Distribution of Doctors and Outpatient Service Workload by Thai Elderly at the Provincial Level, 2021

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Abstract

The arrival of an aging society has increased the demand for health services. The number of physicians affects the ability to provide health care services to the elderly. The ratio of the elderly population to physician in Thailand has improved over the past decade. However, if looking at the distribution of doctors at provincial level, some provinces are far from meeting the needs. In this paper, we explored the elderly population to physician ratio and the use of outpatient services among elderly. The objective was to identify provinces with a shortage of doctors. We used data on physicians and the elderly population from the National Statistical Office during 2019. The number of outpatient services, the first line of health services, were obtained from the Ministry of Public Health. Data on outpatient service usage among elderly people over 60 years of age from public hospitals under the Ministry of Public Health in 2019. The number of elderly outpatient visits per head divided by the total physicians available in the province allowed us to identify which provinces had a relatively high outpatient workload compared to the number of physicians. From the study, it was found that provinces with a physician shortage from higher outpatient workload for physicians in 2019 were: Ranong, Bueng Kan, Nong Bua Lamphu, Uthai Thani, Samut Songkhram, Chainat, Satun, Ang Thong, Phang Nga, and Sing Buri. These provinces did not have a large economic growth size and many provinces were easily accessible. It is recommended that the Ministry of Public Health's policy on physician distribution should also focus on not-remote provinces, in addition to those remote and difficult to access.

Keywords: Outpatient Services, Elderly, Doctor Distribution

Introduction

The arrival of an aging society has made many health agencies eager to prepare for the aging situation in Thailand through elderly policies (Jangkhum, 2020; Jitapunkul & Wivatvanit, 2009; Jitramontree & Thayansin, 2013). The health of the elderly is the most discussed (Jitapunkul & Wivatvanit, 2009), with policies affecting both the supply and demand of health services used by the elderly. Outpatient services are an important component of the health service system and became congested from the Universal Health Coverage policy (Panpiemras et al., 2011). Outpatient services are available at all levels of service ranging from primary care services such as health promoting hospitals, community hospitals, general (provincial) hospitals, and regional hospitals. Most patients use outpatient services, which cover the first line of screening and treatment of other health-related services. While outpatient services at all levels require physicians to provide services as well. Having enough doctors to provide services is important that affects the outpatient service system, such as congestion of services and quality of service (Panpiemras et al., 2011). It is undeniable that the ratio of elderly people to doctor in Thailand has dropped dramatically compared to several years ago, which is a good trend (Witthayapipopsakul et al., 2019). Compare Thailand to other countries with a high proportion of elderly people, such as Japan (28.2%), Italy (22.8%), Greece (21.8%), Portugal (21.8%), Germany (21.4%) and France (20.3%) (United Nations, 2019), the ratios of elderly people to doctor were relatively low at 112.8,

28.5, 35.2, 41.1, 49.8 and 31.2 respectively, while in Thailand was 222.2. Calculated from 2.5 per 1,000 population, 8 per 1,000 population, 6.2 per 1,000 population, 5.3 per 1,000 population, 4.3 per 1,000 population, and 6.5 per 1,000 population respectively, and only 0.9 per 1,000 population in Thailand (The World Bank, n.d.).

However, the distribution of doctors in Thailand is relatively concentrated in provinces with high economic growth. As a result of this problem, the Ministry of Health has issued a policy of paying doctors in rural areas as an incentive to work in more difficult areas than moving to large cities (Chiangchaisakulthai et al., 2011). It is interesting, however, whether it is really a remote, desolate, difficult-to-reach province, or is it only a small province that still has a shortage of doctors compared to big cities and rural areas? In this article, it's worth knowing how Thailand's policy on distribution of medical doctor has achieved and how much gap in the distributions.

