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ORIGINAL RESEARCH

DISTRIBUTION ANALYSIS OF DOCTORS IN INDONESIA

Analisis Distribusi Tenaga Dokter di Indonesia

Agung Dwi Laksono[1], Ilham Akhsanu Ridlo[2,3], Ernawaty[2,3]
[1]National Institute of Health Research and Development, Indonesia Ministry of Health, Indonesia
[2]Department of Health Policy and Administration, Faculty of Public Health, Universitas Airlangga
[3]The Airlangga Centre for Health Policy Research Group, Indonesia
*Correspondence: agung.dwi.laksono-2016@fkm.unair.ac.id

ABSTRACT

Introduction: The distribution of health workers in Indonesia raises an interesting discussion since Indonesia as an archipelagic country has a wide geography and challenges for fulfilling equitable health services.
Aim: This study identified factors related to the distribution of doctors in provinces of Indonesia.
Method: Advanced analysis of secondary data was done and obtained from the "Data and Information: Indonesian Health Profile in 2017". The units analyzed in this study were all 34 provinces in Indonesia. The variables analysed were the number of doctors, population, density, percentage of poor population, the number of hospitals, and the number of primary healthcare centers.
Results: Variability in the number of doctors was very wide. The more the population is, the more attractive it is for doctors to conduct practices in the provinces. The denser the population is, the more doctors are interested to work in the provinces. It also figured out that doctors tend to opt to work in the provinces which have more hospitals and primary healthcare centers.
Conclusions: Out of five independent variables studied, there were four variables 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 important for doctor redistribution policy in Indonesia.

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

ABSTRAK

Pendahuluan: *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. Semakin padat 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 prominent to scrutinize in Indonesia, which has a broad geography as an archipelagic

country in fulfilling fair health services for the entire community. The Indonesian Government expects to ensure and improve the equal health access and health status in all regions of Indonesia, especially in peripheral, remote, border and island areas which until now have not been well-served (Suharmiati, Laksono and Astuti, 2013; Senewe and Elsi, 2014; Soewondo *et al.*, 2019).

Based on the National Long-Term Development Plan (RPJP-N) 2005-2025, health is one of the main focuses to achieve the quality and competitiveness of human resources and the Indonesian Human Development Index. Moreover, the Government directs the national development in the health sector to increase awareness, willingness and the ability of healthy life style for everyone so that the health status can improve. Health workers, including doctors, are the main key players in achieving health development goals since they entirely contribute up to 80% to accelerate health development (Tangcharoensathien, Mills and Palu, 2015).

Governments in various countries have currently been making efforts to achieve health equality, especially for people who are considered vulnerable and disadvantaged. The biggest challenge faced is ensuring 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 raises problems to give equal rights for every citizen. Equality is defined as no difference among groups of people in terms of social, economic, demography or geography (Bambra, 2016).

Health inequality, especially unfair availability of doctors, involves health determinants, such as community access to healthcare facilities. Further, it is related to the government's failure to overcome inequality, in forms of violations towards 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 adequate number and quality of health workers in disadvantaged areas significantly provides equal health services. There is still a huge disparity in Indonesia, between urban and rural areas (Wulandari and Laksono, 2019), between regions, districts and provinces in Indonesia (Laksono, Wulandari and Soedirham, 2019). Data from the Board for Development and Empowerment of Human Resources in Public Health in 2019 explain the distribution of health workers can be seen from the ratio of doctors in areas of Jakarta Province with 65 doctors per 100,000 populations while West Java and Banten have 11 doctors per 100,000 populations. Disparities are also found in West Sulawesi Province with 12 doctors per 100,000 populations, and these occur in the distribution of doctors in Maluku and East Nusa Tenggara Province with 14 doctors per 100,000 populations.

The distribution of doctors according to the ratio of population involves geographical and demographic problems. Not to mention, access to basic health services requires more attention in terms of geography. Actions and policies are required to deal with the problems of doctor distribution, especially in the era of National Health Insurance (Karan *et al.*, 2019). Therefore, this study aims to identify factors related to the doctor distribution in provinces of Indonesia, which can be suggestions for policy-making of health worker distribution.

