Availability of General Practice Workforce and Basic Health Indicators in the Republic of Kazakhstan: 2015-2019

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Abstract

BACKGROUND: The Republic of Kazakhstan paid a particular attention to the development of general practice (GP) workforce over the past three decades.

AIM: This study was aimed at the provision of descriptive analysis on distribution of GPs between different administrative units of Kazakhstan in relation to the basic health indicators for the period of 2015-2019.

METHODS: This was a retrospective cross-sectional study, which was based on the data obtained from the registry of medical manpower. The data on all-cause mortality, mortality from cardiovascular disease, maternity, and infant mortality were obtained from the annual statistical reports issued by the Ministry of Health.

RESULTS: At present, GPs constitute the bulk of medical workforce in Kazakhstan and different geographic localities show different rates of GP supply. Kazakhstan experienced a stable reduction in cardiovascular, maternal, and infant mortality rates during the period 2015–2019, which might be attributed to the increased per capita supply of GPs.

CONCLUSION: GPs are the front men of Kazakhstani health-care system. There is a need to study other factors contributing to the improvement of basic health indicators in Kazakhstan.

Introduction

Like many developed countries, the Republic of Kazakhstan (hereafter – Kazakhstan) paid a particular attention to the development of general practice (GP) workforce over the past three decades. Nowadays, GP composes the majority of health professionals working in the country's primary healthcare. As a profession, GP has started in Alma-Ata, former national capital, where the first family practice facility was settled in 1989. The first GP specialists were retrained pediatricians and internists and already in 1996 Almaty Medical University opened the chair of GP, beginning to teach the future GP on a regular basis. Later on, the Ministry of Health (MoH) envisaged the national-wide training of trainers in GP, which became possible due to the support provided by the international consultants from the UK and the USA [1].

Because before Kazakhstan gained independence in 1991, its health-care system belonged to the Semashko's model, under which family practice literally did not exist, it was of primary concern for the country's government to establish a network of GP clinics. Thus, MoH initiated that a series of national health-care reforms that was targeted on optimization of the existing health services and settled many urban and rural GPs, the number of which by the beginning of the 21st century approximated 1500 [2]. Still, appropriate management of primary healthcare strongly influences the productiveness of GP labor. Therefore, it is not enough just to open more GP clinics but it is important to make decisions considering effective utilization of already existing services [3].

As a result of the common practice of the centralized regulation of medical services, the MoH of Kazakhstan was not prepared to adequately respond to the needs of rapidly appeared small independent GP clinics. Along with a series of socio-economic crises that Kazakhstan faced after gaining independence, this factor contributed to the deterioration of many health indicators [4]. Nevertheless, the country is planning to continue the development of GP sector and makes the particular efforts to train critically thinking professionals

committed to the principles of evidence-based medicine who are able to provide medical care at the level of international standards. For this, it was proposed to expand the network of GPs and to teach more GPs by establishing a specialized residency program in medical schools throughout the country [5].

Within the health-care sector of Kazakhstan, the salary paid to GP is one of the highest and depends on the achievement of a set of health indicators. Of these, morbidity and mortality rates in the population being serviced are of biggest importance [1]. Many countries face disparities in distribution of medical workforce between urban versus rural areas and although little was published on the situation in Kazakhstan, the majority of medical school graduates make their choice in favor of urban settlements [6]. The reason behind this decision is that cities offer better opportunities as compared with small towns and villages and this is true for all aspects of urban life: social, cultural, economic, and professional. This study was aimed at the provision of descriptive analysis on distribution of GP workforce between different administrative units of Kazakhstan in relation to the basic health indicators for the period of 5 years (2015–2019).

Methods

Study design and procedures

The study had a retrospective cross-sectional design. As a first step, we obtained data on GP workforce in different administrative units of Kazakhstan for the period 2015–2019. The data were provided by the Registry of Medical Workforce – a unified database that consolidates information on all medical professionals of Kazakhstan. The registry is maintained by the Observatory of Medical Workforce that operates under umbrella of the Republican Center for Health Development (RCHD). The observatory was envisaged to promote the planning, analysis, and forecast of both national and local demands in medical manpower. Thus, the registry gathers data on all licensed health professionals through regional satellites of the RCHD that were established throughout the entire Kazakhstan. At present, Kazakhstan has introduced strict licensing requirements for medical workforce, which are reinforced by the local health authorities and thus, the chance that a health facility recruits an unlicensed professional is almost neglectable. For this reason, the Registry of Medical Workforce could serve as a reliable database on Kazakhstani medical workforce. The registry collects data related to sociodemographic and professional characteristics of medical professionals, including their age, ethnic origin, medical subspecialty and qualification category, type of practice (government or private), current place of work,

and also information related to professional trajectory and causes of dismissal. In addition, the database has a special subset for recent graduates from medical schools.

As a second step, we obtained data on all-cause mortality, mortality from cardiovascular disease, maternity, and infant mortality from the annual statistical reports issued by the MoH [7] and analyzed them in relation to available GP workforce. Besides, we applied for the demographic yearbooks published by the Statistics Committee of the Ministry of National Economy, Kazakhstan to obtain the data on average annual rates of regional and national population [8]. We did not apply to the Local Ethics Committee to obtain approval since all data used were depersonalized.