In terms of the distribution situation of doctors in Thailand, the ratio of population to physician has greatly improved compared to decades ago (Nishiura et al., 2004; Wibulpolprasert & Pengpaibon, 2003; Pagaiya & Noree, 2009; Suphanchaimat et al., 2013; Witthayapipopsakul et al., 2019). The population to physician ratio was 3,324 in 2009, and in 2019 the ratio was 1,674 (NSO Interactive Dashboard, 2021). Such developments have also improved Thailand's access to outpatient services. However, the overall quantitative improvement does not mean that the dimension of internal equality has improved as well. When we compare between provinces, we may find that the differences are related with large economies. Based on the same data from the National Statistical Office in 2019, the ratio of population to physician in Bangkok was 565 while in Chiang Mai province the ratio was 1,176. Within the same region as Chiang Mai, Mae Hong Son is a province with a relatively high percentage of the poor, with a population-to-doctor ratio of 2,332. It can be seen that even in the same region and close to each other, the disparity ratio was of two fold.

A high population-to-doctor ratio will also affect access to services. This refers to the number of services a physician can provide to the existing population. However, having a small population of physicians does not just mean a limited number of services. The presence of a high number of physicians per population also means better quality of service, high intensity of service, shorter waiting times, and reduced workload of physicians. The doctors may not want to be in the area with heavy workload. This phenomenon is also followed by the resignation of doctors or doctors return to study in a specialty that can work in a big city to meet demand for higher quality of life. Failure to maintain a doctor will only exacerbate the severity of the problem.

When we combine the problems of an aging society with elderly physical vulnerabilities, higher demand for health services disproportionate with distribution of physicians, the impact will be far-reaching. In this article, the question of the study is whether the distribution of doctors was concentrated in provinces with high economic growth. What is the workload of the doctors in those provinces, or do small provinces near the big provinces also have a high workload of the elderly on doctors? To answer these questions, we examine the distribution of physicians and outpatient service use among the elderly. The disparity of the distribution in terms of the size of the economy, one of the key parameters of the distribution of physicians, as well as policy issues of Thai and international literature were the main focus of this article. This will provide a clearer understanding of the distribution of physicians and the use of outpatient services, which are the first gateways to medical services.

Distribution of Doctors at the Provincial Level in Thailand

In response to the question of whether a province with a large economy high number of doctors has, Gross Provincial Product (GPP) figures as a measure of large economy were analyzed the correlation with the number of doctors. To be able to visualize the distribution of physicians, the crucial supply side factor of the Thai health system, this topic will focus on the provincial level. It allows us to initially compare provinces with large economic size and large number of doctors in Thailand.