METHOD

This study was an analysis of secondary data. It used secondary data from "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. There were 34 provinces in Indonesia analyzed in this present study.

The dependent variable involved was "Number of Doctors". The number of doctors includes general and specialist physicians, who conduct practices in certain provinces. There were other five variables, such as population, density, the percentage of poor people, the number of hospitals, and the number of primary healthcare centres. Each variable was categorized into five statistical distribution strata. Cross-tabulation of each variable with the variable "Number of Doctors" can simplify the analysis of doctor distribution.

RESULTS AND DISCUSSION

Figure 1 shows the distribution of available number of doctors per province in Indonesia. It appears that the number of doctors is larger in Java Island. While, Indonesia tends to have more doctors available in Western Indonesia than in Eastern Indonesia.

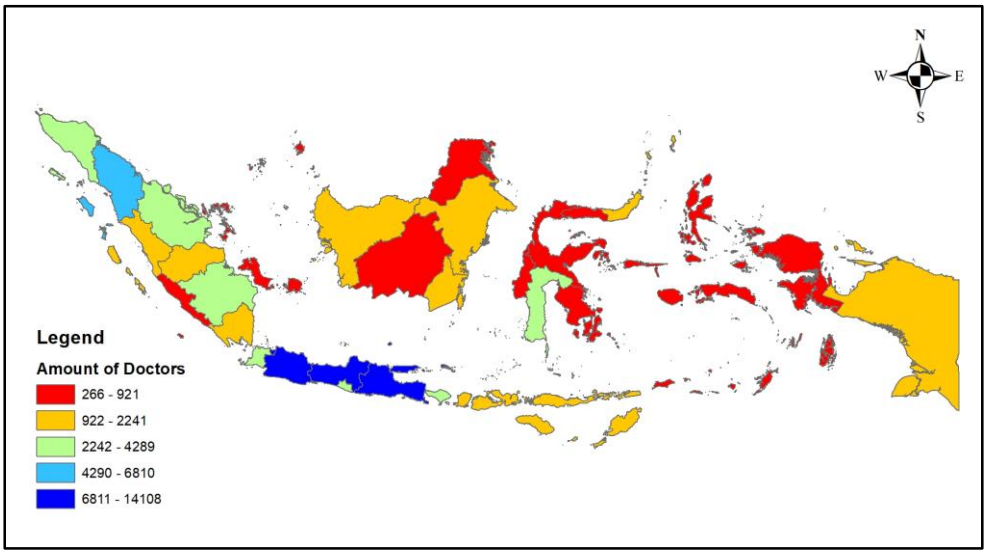

Figure 1. Distribution of Doctors Numbers based on Provinces in Indonesia in 2017.

