

DISTRIBUTION ANALYSIS OF DOCTORS IN INDONESIA

Analisis Distribusi Tenaga Dokter di Indonesia

*Agung Dwi Laksono¹, Ilham Akhsanu Ridlo^{2,3}, Ernawaty^{2,3}

¹National Institute of Health Research and Development, Indonesia Ministry of Health, Indonesia

²Department of Health Services Research and Policy
Research School of Population Health, Faculty of Public Health, Universitas Airlangga, Indonesia

³The Airlangga Centre for Health Policy Research Group, Indonesia

*Correspondence: agung.dwi.laksono-2016@fkm.unair.ac.id

ABSTRACT

Background: The distribution of health workers in Indonesia raises an interesting discussion since Indonesia, as an archipelagic country, faces various challenges, including a wide geographical area, in fulfilling equitable health services.

Aim: This study identifies factors related to the distribution of doctors in Indonesian provinces.

Methods: An advanced analysis of the secondary data was performed according to the "Data and Information: Indonesian Health Profile in 2017." The units that were analyzed in this study represented the 34 provinces of Indonesia. The variables that were assessed denoted the population, specifically the density and percentage of the poor population, as well as the number of doctors, hospitals, and primary healthcare centers.

Results: The variability regarding the number of doctors was significant. A higher population increased the attraction for doctors to practice in the provinces. Furthermore, the study revealed the tendency of doctors to elect to work in provinces with more hospitals and primary healthcare centers.

Conclusions: Of the five independent variables studied, four were related to the number of doctors distributed in the provinces. Population, density, the number of hospitals, and the number of primary healthcare centers were positively related to the number of doctors. The results of this study were pertinent to the policy regarding the redistribution of doctors in Indonesia.

Keywords: distribution analysis, doctor distribution, health resources management, health workers.

ABSTRAK

Latar Belakang: Distribusi tenaga kesehatan menjadi kajian penting di Indonesia yang memiliki rentang geografis yang luas, dan tantangan sebagai negara kepulauan bagi terpenuhinya pelayanan kesehatan yang adil dan merata untuk seluruh masyarakat tanpa kecuali.

Tujuan: Penelitian dilakukan untuk menjawab faktor-faktor yang berkaitan dengan distribusi tenaga dokter berdasarkan provinsi di Indonesia.

Metode: Analisis lanjut data sekunder dari "Data dan Informasi: Profil Kesehatan Indonesia tahun 2017". Unit analisis dalam studi ini adalah provinsi, seluruh 34 provinsi di Indonesia dianalisis. Variabel yang dianalisis adalah jumlah tenaga dokter, jumlah penduduk, densitas, persentase penduduk miskin, jumlah rumah sakit, dan jumlah Puskesmas.

Hasil: Variabilitas ketersediaan tenaga dokter yang sangat lebar. Semakin banyak jumlah penduduk, semakin menarik bagi para tenaga dokter untuk berpraktik di provinsi tersebut. Ditemukan juga bahwa dokter cenderung memilih untuk bekerja di provinsi yang memiliki lebih banyak rumah sakit dan puskesmas.

Kesimpulan: Dari lima variabel independen yang diteliti, ada empat variabel yang terkait dengan jumlah dokter. Variabel jumlah penduduk, densitas penduduk, jumlah rumah sakit, dan jumlah Puskesmas berhubungan secara positif dengan jumlah tenaga dokter. Hasil penelitian ini dinilai penting sebagai dasar kebijakan untuk melakukan redistribusi tenaga dokter di Indonesia.

Kata kunci: analisis distribusi, distribusi tenaga dokter, manajemen sumberdaya kesehatan, tenaga kesehatan.

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INTRODUCTION

The distribution of health workers in Indonesia is prominent to discuss since

Indonesia as an archipelagic country has a broad geography in providing equal health services for all communities. The Indonesian government aims to improve

the health status in all regions of the country, ensuring equal access to health services by citizens from remote parts, peripheral areas, borders, and islands (Suharmiati, Laksono, and Astuti, 2013; Senewe and Elsi, 2014; Soewondo *et al.*, 2019).