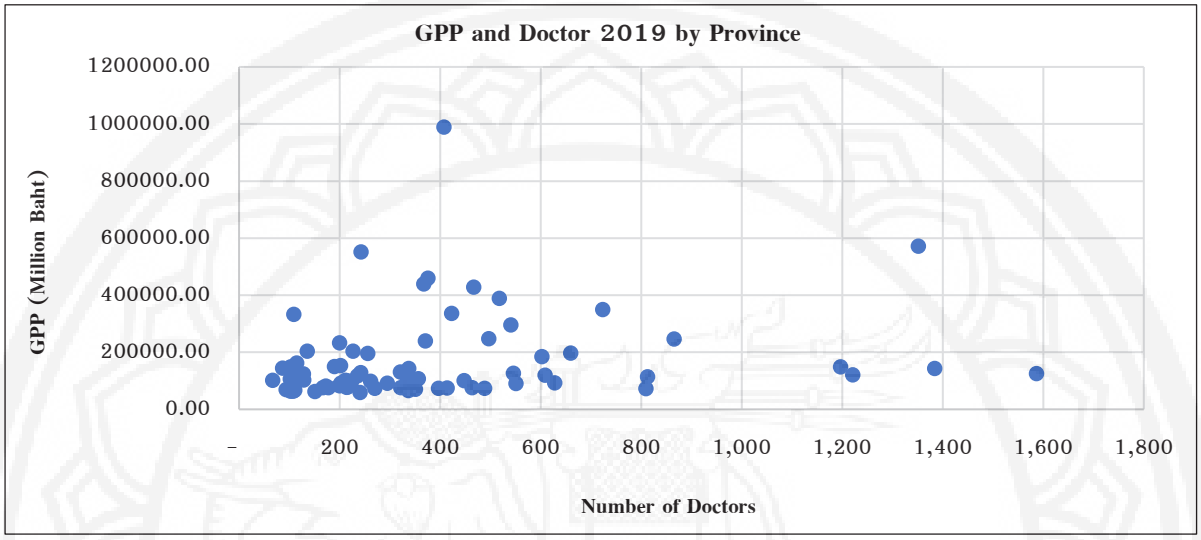

Figure 1 Shows the Elderly Per Doctor by Province and the GPP Value Per Capita Per Year at the Provincial Level, Year 2019.

Sources: 1. Number of Provincial Doctors from the National Statistical Office 2019.
2. GPP from the Office of National Economic and Social Development Board 2019.

Figure 1 shows the nature of the distribution of physicians by province according to the size of Gross Provincial Product (GPP). The vertical axis represents the GPP while the horizontal axis represents the number of physicians in each province. In the picture above, it can be seen that provinces with a per capita GPP greater than 200,000 baht per person per year will have more than 400 physicians in the province. The two-way Pearson Correlation test found that the relationship between GPP per capita and number of doctors had a positive coefficient of 0.377 ($p < 0.05$). It means that the size of each province's GPP and the number of doctors in the province has moderate positive correlation. From the above coefficient, it is rather clear that provinces with greater economic growth will have a statistically significant a greater number of doctors. However, to be more specific with burdens on caring for the elderly, we should compare the population of physicians to the elderly as well.

If we divide the number of the elderly by the number of doctors, we get the elderly populations to doctor ratio. We found that provinces with high population per doctor were provinces with small economies such as Nong Bua Lamphu and Bueng Kan. The provinces with the lowest number of elderly people per doctor were Phuket, Bangkok, and Chonburi, the provinces with large economic sizes.

Table 1 The List of 10 Least and Most Elderly to Physician Ratios in 2019

The Least Elderly to a Doctor		The Most Elderly to a Doctor	
Province	**Elderly / Doctor**	**Province**	**Elderly / Doctor**
Phuket	98.12	Nong Bua Lamphu	710.40
Bangkok	108.13	Kamphaeng Phet	625.57
Chonburi	151.64	Bueng Kan	615.87
Samut Sakhon	167.30	Nakhon Phanom	606.38
Songkhla	183.35	Yasothon	603.17
Pathum Thani	189.79	Phetchabun	600.72
Phitsanulok	196.57	Sukhothai	595.44
Khon Kaen	197.19	Kalasin	583.57
Nakhon Nayok	213.14	Chaiyaphum	579.02
Rayong	231.95	Phatthalung	574.45

Sources: 1. Elderly Population in 2019 from the National Statistical Office.

2. Elderly Per Doctor from Author's Calculation.

In the table above, the data is somewhat contrary to the presented data on the number of doctors and the economic size of the province. It is found that provinces with high numbers of elderly per doctor are provinces with relatively small economic sizes. This means that healthcare workers were concentrated in provinces with high economic size. In the future, this leads to inequality in access to services because the number of health care resources affects both the quality and quantity of services.

From the data comparing the number of elderly populations per doctor, it may still be difficult to tell which province had a shortage of doctors. In fact, this does not mean that provinces with high number of elderly people per doctor would lead to high outpatient services and high workloads of doctors. In the next section, it is necessary to compare the use of outpatient services of the elderly to doctors in those provinces.

The Use of Outpatient Health Services Among Elderly with the Number of Doctors

To explore the distribution of doctors in each province and the use of outpatient services of the elderly with data from the Health Data Center (HDC) which covered government hospitals only, the elderly outpatient service use represents the actual workload of elderly outpatient services for doctors in 2019.