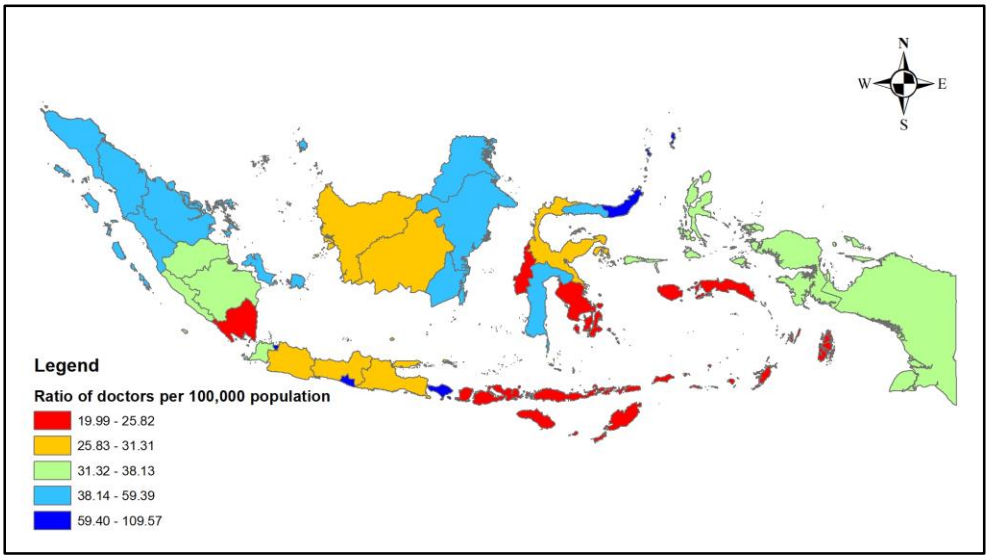

Figure 2. Distribution of Doctors Ratio per 100.000 Population, based on Provinces in Indonesia in 2017.

Meanwhile, Figure 2, which maps the ratio of doctors per 100,000 populations, shows different conditions. Some provinces in Java Island have lower ratio because the effect of the population is more than that in areas of other islands.

Table 1 shows a very wide variability in the number of physicians with absolute numbers. The highest number of doctors is as many as 14,108 doctors in West Java Province. While, West Sulawesi Province has the least number of doctors as many as 266 doctors.

Observed from Table 2, doctors tend to gather in provinces with large populations. It also explains that there is an increase in the number of doctors along with the increase in 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 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 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	0	0	0	0	7
	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%
1,744,654 - 3,265,202	0	6	1	0	0	7
	0.0%	85.7%	14.3%	0.0%	0.0%	100.0%
3,265,203 - 4,955,578	0	0	5	2	0	7
	0.0%	0.0%	71.4%	28.6%	0.0%	100.0%
4,955,579 - 8,690,294	0	1	1	5	0	7
	0.0%	14.3%	14.3%	71.4%	0.0%	100.0%
> 8,690,294	0	0	0	0	6	6
	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%

A cross-tabulation between the number of doctors and population in all provinces show the category of very few populations (<1,744,654 people) was occupied by very few number of doctors (< 637 doctors). Whereas, the category of a very large population (>8,690,294 people) has a very large number of doctors (>3,708 doctors). This means that the number of doctors is positively related to population in a province. The more the population in a

province is, the more doctors are interested to work there.

The number of doctors was cross-tabulated with density or population density in each province as seen in Table 3. The category of very non-dense population (<37.19 people per kilometre) was dominated by very few number of doctors (<637 doctors). While, a very large number of doctors (>3,708 doctors) reside in very dense population (>734.69 people per kilometre). It describes that the number of doctors is positively associated with population density in a province. In other words, doctors are more interested in conducting practices in denser population.

The results of cross-tabulation on the number of doctors and the percentage of poor people have the same trends. It was found that a very few percentages of poor people (<6.08% poor people) have a very small number of doctors (<637 doctors). While, a very large percentage of poor people (>15.58% poor people) are dominated by a very large number of doctors (>3,708 doctors). However, different trends are shown in other categories. For instance, a medium percentages of poor people have a large number of doctors. While, a medium number of doctors work in provinces with a large percentages of poor people.

In relation to the number of hospitals in all provinces, very few doctors (<637 doctors) work in provinces with very few hospitals (<22 hospitals). Conversely, a large number of hospitals (>100 hospitals) tend to have a very large number of doctors (>3,708 doctors). It can be interpreted that the number of doctors is positively related to the number of hospitals in a province. Provinces with a larger number of hospitals will possess more doctors.

