

THE RATIO OF UROLOGISTS FOR EACH REGENCY AND CITY IN EAST JAVA INDONESIA AND THE INDICATORS AFFECTING THEIR DISTRIBUTION

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ABSTRACT

Objective: Research on the distribution of urology in Indonesia, especially in East Java, has not been widely discussed. There are still several areas in East Java that do not have a urologist at all. We try to find out the factors underlying this distribution through several indicators. **Material & Methods:** Data from all hospitals in East Java were compiled with data of urologists in East Java obtained from the Indonesian Urological Association, supplemented by information from social media and the telephone of the hospital operator. The number of urologists and hospitals with urology services is then correlated with the human development index, the education index, purchasing power index, health index, and regional minimum wage. **Results:** The ratio of urologists in each district and city in East Java is not evenly distributed, and likewise with the hospitals that provide urology services in each district and city in East Java. The ratio of urologists and the number of hospitals providing urology services are significantly related to the human development index, the education index, the purchasing power index, the health index, and the regional minimum wage. **Conclusion:** The location of a urologist's practice is related to the development of an area, which in this study is assessed through indicators of human development, education, health, and economy.

Keywords: Urologist Ratio, East Java, Urology.

ABSTRAK

Tujuan: Penelitian tentang persebaran urologi di Indonesia terutama di Jawa Timur masih belum banyak dibahas. Masih ada beberapa daerah di Jawa Timur yang sama sekali belum memiliki dokter urologi. Kami mencoba mencari tahu faktor yang mendasari persebaran ini lewat beberapa indikator. **Bahan & Cara:** Data seluruh rumah sakit di Jawa Timur dihimpun dengan data dokter spesialis urologi di Jawa Timur yang didapatkan dari Ikatan Ahli Urologi Indonesia/ Indonesian Urological Association, ditambah dengan informasi dari media sosial dan telepon operator rumah sakit. Jumlah dokter urologi dan rumah sakit dengan pelayanan urologi, kemudian dikorelasikan dengan indeks pembangunan manusia, indeks pendidikan, indeks daya beli, indeks kesehatan, dan upah minimum regional. **Hasil:** Rasio dokter urologi di tiap kabupaten dan kota di Jawa Timur masih belum merata, begitu juga dengan rumah sakit dengan pelayanan urologi di tiap kabupaten dan kota di Jawa Timur. Rasio dokter urologi dan jumlah rumah sakit dengan pelayanan urologi berhubungan signifikan dengan indeks pembangunan manusia, indeks pendidikan, indeks daya beli, indeks kesehatan, dan upah minimum regional pada suatu daerah. **Simpulan:** Penyebaran dokter spesialis urologi berhubungan dengan kemajuan suatu daerah, yang dalam penelitian ini dinilai lewat indikator pembangunan manusia, pendidikan, kesehatan, dan ekonomi.

Kata kunci: Rasio Dokter Urologi, Jawa Timur, Urologi.

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INTRODUCTION

There is currently no research that examines the ratio of urologists to the population in Indonesia. The need for urology specialists has not yet become a significant priority for the Indonesian government. Moreover, with the continuous growth of Indonesia's

population, the demand for urologists to meet the healthcare needs of the population is also increasing. From 2015 to 2022, Indonesia's population increased from 255.6 million to 275.8 million. While the population of East Java is of concern in this study, in 2015 amounted to 38.9 million people, and in 2022 there were 41.2 million people. To keep up with the

increasing population in Indonesia especially in East Java, there are only five educational centers for training urologists in Indonesia with an average annual production of 40–50 urologists.

The number of urology doctors spread across Indonesia reached 569 doctors in August 2021. Nevertheless, this number is not optimal enough to serve Indonesia's population of 275.8 million in 2022. In addition, the ratio of urologists to the ideal population is still being debated. As a measurement reference, several studies have used the ratio of 1 urologist per 100,000 population.¹⁻² We also use this reference for this research. Furthermore, the issue extends beyond the ratio and distribution of urologists, as the number of hospitals offering urology services remains insufficient.

Urologists tend to have specific preferences when selecting the areas where they provide services, often favoring locations with easy access to major cities and regions or cities with advanced infrastructure and development

OBJECTIVE

This study focuses on the distribution of urologists in East Java, and hospitals providing urology services in East Java. Researchers also looked for factors to infer patterns of districts/cities preferred by urologists. Variables used include the human development index, education index, purchasing power index, health index, and the regional minimum wage.