Based on data on the number and distribution of physicians compared to the use of outpatient services among the elderly in 2019, this portrayed a picture of the elderly's use of primary health services compared to the number of doctors in each province. When the use of outpatient services (outpatient visits) per province is plotted with the number of doctors in the province, it is found that provinces with more physicians were correlated with higher number of outpatient services among the elderly.

The 10 provinces with the highest number of outpatient visits were Nakhon Ratchasima, Khon Kaen, Chiang Mai, Ubon Ratchathani, Nakhon Si Thammarat, Songkhla, Sakon Nakhon, Chiang Rai, and Roi Et. These provinces are the centers of each region and are home to regional hospitals (tertiary hospital) that can provide highly sophisticated medical services. And if we combine the number of doctors with the number of service use, it is clear that provinces with more doctors have more outpatient services as displayed in the Figure 2.

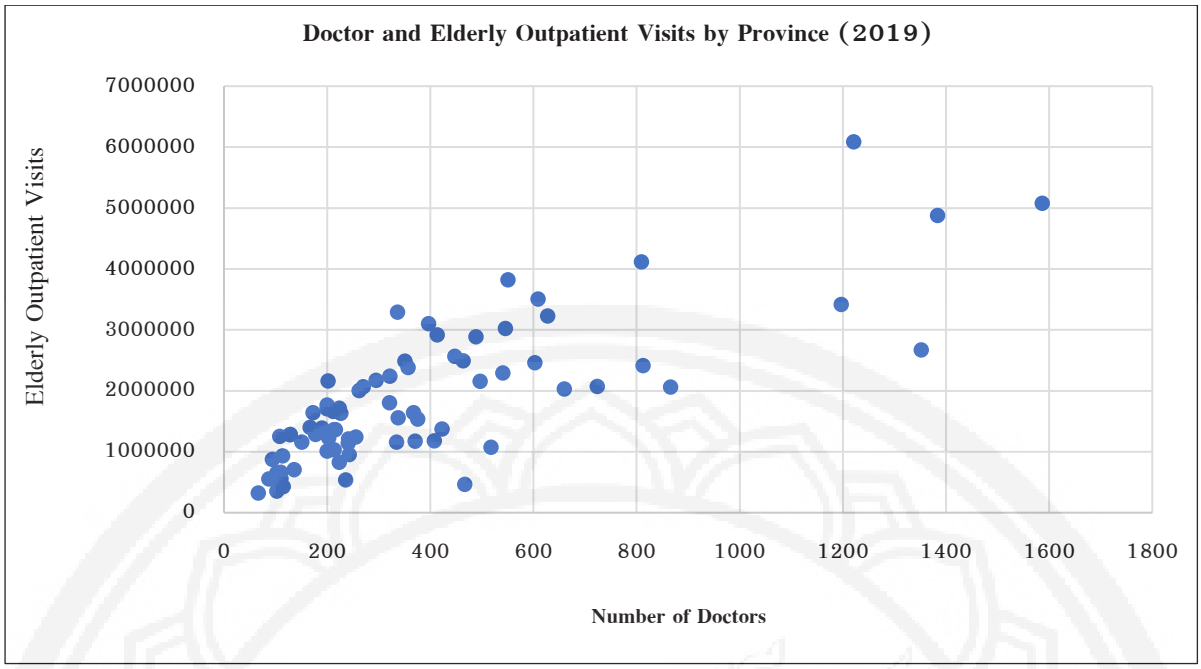

Figure 2 Number of Physicians and the Number of Elderly Outpatient Visits in Year 2019 by Province.

Source: Elderly Outpatient Visit Data from Health Data Center, Ministry of Public Health in 2019.