Table 3. Cross Tabulation of Number of Doctors and Population Density per Kilometre 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	2	2	0	0	7
	42.9%	28.6%	28.6%	0.0%	0.0%	100.0%
37.19 - 87.12	3	2	1	1	0	7
	42.9%	28.6%	14.3%	14.3%	0.0%	100.0%
87.13 - 126.66	1	2	1	3	0	7
	14.3%	28.6%	14.3%	42.9%	0.0%	100.0%
126.67 - 734.69	0	1	3	2	1	7
	0.0%	14.3%	42.9%	28.6%	14.3%	100.0%
>734.69	0	0	0	1	5	6
	0.0%	0.0%	0.0%	16.7%	83.3%	100.0%

The previous results also can be found in finding the relationship between the number of doctors and the number of primary healthcare centers. Provinces with a very few number of primary healthcare centers (<121 primary healthcare centers) are dominated by a very few number of doctors (< 637 doctors). It means that a large number of doctors (> 3,708 doctors) tend to conduct practices in provinces with a large number of primary healthcare centers (>372 primary healthcare centers). It can be stated that the number of primary healthcare centers has a linear relationship with the number of doctors.

On the other hand, Table 6 shows a very few number of primary healthcare centers have the number of doctors in a medium category. This condition is possible because there are some multi factors that affect the distribution of physicians. Thus, such case should be studied further in future research.

The distribution of doctors among provinces showed a very wide variability. West Sulawesi Province has at least 266 doctors while the number of doctors reaches 14,108 doctors in West Java Province. The results also show that the number of doctors is positively related to population, density, the number of hospitals and the number of primary healthcare centers. This condition is caused by health service policies issued by the Government. For example, until 2014 the policy of primary healthcare centers stipulates 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 valid until now. Although the quota of doctors in Indonesia has exceeded the quota, more than 700 primary healthcare centers lack for 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 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 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	1	0	2	0	7
	57.1%	14.3%	0.0%	28.6%	0.0%	100.0%
121 - 189	2	1	4	0	0	7
	28.6%	14.3%	57.1%	0.0%	0.0%	100.0%
190 - 241	1	2	2	1	1	7
	14.3%	28.6%	28.6%	14.3%	14.3%	100.0%
242 - 372	0	2	1	3	1	7
	0.0%	28.6%	14.3%	42.9%	14.3%	100.0%
>372	0	1	0	1	4	6
	0.0%	16.7%	0.0%	16.7%	66.7%	100.0%

The Regulation of Indonesian Ministry of Health No. 75 of 2014 about primary healthcare centers regulates the minimum number of health workers, including doctors, that must be available in each primary healthcare center. This policy in detail calculates the number of health workers based on analysis of 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 is also the basis for the issuance of other policies, such as the Regulation of 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 becomes an alternative to distribute doctors and other health workers in peripheral areas, which health workers are rarely interested in. Doctors can be distributed in two ways, such as a team-based mechanism together with other health workers or individual mechanism, in accordance with Non-Permanent Employee Program.

In addition, the Government also gives special attention and separate policies for disadvantaged areas, borders, and islands. For instance, they established mobile hospitals, border hospitals, mobile hospitals, temporary doctors, water services, as well as financing policies for health (Pratiwi *et al.*, 2014; Misnaniarti *et al.*, 2017; Prawiroharjo, Pratama and Librianty, 2019). Despite this policy, other policy supports are required for the redistribution of doctors in Indonesia.

In addition to the macro variables examined, there are several regional conditions that make doctors attracted to

come, such as regional fiscal capacity, regional original income, regional gross domestic income, economic growth, and the percentage of budget for health sector (Wahab, Husein and Al-Hadithi, 2016; Thomson, 2019; McIsaac, Scott and Kalb, 2019). Research conducted in Blitar District suggests an incentive mechanism for doctors by considering the difficulty levels of regions, topography, availability of transportation, facilities and infrastructures. Recommendations were then formulated in discussions with doctors, heads of primary healthcare centers, regional hospitals, District Health Offices, members of the Regional House of People's Representative, the Regional Personnel Agency, and the Agency for Regional Development (Laksono, Pudjirahardjo and Mulyono, 2012).