The National Long-Term Development Plan (RPJP-N) 2005-2025 focuses on health and how to achieve good quality and competence of human resources and improve the Indonesian Human Development Index. Moreover, the government directs the national development of the health sector to increase awareness, willingness, and the ability of everyone to lead a healthy lifestyle, allowing the health status of all citizens to improve. Health workers, including doctors, are key players in achieving the health development goals since they are responsible for up to 80% of the increase on this front (Tangcharoensathien, Mills and Palu, 2015).

The governments of various countries are currently involved in efforts to achieve health equality, especially for people who are considered vulnerable and disadvantaged. The most significant challenge is ensuring that peripheral, backward, and remote areas also have access to qualified health services, competent health workers, and adequate healthcare facilities. The distribution of doctors in Indonesia presents problems in providing equal rights to every citizen. Equality is defined as no difference between groups of people in terms of social, economic, demographic, or geographical factors (Bambra, 2016).

Health inequality, especially the unfair availability of doctors, involves health determinants, such as community access to healthcare facilities. Furthermore, it is related to the government's failure to overcome inequality, evidenced by the violation of justice and human rights (Fu *et*

al., 2018; Tayyari Dehbarez *et al.*, 2018). The unequal distribution and geographical imbalance add to the challenges. Distributing and placing an adequate number of quality health workers in disadvantaged areas significantly increases the level of equal health services. Indonesia still displays a substantial disparity between urban and rural areas (Wulandari and Laksono, 2019), as well as between the respective regions, districts, and provinces in the country (Laksono, Wulandari, and Soedirham, 2019). Data from the Board for Development and Empowerment of Human Resources in Public Health in 2019 explained that the distribution of health workers can be derived from the ratio of doctors in parts of Jakarta Province with 65 doctors per 100,000 people, while West Java and Banten have 11 doctors per 100,000 citizens. Disparities are also found in West Sulawesi Province with 12 doctors per 100,000 people, while Maluku and East Nusa Tenggara Province have 14 doctors for the same number of citizens.

The distribution ratio of doctors to the number of people is affected by geographical and demographic problems. Furthermore, access to basic health services requires more attention in terms of geography. Sufficient actions and policies are required to deal with the challenges presented by doctor distribution, especially in the era of National Health Insurance (Karan *et al.*, 2019). Therefore, this study aims to identify factors related to the distribution of doctors in Indonesian provinces, which can provide suggestions for those involved in the policy-making of health worker distribution.

METHODS

This study represented an analysis of secondary data from the "Data and Information: Indonesian Health Profile 2017" issued by the Health Data and

Information Center, Indonesian Ministry of Health (Indonesian Ministry of Health, 2018). The profile book was provided on www.pusdatin.kemkes.go.id, while the analysis involved 34 Indonesian provinces.

The dependent variable was designated as "Number of Doctors." The number of doctors included general and specialist physicians practicing in certain provinces. An additional five variables were assessed, namely population, density, the percentage of poor people, the number of hospitals, and the number of primary healthcare centers. These variables were each categorized into five statistical

distribution strata. The cross-tabulation of the individual variables with that of the "Number of Doctors" simplified the analysis of doctor distribution.

RESULTS AND DISCUSSION

Figure 1 shows the distribution of the available number of doctors per province in Indonesia, which appears to be more extensive on Java Island. Additionally, more doctors seem to be available in Western Indonesia than in Eastern Indonesia.