Provinces with smaller number of physicians had fewer visits. However, this was biased to the provinces with large elderly population. Therefore, the number of outpatient visits divided by the number of elderly people would take into consideration the factor of large number of elderly people in some provinces. When the number of elderly people in the province divided by the number of doctors were plotted against the number of elderly people per doctor in the province, the distribution appears as shown in Figure 3.

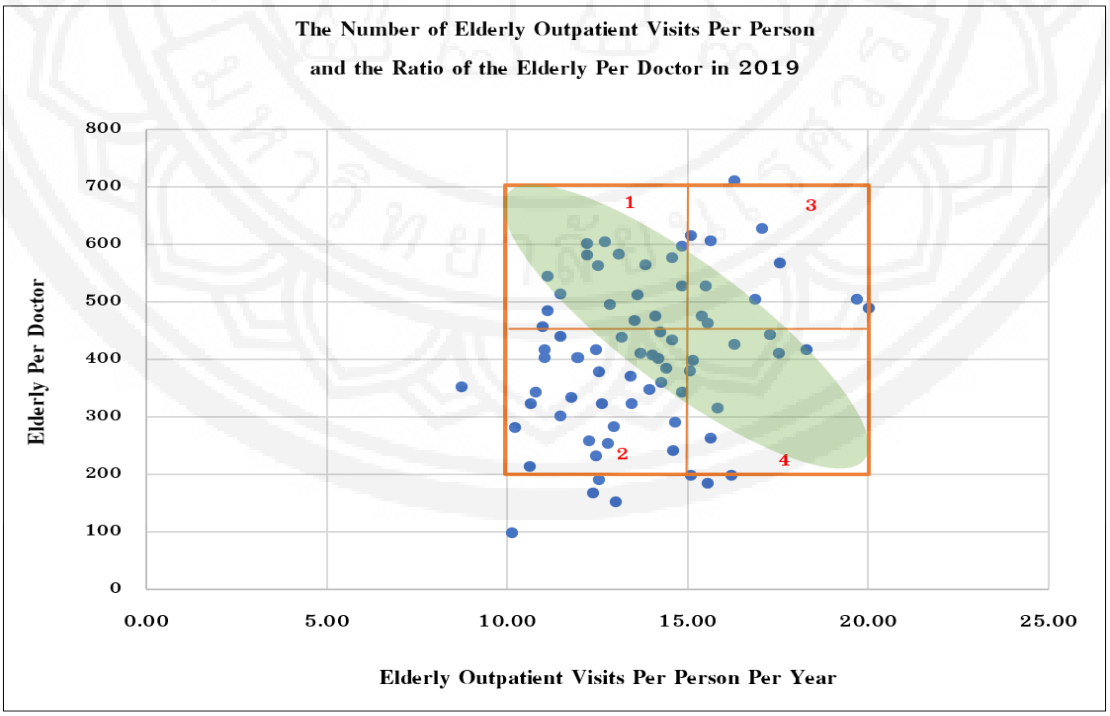

Figure 3 Mendelow Matrix Comparison (Mendelow, 1983) in the Distribution of Healthcare Workers.

Source: Author's Calculation.

If we take the distribution of outpatient services and the number of physicians to the Mendelow's power and interest matrix (Mendelow, 1981; Mendelow, 1983) to analyze the direction of resource use as illustrated above (Arbabi et al., 2020). It is found that the scatterplots were concentrated in 3 frames: Box 1: the high number of elderly people per doctor vs. the low number of visits per elderly, Box 2: the low number of elderly people per doctor vs. the low number of outpatient visits per elderly, and Box 3: the high number of elderly people per doctor (doctor shortage), but the elderly used more frequent services. Only a few provinces were in Box 4, which was the most efficient service use compared to the number of available doctors. That is, the number of elderly people per doctor was low and the number of outpatient visits per elderly was high. As for what should be the distribution of doctors in relation to the use of outpatient services, the proposed conditions should fall in an oval green shading frame. The consumptions of services outside the green shaded area as of Box 3 represent a very difficult workload for physicians while in Box 2 the rationing mechanism was observed.