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

Slightly different from the present findings, in Lebanon doctors were less interested in primary healthcare service. They preferred to work independently in urban areas. There were at least five main problems that make doctors uninterested in primary healthcare services. They included low understanding of concepts, diminutive scope of work in primary healthcare services, issues of recruitment, problems with low doctor retention, challenges in remote and retarded areas, and lack of policy makers' roles for post-distribution (Alameddine *et al.*, 2016). Doctor retention especially from primary healthcare centers is low due to low income. The capitation system used as the basis for payment of medical services does not apply to doctors who work in remote areas especially because of diffusion. In addition, doctors face difficult working environment 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 is far better than in rural areas (Kenea and Jisha, 2017; Wen *et al.*, 2017; Gonzales *et al.*, 2017; Li *et al.*, 2018). The Eastern Indonesia regions with the dominance of rural areas, inadequate facilities, and low population density become barriers for doctors and other health workers (Nantabah, Agustina and Laksono, 2019).

This study had a limited recommendation for macro policy because it used aggregate data at the provincial level. Further research is still needed to find out influencing factors at the individual level from doctors as implementers and communities as policy targets. This future study can be used as a basis for more detailed policy decisions at the micro level.

CONCLUSION

To conclude from five independent variables studied, there were four variables 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 of 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 the ease enrolment to specialist schools for doctors serving in the regions.

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CONFLICT OF INTEREST

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

REFERENCES

Alameddine, M. *et al.* (2016) 'Upscaling the recruitment and retention of human resources for health at primary healthcare centres in Lebanon: a qualitative study', *Health Soc Care Community*, 24(3), pp. 353–362. doi: 10.1111/hsc.12210.

Anorital, A., Muljati, S. and Andayasari, L. (2016) 'Overview of The Availability of Human Resources and Dental Health Services in Indonesian Public Health Centers', *Buletin Penelitian Kesehatan*, 44(3), pp. 197–204. doi: 10.22435/bpk.v44i3.5297.197-204.

Bambra, C. (2016) *Health Divides: where you live can kill you*. Bristol: Policy Press.

Bertone, M. P., Lurton, G. and Mutombo, P. B. (2016) 'Investigating the remuneration of health workers in the DR Congo: Implications for the health workforce and the health system in a fragile setting', *Health Policy and Planning*, 31(9), pp. 1143–1151. doi: 10.1093/heapol/czv131.

Dharmayuda, A. A. N. G., Wulandari, L. P. L. and Wirawan, D. N. (2015) 'Workload Analysis of Doctors at Puskesmas Using Workload Indicators of Staffing Need in Denpasar', *Public Health and Preventive Medicine Archive*, 3(1), pp. 16–21. doi: 10.15562/phpma.v3i1.95.

Fu, X. *et al.* (2018) 'Influencing factors of inequity in health services utilization among the elderly in China 14 Economics 1402 Applied Economics 11 Medical and Health Sciences 1117 Public Health and Health Services', *International Journal for Equity in Health*, 17(1). doi: 10.1186/s12939-018-0861-6.

Gonzales, S. *et al.* (2017) 'Progressive rural-urban disparity in acute stroke care', *Neurology*, 88(5), pp. 441–448. doi: 10.1212/WNL.0000000000003562.

Hidayanti, H. (2018) 'Distribution of Health Workers in Lamongan District', *Cakrawala*, 12(2), pp. 162–177. doi: 10.32781/cakrawala.v12i2.272.

Honda, A. *et al.* (2019) 'For more than money: Willingness of health professionals to stay in remote Senegal', *Human Resources for Health*, 17(1), p. Article number 28. doi: 10.1186/s12960-019-0363-7.

Indonesian Ministry of Health (2018) *Data and Information: Indonesian Health Profile in 2017 (Data dan Informasi: Profil Kesehatan Indonesia tahun 2017)*. Jakarta: Indonesian Ministry of Health.

Indonesian Ministry of Health (2019) *Indonesia Health Profile in 2018 (Profil Kesehatan Indonesia Tahun 2018)*. Jakarta. Available at: http://www.depkes.go.id/resources/download/pusdatin/profil-kesehatan-indonesia/Data-dan-Informasi_Profil-Kesehatan-Indonesia-2018.pdf.