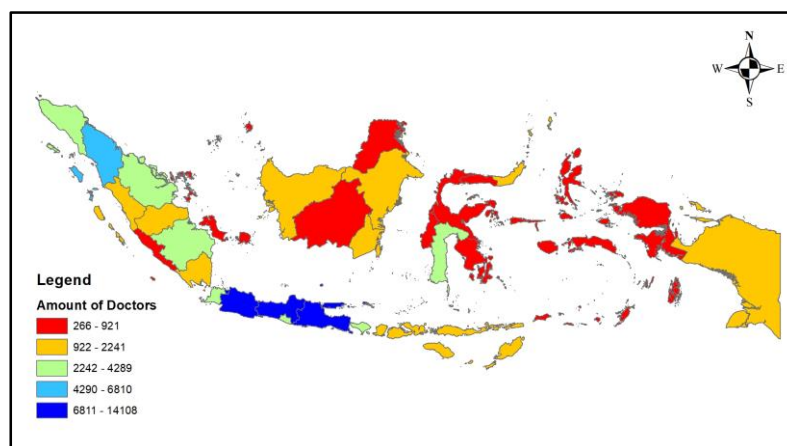


Figure 1. Distribution of the Number of Doctors based in Provinces in Indonesia in 2017.

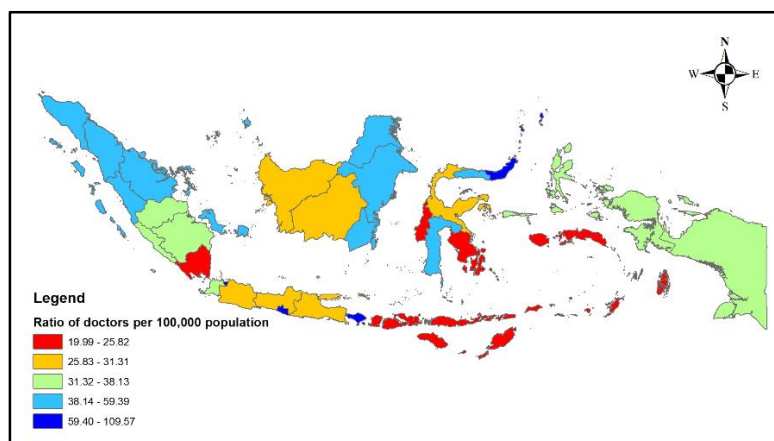


Figure 2. Distribution of the Doctor Ratio per 100,000 People, based on Provinces in Indonesia in 2017.

Figure 2, which maps the ratio of doctors per 100,000 people, shows

different conditions. Some provinces in Java Island exhibit a lower ratio.

Table 1 shows extensive variability in the number of physicians. The highest number of doctors is evident in West Java Province, with as many as 14,108, while West Sulawesi Province has the least number of physicians at 266.

Table 2 indicates that doctors tend to gather in provinces with large populations.

It also explains that there is an increase in the number of doctors in conjunction with a rise in the population of each province, as illustrated in Figure 1. Provinces in Eastern Indonesia have fewer doctors than Java and Sumatra.

Table 1. Descriptive Statistics of the Number of Doctors and Other Related Variables.

Variables	N	Min	Max	Mean	Std Deviation
Number of doctors	34	266	14108	2932.44	3632.620
Number of Populations	34	691,058	48037,827	7,702,672.71	11,003,254.853
Percentage of Poor Population	34	3.78%	27.76%	10.95%	0.0578730
Population Density	34	9.16	15,623.61	727.1847	2,661.62002
Number of hospitals	34	10	393	81.65	96.411
Number of primary healthcare centers	34	49	1056	288.97	243.159

Table 2. Cross Tabulation of the Number of Doctors and Population in Indonesia 2017.

