce this disparity, the government needs to allocate resources for the construction of class A and B hospitals in areas with urgent needs, improve supporting infrastructure, and provide incentives for medical personnel to work in remote areas. Thus, it is hoped that a more even distribution of hospitals can support increased accessibility and quality of health services throughout Indonesia.

We observed the low percentage of Class A hospital distribution. This condition reflects the major challenges in equalizing high-level health services in Indonesia. Class A hospitals require very high investment in development and operations, which is often difficult to realize in provinces with low populations, limited purchasing power, and inadequate human health resources. This inequality has the potential to hinder people's access to advanced health services, especially in remote areas, and encourage them to seek care in big cities. This disparity results in people in these areas having to travel far to big cities to get specialist health services, which not only increases the burden of costs and time, but also extends the waiting time for services at health facilities in big cities (Shehadeh and Snyder, 2023; Tao and Wang, 2022).

This uneven distribution also impacts the efficiency of the national health care system. The workload in hospitals in big cities becomes very high, while on the other hand, people in remote areas often cannot access basic or specialist health care. This condition worsens the inequity in health care, which can ultimately affect the quality of life of the community as a whole (Iamtrakul et al., 2024). The government needs to pursue strategic policies to reduce this disparity, such as encouraging the construction of class A and B hospitals in areas with high needs, providing incentives for medical personnel to work in

remote areas, and increasing accessibility through the development of supporting infrastructure. With this approach, it is hoped that access to quality health services can be felt evenly by all Indonesian people, regardless of their geographic location.

We observed high ratio of population to hospital in Papua, which indicates a major challenge in providing adequate healthcare, especially in remote and hard-to-reach areas. In contrast, North Kalimantan has the lowest ratio reflecting relatively better access to healthcare facilities in the region. Moreover, the high numbers of ratio in West and Central Java indicate the limitations of health infrastructure that must cope with the pressure of a large population. In term of island, the low ratio in Sulawesi and Kalimantan indicates a more even distribution in some areas with smaller populations.

The high ratio in Papua indicates a poor distribution of health facilities in these regions. The results of this analysis provide important implications for government policy in improving access to health services. The construction of new hospitals in areas with high population ratios needs to be a priority, especially in Papua and West Nusa Tenggara. In addition, the government also needs to improve transportation infrastructure to increase accessibility to health facilities in remote areas. These efforts must be balanced with incentives for medical personnel to work in areas with limited access to health services (Chen et al., 2023; Chowdhury and Ravi, 2022; van den Heever, 2016). With these steps, it is hoped that the gap in accessibility of health services between regions can be reduced, so that people throughout Indonesia receive equal and quality health services.

The results of the analysis show inequality in the distribution of hospitals in Indonesia, both in terms of number, class, and ratio to population. Java Island has the highest

number of hospitals, but the ratio to population in several provinces is still not ideal, while areas outside Java, especially Eastern Indonesia, face geographical, economic, and infrastructure challenges that worsen the accessibility of health services. Class A and B hospitals that offer complete services tend to be concentrated in large cities, so that people in remote areas have to travel long distances at high costs to get adequate health services. This study emphasizes the importance of equitable health infrastructure development, increasing accessibility, and adjusting the ratio of hospitals to the population in disadvantaged areas to realize justice in health services throughout Indonesia.

AUTHOR CONTRIBUTION

All authors have made significant contributions to the data analysis as well as preparing the final manuscript.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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