Karan, A. *et al.* (2019) 'Size, composition and distribution of human resource for health in India: new estimates using National Sample Survey and Registry data', *BMJ open*, 9(4), p. Page e025979. doi: 10.1136/bmjopen-2018-025979.

Kenea, D. and Jisha, H. (2017) 'Urban-rural disparity and determinants of delivery

care utilization in Oromia region, Ethiopia: Community-based cross-sectional study', *International Journal of Nursing Practice*, 23(1). doi: 10.1111/ijn.12510.

Laksono, A. D., Pudjirahardjo, W. J. and Mulyono, I. M. (2012) *Personnel Policy Analysis: A Workforce Policy Formulation for General Practitioners (Analisis Kebijakan Ketenagaan: Sebuah Formulasi Kebijakan Ketenagaan Dokter Umum)*. Surabaya: Health Advocacy.

Laksono, A. D., Wulandari, R. D. and Soedirham, O. (2019) 'Regional Disparities of Health Center Utilization in Rural Indonesia', *Malaysian Journal of Public Health Medicine*, 19(1).

Li, J. *et al.* (2018) 'Urban-rural disparities in health care utilization among Chinese adults from 1993 to 2011', *BMC health services research*, 18(102), pp. 1–9. doi: 10.1186/s12913-018-2905-4.

Marlinda, P. (2017) 'Analysis of Planning for Doctors' Needs by the Pekanbaru City Health Office (Analisis Perencanaan Kebutuhan Tenaga Dokter oleh Dinas Kesehatan Kota Pekanbaru)', *Jurnal Niara*, 9(2), pp. 71–83. doi: 10.31849/nia.v9i2.2100.

Mashange, W. *et al.* (2019) 'Flexibility of deployment: Challenges and policy options for retaining health workers during crisis in Zimbabwe', *Human Resources for Health*, 17(1), p. Article number 39. doi: 10.1186/s12960-019-0369-1.

McIsaac, M., Scott, A. and Kalb, G. (2019) 'The role of financial factors in the mobility and location choices of General Practitioners in Australia', *Human Resources for Health*, 17(1), p. Article number 34. doi: 10.1186/s12960-019-0374-4.

Misnaniarti *et al.* (2017) 'Availability of Facilities and Health Workers in Support of National Health Insurance Coverage (Ketersediaan Fasilitas dan Tenaga Kesehatan Dalam Mendukung Cakupan Semesta Jaminan Kesehatan Nasional)', *Jurnal Penelitian dan Pengembangan Pelayanan Kesehatan*, 1(1), pp. 6–16. doi: 10.22435/jpppk.v1i1.425.

Nantabah, Z. K., Agustina, Z. A. and Laksono, A. D. (2019) 'Overview of Health Service Access to Toddlers in Indonesia (Gambaran Akses Pelayanan Kesehatan pada Balita di Indonesia)', *Bulletin of Health System Research*, 22(1), pp. 54–61. doi: 10.22435/hsr.v22i1.439.

Pratiwi, N. L. *et al.* (2014) 'Policy Review on the Distribution of Health Operational Assistance Funds in Support of Achieving Maternal and Child Health (MDG's 4,5) in Three Districts, Cities in East Java Province (Kajian Kebijakan Penyaluran Dana Bantuan Operasional Kesehatan dalam M', *Buletin Penelitian Sistem Kesehatan*, 17(4), pp. 395–405.

Prawiroharjo, P., Pratama, P. and Librianty, N. (2019) 'Telemedicine Services in Indonesia: Inevitability, Risks and Ethics Limits (Layanan Telemedis di Indonesia: Keniscayaan, Risiko, dan Batasan Etika)', *Jurnal Etika Kesehatan Indonesia*, 3(1), p. 109. doi: 10.1017/S0963180108080535.