Number of Populations	Number of Doctors					Total
	< 637	637 - 1,125	1,126 - 2,059	2,060 - 3,708	> 3,708	
< 1,744,654	7 100.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	7 100.0%
1,744,654 - 3,265,202	0 0.0%	6 85.7%	1 14.3%	0 0.0%	0 0.0%	7 100.0%
3,265,203 - 4,955,578	0 0.0%	0 0.0%	5 71.4%	2 28.6%	0 0.0%	7 100.0%
4,955,579 - 8,690,294	0 0.0%	1 14.3%	1 14.3%	5 71.4%	0 0.0%	7 100.0%
> 8,690,294	0 0.0%	0 0.0%	0 0.0%	0 0.0%	6 100.0%	6 100.0%

A cross-tabulation between the number of doctors and the population in all provinces shows that the category denoting a meager population (<1,744,654 people) contained very few doctors (< 637 doctors). Whereas, the category signifying an exceedingly large population (>8,690,294 people) presented a substantial number of doctors (>3,708 doctors). This means that the number of doctors is positively related to the population of a province. Therefore, the higher the population of a province, the

higher the interest of doctors in working there.

The number of doctors was cross-tabulated with the density or population density in each province, as seen in Table 3. The category denoting the non-dense population (<37.19 people per kilometer) was dominated by a low number of doctors (<637 doctors). However, an exceedingly high number of doctors (>3,708 doctors) resided in areas that were densely populated (>734.69 people per kilometer).

Consequently, the number of doctors is positively associated with the population density in a province. In other words, doctors are more interested in conducting practices in densely populated regions.

The results regarding the cross-tabulation of the number of doctors and the percentage of poor people exhibited the same trend. A low percentage of poor people (<6.08% poor people) corresponded with a low number of doctors (<637 doctors). Contrarily, an extremely high percentage of poor people (>15.58% poor people) were dominated by an exceedingly large number of doctors (>3,708 doctors). However, different trends were evident in other categories. For

instance, a medium percentage of poor people was associated with a large number of doctors, while a medium number of doctors worked in provinces with a large percentage of poor people.

Regarding the number of hospitals in all provinces, very few doctors (<637 doctors) worked in provinces that did not have many hospitals (<22 hospitals). Conversely, a large number of hospitals (>100 hospitals) tended to attract many doctors (>3,708 doctors). Therefore, these results indicate that the number of doctors is positively related to the number of hospitals in a province. Provinces with a larger number of hospitals will have more doctors.

Table 3. Cross Tabulation of the Number of Doctors and Population Density per Kilometer in Indonesia 2017.

Density	Number of Doctors					Total
	< 637	637 - 1,125	1,126 - 2,059	2,060 - 3,708	> 3,708	
<37.19	3 42.9%	2 28.6%	2 28.6%	0 0.0%	0 0.0%	7 100.0%
37.19 - 87.12	3 42.9%	2 28.6%	1 14.3%	1 14.3%	0 0.0%	7 100.0%
87.13 - 126.66	1 14.3%	2 28.6%	1 14.3%	3 42.9%	0 0.0%	7 100.0%
126.67 - 734.69	0 0.0%	1 14.3%	3 42.9%	2 28.6%	1 14.3%	7 100.0%
>734.69	0 0.0%	0 0.0%	0 0.0%	1 16.7%	5 83.3%	6 100.0%

The previous results are also indicative of the relationship between the number of doctors and the number of primary healthcare centers. Provinces with very few primary healthcare centers (<121 primary healthcare centers) were dominated by a low number of doctors (< 637 doctors). Therefore, a large number of doctors (> 3,708 doctors) tended to conduct practices in provinces with a large number of primary healthcare centers (>372 primary healthcare centers), indicating that the number of primary

healthcare centers exhibited a linear relationship with the number of doctors.

However, Table 6 shows a very few number of primary healthcare centers have a medium number of doctors. This may be attributed to various factors affecting the distribution of physicians and requires further research.

The distribution of doctors among provinces showed extensive variability. West Sulawesi Province had 266 doctors, while this number reached 14,108 in West Java Province. The results also showed

that the number of doctors was positively related to population, density, the number of hospitals, and the number of primary healthcare centers. This situation was the result of health service policies issued by the government. For example, until 2014, the policy involving primary healthcare centers stipulated a standard ratio of a primary healthcare center per 30,000 residents. Due to the progressive

development of primary healthcare centers in 2014, the ratio per resident was changed to per district. This policy is still currently valid. Although the quota of doctors in Indonesia has been exceeded, more than 700 primary healthcare centers lack doctors. This is due to the unequal distribution of human resources, which often dominates Java-Bali (Indonesian Ministry of Health, 2019).