Physician Workload Situation from Outpatient Service Data

The data on the number of elderly people per doctor in a province can be used to provide a picture of the physician's responsibilities. To measure this physician workload situation, we investigated data on the number of physicians and the number of elderly from the National Statistical Office, and the number of outpatient visits by the elderly from the Ministry of Public Health. The number of elderly outpatient visits per elderly divided by the total number of physicians available allowed us to identify which provinces had a relatively high workload of physicians compared to the number of physicians. Knowing the provinces with high physician workloads suggests that these provinces had a comparatively insufficient number of physicians as shown in Table 2.

Table 2 Show the Workload of Doctors in Each Province from the Use of Outpatient Services by the Elderly, Year 2019

Province	Elderly Per Doctor	OPD Visit (Per Head)	Doctor Workloads	Province	Elderly Per Doctor	OPD Visit (Per Head)	Doctor Workloads
Nong Bua Lamphu	710	16.29	0.15	Kanchanaburi	409	13.74	0.04
Kamphaeng Phet	626	17.10	0.08	Phang Nga	407	14.04	0.13
Bueng Kan	616	15.12	0.16	Ayutthaya	403	11.04	0.03
Nakhon Phanom	606	15.63	0.09	Ranong	402	11.93	0.18
Yasothon	603	12.71	0.08	Pattani	402	11.99	0.06
Phetchabun	601	12.25	0.04	Satun	401	14.19	0.14
Sukhothai	595	14.85	0.07	Nong Khai	397	15.17	0.07
Kalasin	584	13.11	0.05	Nakhon Sawan	384	14.40	0.03
Chaiyaphum	579	12.23	0.03	Lampang	380	15.08	0.03
Phatthalung	574	14.57	0.09	Narathiwat	377	12.54	0.05
Chainat	567	17.56	0.14	Nakhon Ratchasima	371	13.42	0.01
Roi Et	565	13.83	0.03	Chiang Rai	360	14.29	0.02
Sisaket	562	12.54	0.03	Nonthaburi	351	8.76	0.01
Amnat Charoen	544	11.11	0.10	Prachuap KhiriKhan	347	13.98	0.05
Loei	527	14.85	0.07	Trat	343	10.80	0.09
Ang Thong	527	15.53	0.14	Ubon Ratchathani	342	14.87	0.02
Buriram	514	11.49	0.02	Prachinburi	333	11.78	0.05
Maha Sarakham	510	13.65	0.04	Chachoengsao	323	12.64	0.03

Table 2 (Cont.)

Province	Elderly Per Doctor	OPD Visit (Per Head)	Doctor Workloads	Province	Elderly Per Doctor	OPD Visit (Per Head)	Doctor Workloads
Phrae	504	16.89	0.08	Ratchaburi	323	13.46	0.03
Uthai Thani	504	19.70	0.15	Mae Hong Son	321	10.66	0.10
Samut Songkhram	494	12.85	0.15	Tak	316	15.86	0.07
Sakon Nakhon	487	20.05	0.06	Trang	300	11.49	0.03
Surin	484	11.12	0.02	Nakhon Pathom	289	14.64	0.03
Phetchaburi	475	15.40	0.08	Yala	283	12.99	0.06
Suphan Buri	473	14.11	0.04	Samut Prakan	280	10.22	0.01
Sing Buri	467	13.53	0.13	Surat Thani	261	15.63	0.03
Sa Kaeo	463	15.58	0.09	Chanthaburi	257	12.27	0.03
Mukdahan	455	11.02	0.10	Saraburi	254	12.79	0.03
Uttaradit	446	14.26	0.07	Chiang Mai	241	14.62	0.01
Phayao	442	17.31	0.08	Rayong	232	12.46	0.03
Chumphon	440	11.49	0.06	Nakhon Nayok	213	10.64	0.05
Nakhon Si Thammarat	436	13.19	0.02	Khon Kaen	197	16.22	0.01
Nan	434	14.57	0.07	Phitsanulok	197	15.11	0.02
Udon Thani	425	16.32	0.03	Pathum Thani	190	12.55	0.01
Phichit	417	18.33	0.07	Songkhla	183	15.57	0.01
Krabi	416	12.48	0.09	Samut Sakhon	167	12.39	0.02
Lopburi	416	11.05	0.03	Chonburi	152	13.03	0.01
Lamphun	409	17.54	0.08	Phuket	98	10.15	0.02