Senewe, F. P. and Elsi, E. (2014) 'Descriptive Analysis to Environment Health in Less Development, Borderlands, Archipelagoes and Remote Areas (DTPK-T)', *Media Litbangkes*, 24(3), pp. 153–160. doi: 10.22435/mpk.v24i3.3650.153-160.

Simanjuntak, A. T., Kusmanto, H. and Suriadi, A. (2018) 'The Effectiveness of the Nusantara Sehat Program at the Tanjung Beringin Health Center, Tanjung Beringin District, Serdang Bedagai Regency (Efektivitas

Program Nusantara Sehat Pada Puskesmas Tanjung Beringin, Kecamatan Tanjung Beringin Kabupaten Serdang B', *Anthropos: Jurnal Antropologi Sosial dan Budaya*, 4(1), pp. 92–107. doi: 10.24114/antro.v4i1.10156.

Singh, A. (2019) 'Shortage and inequalities in the distribution of specialists across community health centres in Uttar Pradesh, 2002-2012', *BMC Health Services Research*, 19(1), p. Article number 331. doi: 10.1186/s12913-019-4134-x.

Soewondo, P. *et al.* (2019) 'Inspecting Primary Healthcare Centers in Remote Areas: Facilities, Activities, and Finances', *Jurnal Administrasi Kesehatan Indonesia*, 7(1), pp. 89–98. doi: 10.20473/jaki.v7i1.2019.89-98.

Suharmiati, Laksono, A. D. and Astuti, W. D. (2013) 'Policy Review on Health Services in Primary Health Center in the Border and Remote Area (Review Kebijakan tentang Pelayanan Kesehatan Puskesmas di Daerah Terpencil Perbatasan)', *Bulletin of Health System Research*, 16(2), pp. 109–116.

Tangcharoensathien, V., Mills, A. and Palu, T. (2015) 'Accelerating health equity: The key role of universal health coverage in the Sustainable Development Goals', *BMC Medicine*, 13(1), p. Article number 101. doi: 10.1186/s12916-015-0342-3.

Tayyari Dehbarez, N. *et al.* (2018) 'Does free choice of hospital conflict with equity of access to highly specialized hospitals? A case study from the Danish health care system', *Health Policy*. doi: 10.1016/j.healthpol.2018.04.006.

Thomson, M. (2019) 'Who had access to doctors before and after new universal capitated subsidies in New Zealand?', *Health Policy*, 123(8), pp. 756–764. doi: 10.1016/j.healthpol.2019.04.004.

Wahab, M. A., Husein, V. M. and Al-Hadithi, T. S. (2016) 'Distribution of doctors' workforce in Erbil Governorate', *Zanko Journal of Medical Science*, 20(1), p. 1138_1146. doi: 10.15218/zjms.2016.0001.

Wen, P.-C. *et al.* (2017) 'Demographic and rural-urban variations in dental service utilization in Taiwan', *Rural and Remote Health*, 17(3). doi: 10.22605/RRH4161.

Wu, J. and Yang, Y. (2019) 'Inequality trends in the demographic and geographic distribution of health care professionals in China: Data from 2002 to 2016', *International Journal of Health Planning and Management*, 34(1), pp. e487–e508. doi: 10.1002/hpm.2664.

Wulandari, R. D. and Laksono, A. D. (2019) 'Urban-Rural Disparity: The Utilization of Primary Health Care Center Among Elderly in East Java, Indonesia', *Jurnal Administrasi Kesehatan Indonesia*, 7(2), pp. 147–154. doi: 10.20473/jaki.v7i2.2019.147-154.

Yang, L., Yin, Y. and Wang, H. (2019) 'Is the health workforce distribution in Beijing, China perfectly equitable?', *Ethiopian Journal of Health Development*, 33(1), pp. 22–27.

Zhu, B., Hsieh, C.-W. and Mao, Y. (2019) 'Addressing the Licensed Doctor Maldistribution in China: A Demand-And-Supply Perspective', *International journal of environmental research and public health*, 16(10), pp. 1–19. doi: 10.3390/ijerph16101753.