MATERIAL&METHODS

This research was conducted from December 2022 to January 2023. The researchers collected data on the number of urologists for each region from the Indonesian Urological Association. The researchers also took data on the list of hospitals in East Java through data from the Indonesian Ministry of Health. Researchers then examined the urologists at every hospital in East Java, through social media and hospital websites. If the data is still insufficient or doubtful, the researcher calls the hospital operator to ensure the correctness of the data.

Certain independent variables in this study were human development index, education index, purchasing power index, health index, and regional minimum wage. While the dependent variables used are the ratio of urologists and the number of hospitals that have urology services.

The choropleth of each district and city in East Java is presented to show the distribution of urology ratios and the distribution of hospitals with urology services. Choropleth presented using Tableau for Public. The data were then analyzed using SPSS Version 20. Researchers used the Spearman test to assess the relationship between the urology ratio per 100,000 population and the number of hospitals with urology services on the education index, human development index, purchasing power index, health index, and regional minimum wage.

RESULTS

The main result of this study is Choropleth which describes the distribution of urologists with a ratio per 100,000 population in East Java. Researchers divided the distribution into: 0, 0-0.2, 0.2-0.4, 0.4-0.6, 0.6-0.8, 0.8-1, and greater than 1.

Although the Indonesian Urological Association has been established in 1981, in East Java, there are still three regencies that do not have a urologist at all. Namely, Pacitan Regency, Sampang Regency, and Sumenep Regency. Rather, several cities have a ratio that exceeds 1, especially in big cities such as Surabaya City, Malang City, Mojokerto City, Blitar City, Madiun City, and Malang Regency. Most areas in East Java have a ratio of 0.2-0.4 urologists per 100.000 population.

The distribution of hospitals providing urology services in East Java is quite diverse. Until 2023, there are still several areas that do not have a hospital with urologist services at all. Such as Pacitan Regency, Sampang Regency, and Sumenep Regency. Nevertheless, several big cities have a much larger number of hospitals with urology services, such as Surabaya City, Malang City, Kediri Regency, Malang Regency, Sidoarjo Regency, and Lamongan Regency.

The researcher then conducted a Spearman Correlation statistical test of the ratio of urologists and the number of hospitals providing urology services to the human development index, education index, purchasing power index, health index, and regional minimum wage.

The ratio of urologists and the number of hospitals having urology services has a significant relationship with all previously mentioned variables. Correlation values between the ratio of urologists to several variables showed varying correlation strengths. The ratio of urologists to the human development index, education index, purchasing power index, and health index shows strong

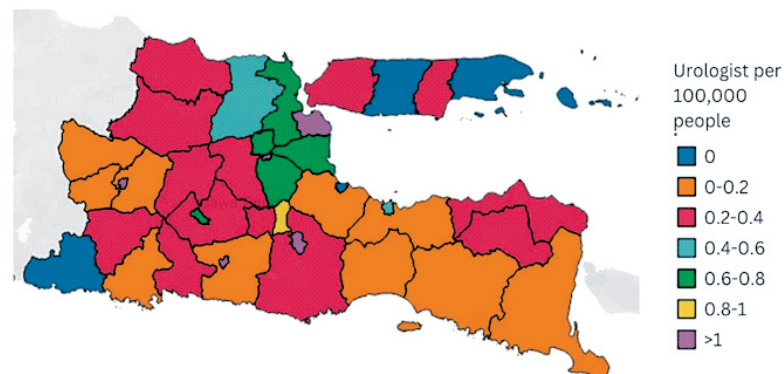


Figure 1. The ratio of urologists per 100.000 people in each regency and city in East Java.

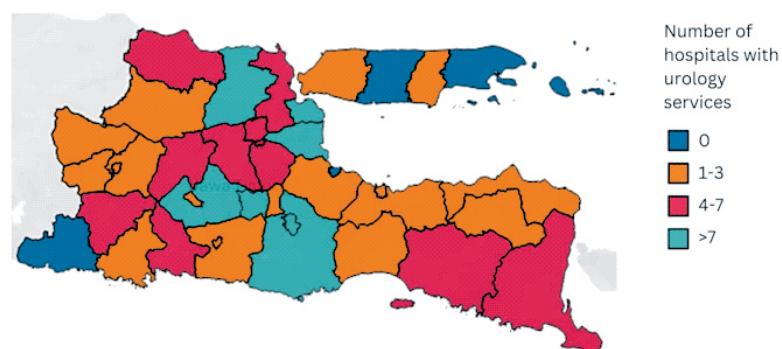


Figure 2. Number of Hospitals with Urology Services for each Regency and City in East Java.