Source: Author's Calculations.

In Table 2, the column doctor workload is high in some provinces only. The high number of elderly per doctor does not necessarily mean that a province has a high doctor's workload. In comparing doctor workloads, provinces with high doctor workload are Ranong (0.18), but outpatient visits per elderly was only 11.93. Bueng Kan was a province with a doctor's workload of 0.16 with outpatient visit per elderly of 15.12 still in the middle level. While doctor workload equaled to 0.15 was found in 3 provinces including Nong Bua Lamphu, Uthai Thani, and Samut Songkhram. Provinces with doctor workload of 0.14 were Chainat, Satun, and Ang Thong, and provinces with doctor workload of 0.13 (still considered to be high) were Phang Nga and Sing Buri.

One important observation from the table above is that a province with a high number of elderly per doctor did not mean that a province had a shortage of doctors. Those provinces were Kamphaeng Phet, Nakhon Phanom, Yasothon, Phetchabun, Sukhothai, Kalasin, Chaiyaphum, Phatthalung, Chainat, Roi Et, Sisaket, Amnat Charoen, Loei, Ang Thong, Buriram, Maha Sarakham and Phrae. Provinces with high outpatient visits per elderly also did not mean they had high doctor workloads. The most obvious provinces are Kamphaeng Phet (17.10), Nakhon Phanom (15.63), Phrae (16.89), Phetchaburi (15.40), Sakon Nakhon (20.05), Phayao (17.31), Udon Thani (16.32), Pichit (18.33), Tak (15.86), Khon Kaen (16.22), Phitsanulok (15.11), Songkhla (15.57), Surat Thani (15.63).

Discussion

This section discusses the policy of distributing physicians and retaining physicians in scarce areas, which has been a long-standing policy discussion in the health resource management system in Thailand. Therefore, there are important worth discussing issues as follows.

A Gray Zone is the Not Urban and Not Rural Area

One important issue is that over the years Thailand had defined the wilderness area as to where the hospital was located. The classification of such areas was the remote, low economic growth, and hard-to-reach with low livable appeal compared to other areas. And this was developed into a policy to incentivize health workers to serve in the area (Wibulpolprasert & Pengpaibon, 2003). As for the highest rank of the very rural areas, it was very obvious and uncontroversial. But for semi-urban and not very remote where the number of doctors were also small and problematic were the long-standing debates. As of literature in Thailand, it is found that the distribution is relatively unfair, mainly concentrated in large cities and a very long-standing problem in Thailand (Pagaiya et al., 2015; Thammatacharee et al., 2012; Wibulpolprasert & Pengpaibon, 2003; Witthayapipopsakul et al., 2019). This can be seen from the elderly population to the number of doctors in Thailand, which is still a 5-7-fold difference in the content presented in this article. While the study by Witthayapipopsakul et al. (2019) indicated that the distribution of resources, especially medical resources, was also concentrated in large cities (Nishiura et al., 2004), in provincial and regional hospitals (secondary and tertiary care hospital). However, additional information from their study indicates that if considering at the community hospital level, the number of health personnel was more in small hospitals. While medium-sized hospitals may not receive much attention, consistent with the data we have presented, provinces with high workloads on doctors were Ranong, Bueng Kan, Nong Bua Lamphu, Uthai Thani, Samut Songkhram, Chainat, Satun, Ang Thong, Phang Nga, and Sing Buri. These provinces were not hard-to-reach areas, not the border provinces, but in the central region where the workload of doctors was high. This may be aggravating the health workforce issue in these provinces due to the high workload.