Statistical analysis

The statistical analyzes were carried out through the IBM SPSS Statistics 20 software. Initially, we calculated the supply of GP per 10,000 population and the share of GP out of all medical doctors. For this, the following formulas were used:

Supply of GP/10,000 population = number of all GP × 10,000/total number of population by the end of each year

Share of GP = number of all GP × 100/total number of all medical doctors.

On the next step of our study, we calculated the rates of maternal and infant mortality, all-cause mortality, and mortality from cardiovascular disease following the common formulas:

All-cause mortality = number of all individuals who died during 1 calendar year × 1000/mid-year population

Mortality from cardiovascular disease = number of individuals who died from cardiovascular disease × 100,000/mid-year population

Maternal mortality rate = number of women who died during pregnancy or within 42 days after its termination × 100,000/total number of live births within 1 year

Infant mortality rate = number of children who died before the age of 1 year × 1000/total number of live births within 1 year [9].

All indicators were calculated separately for three cities of republican significance, that is, Shymkent (located in South Kazakhstan region), Almaty (the former national capital), and Nur-Sultan (earlier known as Astana, the present national capital) and then compared to the average regional and average national rates. Finally, the graphical charts were constructed to enable better visualization of data on availability of GP workforce.

Results

In general, during the study period (2015–2019), there was a substantial variation in the proportion of GPs out of all medical professionals between three cities of republican significance (Nur-Sultan, Almaty, and Shymkent), average regional, and average national rates. Such, the national capital (Nur-Sultan) tended to have the lowest proportion of GPs, while Shymkent had the highest proportion of GPs out of all medical professionals, except for 2019, when this indicator was higher in Almaty. While average regional rates were characterized by greater stability, there was much variability in average national rates. The main conclusion that could be drawn from the Figure 1 is that currently GPs constitute the bulk of medical workforce in Kazakhstan.
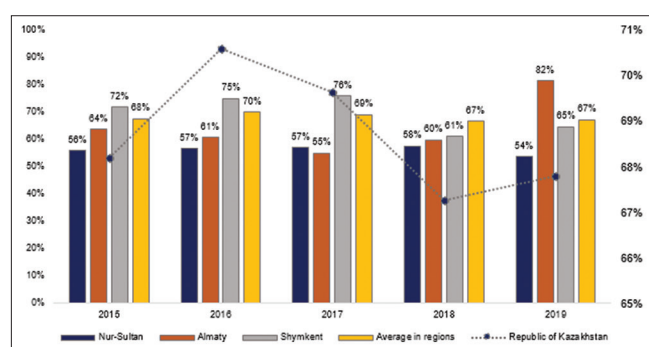

Figure 1: The proportion of general practice out of all medical doctors in Nur-Sultan, Almaty, and Shymkent cities in comparison with average regional and average national rates (Republic of Kazakhstan), 2015–2019 (%)

Despite a decreasing proportion of GPs out of all medical doctors that was observed at a national level, a supply of GPs per 10,000 population has increased drastically. Still, different metropolises showed different rates of GP supply. Such, the lowest rate of per capita GP availability was seen in Nur-Sultan, where it ranged from 4.35/10,000 population in 2019 to 4.88/10,000 population in 2016. This is probably best explained by a high concentration of different specialized medical facilities, a typical feature of a capital city. Meanwhile, during the period of study, the highest rates of per capita GP supply were observed in Shymkent, except for 2019 when these indices were outnumbered by those of Almaty. Surprisingly, the regional per capita GP supply was lower than the national (Figure 2).

In Almaty, the supply of GPs per capita grew abruptly from 4.72/10,000 population in 2015 to 6.01/10,000 population in 2019. This growth was transformed into decreasing all-cause mortality: From 7.21/1,000 population in 2015 to 6.39/1,000 population in 2019. However, this was not true for other administrative units under study, where the growth of GP supply was rather mild or even absent but the rates of all-cause mortality also experienced a decline (Table 1).
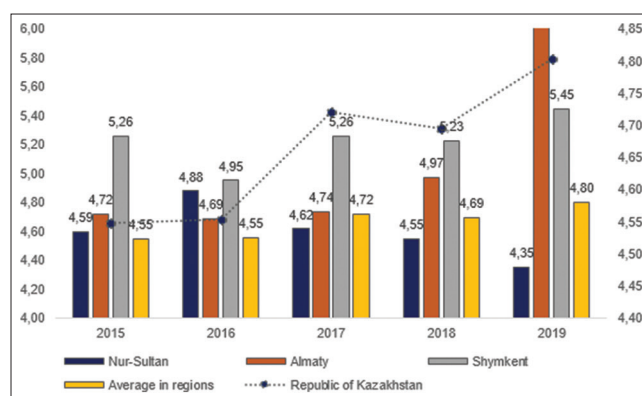

Figure 2: Supply of general practice in Nur-Sultan, Almaty, and Shymkent cities in comparison with average regional and average national rates (Republic of Kazakhstan), per 10,000 population, 2015–2019

Table 2 presents the rates of cardiovascular mortality in three cities of republican significance in comparison to average regional and average national rates and in dependence with the per capita GP supply.