Table 1. Pearson correlation of urologist ratio and number of hospitals with certain indicators.

No	Mean	Standard Deviation		Urologists Ratio		Number of Hospitals with Urology Services	
				r	p-value	r	p-value
Human Development Index	7296.92	507.7		0.691	<0.001	0.422	0.008
Education Index	64.13	7.28		0.678	<0.001	0.397	0.014
Purchasing Power Index	0.74	0.06		0.638	<0.001	0.393	0.015
	Median	Minimum	Maximum	Urologists Ratio		Number of Hospitals with Urology Services	
				r	p-value	r	p-value
Health Index	0.81	0.72	0.83	0.517	0.001	0.414	0.010
Regional minimum wage	IDR 2.261.495,50	IDR 2.114.335	IDR 4.525.479	0.397	0.013	0.520	0.001

correlation strength. Meanwhile, the ratio of urologists to regional minimum wages has a moderate correlation strength.

The number of hospitals with urology services also has a varied correlation with several variables. The number of hospitals with urology services to the human development index, education index, purchasing power index, and health index, has a moderate correlation strength. The number of hospitals providing urology services and the regional minimum wage have a strong correlation.

DISCUSSION

In this study, we tried to map the distribution of urologists in East Java. The ratio of urologists to the total population, which has a ratio exceeding 1, is only found in big cities in East Java, especially in cities that have urology education centers, such as Surabaya City and Malang City. While this ratio is 0 in areas where access to the area is difficult, such as Pacitan Regency, Sampang Regency, and Sumenep Regency. Other areas with relatively easy access, such as those on the north coast of Java Island, which are the main routes between provinces, tend to have a larger ratio than areas with relatively more difficult access, such as areas along the south coast of Java, where the ratio is mostly 0-0.2. Areas on the north coast of Java are also supported by closer and easier access to the capital city of East Java, Surabaya City. This finding is similar to conditions found in America, South Korea, and India, where urologists practice more in metropolitan areas.¹⁻³ This finding is similar to conditions found in America, South Korea, and India, where urologists practice more in metropolitan areas.¹⁻³

The total number of urologists in Indonesia in 2021 is only 569, compared to Indonesia's total population of 270 million people, every 1 urologist will serve 474.516 people. This is very different from conditions in America in 2022, where 1 urologist could serve as many as 32.395 people.

Furthermore, with a study in South Korea in 2012, this ratio reached 4-6 urologists per 100.000 population.² The numbers in Indonesia are still better than in India, with 1 urologist serving a total of 564.171 people.³ In East Java, the majority of areas that have hospitals with urology services are in big cities such as Surabaya and Malang. Both cities also have urology education centers. On the other hand, there are still many areas that only have 1-3 hospitals with urology services, and there are even areas that do not yet have urologists. Previously, there had been

no research discussing the distribution of hospitals providing urology services, so this situation could not be compared to other countries or regions in Indonesia. The human development index is significantly related to the ratio of urologists, as well as the number of hospitals providing urology services. Referring to the United Nations Development Program, the assessment of the human development index aims to assess that the development of a region does not only refer to income but also to the quality of human resources.

The education index also has a significant relationship with the ratio of urologists and hospitals providing urology services. Internationally, the United Nations has created an education index measurement that is assessed based on adult literacy rates and the combined gross enrollment ratio of primary, secondary, and tertiary education. This description is consistent with previous studies which found that urologists practice more in areas with higher levels of education.¹ The high ratio in urban areas such as Surabaya City and Malang City is in line with the role of these two areas in having urology education centers. Which, the existence of an education center (training hospital) is a factor that greatly influences this spread.²

The regional purchasing power index and minimum wage are significantly related to the ratio of urologists and the number of hospitals providing urology services. In other countries where economic development has played a role in improving population health, studies in China show that the greater the GDP (Gross Domestic Product) in an area, the health of the population in that region will also improve.⁴ It seems that they influence each other, increasing the degree of health in groups of people, is also closely related to economic development. Obviously, these educational and economic developments are also supported by development in educational and economic development both nationally and internationally.⁵ Other studies examining the accessibility and utilization of medications, particularly those related to diabetes treatment and CDC-recommended vaccines, have shown disparities linked to poverty levels, types of insurance used by different population groups, and educational attainment.⁶

Considering that the variables in this study are correlated, the government must be able to create equal access to health in each regency and city. Thus, every individual has the same opportunity to get health services through equal distribution of health resources, including health workers, health facilities,

Table 2. Number of urologists, urologists ratio, and number of hospitals with urology services.