Urbanization is Not an All-in-One Answer

Using economic size as a measure may not be the full answer for keeping doctors in the province. Some provinces have a high Gross Provincial Product (GPP), but this does not indicate that they are more urban than others or that they are more attractive to physician. These provinces were such as Kamphaeng Phet, Rayong, which were characterized as industrial provinces.

An example of a comparison between Rayong and Chiang Mai where the differences could be clearly seen. The reason is because Rayong was an industrial province with a provincial GPP value of 988,748.13 while Chiang Mai had a GPP of 143,637.59 baht per capita per year. It can be noted that the difference in GPP was that the doctor's workload was not much different, 0.03 and 0.01 respectively. This clearly shows that the size of the economy may not be a good indicator of the urbanization of each province. The results were consistent with the findings that measured the relationship between physicians and the economic situation, which were not correlated (Noree et al., 2022). However, although there was no correlation, this does not mean that economic factors do not affect the international studies where economic factors clearly affect the distribution of physicians (Correia & Veiga, 2010; Pál et al., 2021; Rabbanikhah et al., 2018).

In addition to prosperity of the province, there are other issues that need to be understood, such as the career path of a doctor. Ultimately, physicians are choosing to specialize in their profession unless they choose to work

long time in community hospital. Physicians have moved to receive educational opportunity in hospitals that better serve their career development both in private sectors and aboard (Suphanchaimat et al., 2013). The family issue is one of the most concerned issues for doctors to work in rural areas. Having a family or hometown in a different province from the workplace forces doctors to stay away from their families (Haskins et al., 2017). This includes that the doctor grew up in the countryside (Saijo et al., 2018). Lifestyle issues, being urbanized (Adewoyin et al., 2018; Cao et al., 2020; Chen et al., 2014), or having the opportunity to live in a city may also be pleasing to doctors. Making urbanization is one of the variables that influence the decision to work in rural areas of physicians.

Conclusion and Suggestions

Although Thailand has improved the ratio of population to physician as a whole at the country level, but when digging deeper into each province, there are still inequalities that lead to problems that may expand. In this article, outpatient service uses of the elderly are used as a measure of doctor's workloads. This is because the elderly is a group of people who face more physical vulnerability than other age groups. Areas with a large number of elderly people tend to have more outpatient services. It is therefore important to monitor areas where there is disparity in the quantity of physicians. However, this study did not include the quality of outpatient services which we assumed to be constant (cetaris paribus). The data revealed that the disparity in the quantity of doctors does exist. The provinces with small economic size and highest workload of physicians in outpatient services in 2019 were: Ranong, Bueng Kan, Nong Bua Lamphu, Uthai Thani, and Samut Songkhram, Chainat, Satun, and Ang Thong, Phang Nga, and Sing Buri. Some of these provinces, which were not in very remote areas, were easily accessible while others did not have a high proportion of elderly to physicians.

The doctor shortage and physician workload can guide policy designs exactly where the shortage is. According to the results of the study, smaller provinces and provinces that are not remote may also have a shortage of doctors. Therefore, the ministry's policy should not only focus on provinces that are remote, difficult to access, and are only on the border. However, to provide more explicit data, the specialist shortages should also be identified in the future, such as the number of general practitioners and the family doctors, in order to identify which fields are lacking. This increases the accuracy of the doctor's workload estimation in Thailand. Moreover, identifying district-level data will make the data more accurate than provincial-level. Because at the provincial level, it seems that there are enough doctors to meet the needs. But in fact, some provinces have a different longer shape and landscape, such as Chiang Mai, Korat and Buriram. As a result, some districts of the aforementioned provinces are in remote areas and have a context of shortage of doctors, which at the district level can be more clearly reflected.

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