Table 4. Cross Tabulation Number of Doctors and Percentage of Poor Population in Indonesia in 2017.

Percentage of Poor Populations	Number of Doctors					Total
	< 637	637 - 1,125	1,126 - 2,059	2,060 - 3,708	> 3,708	
<6.08%	3	2	2	0	0	7
	42.9%	28.6%	28.6%	0.0%	0.0%	100.0%
6.08% - 7.86%	3	2	1	1	0	7
	42.9%	28.6%	14.3%	14.3%	0.0%	100.0%
7.87% - 11.97%	1	2	1	3	0	7
	14.3%	28.6%	14.3%	42.9%	0.0%	100.0%
11.98% - 15.58%	0	1	3	2	1	7
	0.0%	14.3%	42.9%	28.6%	14.3%	100.0%
>15.58%	0	0	0	1	5	6
	0.0%	0.0%	0.0%	16.7%	83.3%	100.0%

Table 5. Cross Tabulation of the Number of Doctors and Number of Hospitals in Indonesia in 2017.

Number of Hospitals	Number of Doctors					Total
	< 637	637 - 1,125	1,126 - 2,059	2,060 - 3,708	> 3,708	
< 22	6	2	0	0	0	8
	75.0%	25.0%	0.0%	0.0%	0.0%	100.0%
22 - 35	1	3	2	0	0	6
	16.7%	50.0%	33.3%	0.0%	0.0%	100.0%
36 - 63	0	2	4	1	0	7
	0.0%	28.6%	57.1%	14.3%	0.0%	100.0%
64 - 100	0	0	1	6	0	7
	0.0%	0.0%	14.3%	85.7%	0.0%	100.0%
> 100	0	0	0	0	6	6
	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%

Table 6. Cross Tabulation of the Number of Doctors and Number of Primary Healthcare Centers in Indonesia in 2017.

Number of Primary Healthcare Centers	Number of Doctors					Total
	< 637	637 - 1,125	1,126 - 2,059	2,060 - 3,708	> 3,708	
<121	4 57.1%	1 14.3%	0 0.0%	2 28.6%	0 0.0%	7 100.0%
121 - 189	2 28.6%	1 14.3%	4 57.1%	0 0.0%	0 0.0%	7 100.0%
190 - 241	1 14.3%	2 28.6%	2 28.6%	1 14.3%	1 14.3%	7 100.0%
242 - 372	0 0.0%	2 28.6%	1 14.3%	3 42.9%	1 14.3%	7 100.0%
>372	0 0.0%	1 16.7%	0 0.0%	1 16.7%	4 66.7%	6 100.0%

The Regulation of the Indonesian Ministry of Health No. 75 of 2014 regulates the minimum number of health workers, including doctors, that must be available in each primary healthcare center. This policy calculates the number of health workers based on an analysis of the staff workload, types of health services provided, population size and distribution, working areas, characteristics of the working areas, availability of other healthcare facilities in the working areas, and the division of work duration (Dharmayuda, Wulandari, and Wirawan, 2015; Anorital, Muljati, and Andayasari, 2016; Marlinda, 2017; Hidayanti, 2018).

This regulation also forms the basis for the issuance of other policies, such as the Regulation of the Indonesian Ministry of Health No. 33 of 2018 concerning the Healthy Nation Program or *Nusantara Sehat*. The Healthy Nation Program was initiated to meet the needs of several primary healthcare centers in disadvantaged areas, borders, and islands, where the number of health workers is not in accordance with the standard (Simanjuntak, Kusmanto, and Suriadi, 2018). This policy became an alternative to distributing doctors and other health

workers in peripheral areas that were rarely of interest to these professionals. Doctors can be distributed in two ways, namely as part of a team-based mechanism in conjunction with other health workers, or an individual mechanism, in accordance with the Non-Permanent Employee Program.