No	Regency/ City	Number of Urologists	Ratio of Urologists Per 100.000 Population	Number of Hospitals With Urology Services	Total Population 2023
1	Pacitan Regency	0	0	0	596.649
2	Ponorogo Regency	2	0.21	4	972.582
3	Tulungagung Regency	3	0.27	5	1.113.973
4	Trenggalek Regency	1	0.13	1	744.358
5	Blitar Regency	2	0.16	3	1.249.497
6	Kediri Regency	6	0.36	9	1.667.450
7	Malang Regency	7	0.26	10	2.703.175
8	Lumajang Regency	1	0.09	3	1.147.261
9	Jember Regency	5	0.19	6	2.584.771
10	Banyuwangi Regency	2	0.11	4	1.744.814
11	Bondowoso Regency	2	0.26	2	784.192
12	Situbondo Regency	2	0.29	3	694.081
13	Probolinggo Regency	1	0.09	2	1.163.859
14	Pasuruan Regency	2	0.12	2	1.626.029
15	Sidoarjo Regency	13	0.61	12	2.114.588
16	Mojokerto Regency	7	0.61	5	1.141.516
17	Jombang Regency	3	0.22	5	1.345.886
18	Nganjuk Regency	3	0.27	4	1.124.247
19	Madiun Regency	1	0.13	1	765.135
20	Magetan Regency	1	0.15	1	682.466
21	Ngawi Regency	1	0.11	1	881.393
22	Bojonegoro Regency	4	0.3	2	1.322.474
23	Tuban Regency	4	0.33	6	1.215.795
24	Lamongan Regency	7	0.5	8	1.386.941
25	Gresik Regency	10	0.74	7	1.344.648
26	Bangkalan Regency	3	0.27	2	1.101.556
27	Sampang Regency	0	0	0	992.210
28	Pamekasan Regency	2	0.23	1	862.009
29	Sumenep Regency	0	0	0	1.143.295
30	Kediri City	2	0.69	3	290.836
31	Blitar City	2	1.3	3	153.541
32	Malang City	14	1.65	8	847.182
33	Probolinggo City	1	0.41	1	245.174
34	Pasuruan City	0	0	0	213.450
35	Mojokerto City	3	2.22	4	135.414
36	Madiun City	3	1.49	3	201.460
37	Surabaya City	42	1.45	33	2.893.698
38	Batu City	2	0.91	3	218.802

and sources of health development funds.⁷ A high urologist ratio will increase the number of diagnoses and also decrease the high mortality rate of urological disease. An increase in the ratio of urologists in an area significantly reduces the

mortality rate for prostate cancer, bladder cancer, and kidney cancer.⁸ It is necessary to find a solution for the deployment of urologists practice and hospitals with urology services to accelerate its increase, considering that diseases in urology will

continue to increase, such as the incidence of urolithiasis in Indonesia which can reach 8.3% with a peak at the age of 30-60 years.⁹ Furthermore, the economic impact of urolithiasis in the United States is estimated to cost up to 5 billion dollars per year, calculated from direct and indirect impacts such as loss of productivity.¹⁰ Studies on the factors influencing urologists' workplace selection are still limited. One study that represents this is the finding that factors such as a good workplace, career and professional development, non-work-related issues, personal contacts, and salary are key determinants affecting healthcare professionals' choice of workplace.¹¹

Several areas such as Surabaya City, the number of urologists has reached 42 people, even though they only serve 2.9 million people. Rather, there is the Pacitan Regency with 590 thousand people, which has not been served by a single urologist. Developed countries such as the United States and South Korea still have the same problem regarding this distribution.¹⁻² The key factors influencing a urologist's decision to work in rural areas include strong personal motivation and a rural background, therefore healthcare workers with these characteristics are more inclined to serve in rural regions.¹² However, there is currently a lack of research specifically examining the opinions of Indonesian urologists on their workplace preferences. Exploring this topic would provide valuable insights and could be an interesting area for further study

CONCLUSION

The distribution of urologists in East Java is still uneven. A high ratio of urologists was found in big cities which have hospital training, such as Surabaya City and Malang City, followed by regencies or cities around the two cities. Likewise, there are many hospitals with urology services in big cities and surrounding cities that have easy access to big cities. There are still several areas in East Java, such as Pacitan Regency, Sampang Regency, and Sumenep Regency that do not yet have a urologist.

The ratio of urologists and the number of hospitals providing urology services are significantly related to the human development index, education index, health index, purchasing

power index, and regional minimum wage. These results indicate that many urologists prefer to practice in developed regions as measured by the quality of human resources, education, health, and economy.

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