In addition, the government pays specific attention to disadvantaged areas, borders, and islands, for whom separate policies are created. This refers to the establishment of mobile hospitals, border hospitals, temporary doctors, and water services, as well as financing policies for health (Pratiwi *et al.*, 2014; Misnaniarti *et al.*, 2017; Prawiroharjo, Pratama and Librianty, 2019). However, additional support structures are required for the redistribution of doctors in Indonesia.

In addition to the macro variables that were examined, several regional conditions attracted doctors, such as regional fiscal capacity, original regional income, regional gross domestic income, economic growth, and the percentage of the budget reserved for the health sector (Wahab, Husein, and Al-Hadithi, 2016; Thomson, 2019; Mclsaac, Scott and Kalb, 2019). Research conducted in Blitar District suggested an incentive mechanism for doctors by considering the

difficulty levels of regions, topography, availability of transportation, facilities, and infrastructure. Recommendations were then formulated via discussions with doctors, heads of primary healthcare centers, regional hospitals, District Health Offices, members of the Regional House of People's Representatives, the Regional Personnel Agency, and the Agency for Regional Development (Laksono, Pudjirahardjo, and Mulyono, 2012).

The findings of this study corresponded with the latest research findings in India (Singh, 2019; Karan *et al.*, 2019) and China (Zhu, Hsieh, and Mao, 2019). Results showed that the distribution of physicians was influenced by the population, as well as the population density of a particular area. Disparities in the distribution of physicians in India and China were in line with an increase in the Gini index (Singh, 2019; Yang, Yin and Wang, 2019; Wu and Yang, 2019).

A slight deviation from the present findings indicated that doctors in Lebanon were less interested in primary healthcare services and preferred to work independently in urban areas. At least five main issues contributed to doctors' disinterest in primary healthcare services. These included a minimal understanding of concepts, a diminutive scope of work in primary healthcare services, issues with recruitment, problems with low doctor retention, challenges in remote and retarded areas, and a lack of policymakers' roles during post-distribution (Alameddine *et al.*, 2016). Doctor retention, especially in primary healthcare centers, is low due to low income. The capitation system used as the basis for the payment of medical services does not apply to doctors who work in remote areas, specifically due to diffusion. In addition, doctors face difficult working environments and do not receive social life guarantees (Bertone, Lurton, and Mutombo, 2016; Honda *et al.*, 2019; Mashange *et al.*, 2019).

The reluctance of doctors to work in rural and remote areas far from cities is a challenge. Thus, access to health services in urban areas far exceeds that in rural areas (Kenea and Jisha, 2017; Wen *et al.*, 2017; Gonzales *et al.*, 2017; Li *et al.*, 2018). The Eastern Indonesian regions, which are dominated by rural areas, inadequate facilities, and low population density, become barriers for doctors and other health workers (Nantabah, Agustina and Laksono, 2019).

This study provided limited macro policy recommendations because it used aggregate data at the provincial level. Further research is still required to determine the influencing factors at the individual level from doctors as implementers and communities as policy targets. Furthermore, future research can be used as a basis for more detailed policy decisions at the micro level.

CONCLUSION

To conclude, of the five independent variables studied, four were related to the number of doctors. Population size, density or population density, the number of hospitals, and the number of primary healthcare centers are positively related to the number of doctors. The government needs to issue a policy for the redistribution of physicians in Indonesia. Doctor retention in disadvantaged regions can be maintained by giving doctors rewards, both material and non-material. For example, the government can guarantee easy enrolment to specialist schools for doctors serving in these regions.

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CONFLICT OF INTEREST

The authors state that there is no conflict of interest in this article.

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