Table 1: All-cause mortality in Nur-Sultan, Almaty, and Shymkent cities, average regional and average national rates in dependence with the per capita GP supply, 2015–2019

Locality	Indicator	Year				
		2015	2016	2017	2018	2019
Average regional rate	All-cause mortality per 1000 population	8.35	7.74	7.71	7.34	7.36
	Supply of GPs per 10,000 population	4.55	4.55	4.72	4.69	4.80
Almaty	All-cause mortality per 1000 population	7.21	6.34	6,25	6.15	6,39
	Supply of GPs per 10,000 population	4.72	4.69	4.74	4.97	6.01
Shymkent	All-cause mortality per 1000 population	5.55	5.26	5.13	4.77	4.63
	Supply of GPs per 10,000 population	5.26	4.95	5.26	5.23	5.45
Nur-Sultan	All-cause mortality per 1000 population	4.44	4.47	4.39	3.90	3.96
	Supply of GPs per 10,000 population	4.59	4.88	4.62	4.55	4.35
Average national rate	All-cause mortality per 1000 population	4.55	4.55	4.72	4.69	4.80
	Supply of GPs per 10,000 population	7.98	7.47	7.37	7.15	7.14

GP: General practice.

Like in case with all-cause mortality, a reduction of cardiovascular mortality was observed in all geographic localities of Kazakhstan except for Almaty, where it grew up. Almaty city is the former national capital and has high concentration of top level medical facilities providing care to patients with cardiovascular disease, which inevitably contributed to increasing cardiovascular mortality.

Table 2: Cardiovascular mortality in Nur-Sultan, Almaty, and Shymkent cities, average regional and average national rates in dependence with the per capita GP supply, 2015–2019

Locality	Indicator	Year				
		2015	2016	2017	2018	2019
Average regional rate	Cardiovascular mortality per 1000 population	210.23	199.25	183.77	174.62	165.23
	Supply of GPs per 10,000 population	4.55	4.55	4.72	4.69	4.80
Almaty	Cardiovascular mortality per 1000 population	167.10	139.50	175.16	190.13	187.22
	Supply of GPs per 10,000 population	4.72	4.69	4.74	4.97	6.01
Shymkent	Cardiovascular mortality per 1000 population	153.60	147.40	139.73	146.10	129.41
	Supply of GPs per 10,000 population	5.26	4.95	5.26	5.23	5.45
Nur-Sultan	Cardiovascular mortality per 1000 population	145.60	157.60	152.28	123.10	124.80
	Supply of GPs per 10,000 population	4.59	4.88	4.62	4.55	4.35
Average national rate	Cardiovascular mortality per 1000 population	207.20	193.80	178.92	174.83	167.28
	Supply of GPs per 10,000 population	7.98	7.47	7.37	7.15	7.14

GP: General practice.

Kazakhstan experienced a stable reduction in both regional and national maternal mortality rates during the period 2015–2019. However, the marked growth from 2.40/100,000 live births in 2015 to 8.20/100,000 live births in 2019 was observed in Almaty. In Nur-Sultan, this indicator was characterized by a greater instability: After initial decline from 12.30/100,000 live births in 2015 to 3.80 in 2016 it started to grow reaching the level of 28.20/100,000 in 2019 (Table 3). These peculiarities could be also attributed to a high concentration of specialized medical facilities in both the former and the present national capitals.

Table 3: Maternity mortality in Nur-Sultan, Almaty, and Shymkent cities, average regional and average national rates in dependence with the per capita GP supply, 2015–2019

Locality	Indicator	Year				
		2015	2016	2017	2018	2019
Average regional rate	Maternal mortality per 100,000 live births	10.39	12.92	12.13	11.24	14.32
	Supply of GPs per 10,000 population	4.55	4.55	4.72	4.69	4.80
Almaty	Maternal mortality per 100,000 live births	2.40	2.40	9.10	12.60	8.20
	Supply of GPs per 10,000 population	4.72	4.69	4.74	4.97	6.01
Shymkent	Maternal mortality per 100,000 live births	16.40	11.40	17.70	13.10	9.80
	Supply of GPs per 10,000 population	5.26	4.95	5.26	5.23	5.45
Nur-Sultan	Maternal mortality per 100,000 live births	12.30	3.80	11.00	9.80	28.20
	Supply of GPs per 10,000 population	4.59	4.88	4.62	4.55	4.35
Average national rate	Maternal mortality per 100,000 live births	11.70	12.80	12.90	12.50	13.90
	Supply of GPs per 10,000 population	7.98	7.47	7.37	7.15	7.14

GP: General practice.

Like in case of all-cause, cardiovascular, and maternal mortality, the rates of infant mortality have also declined in the period of 2015–2019. However, a mild growth was seen in 2019 in Almaty and Shymkent cities, and also at a regional level. Although national rates of infant mortality experienced a gradual decline, the above described phenomenon requires further investigation (Table 4).

Discussion

This study performed the descriptive analysis of distribution of GP workforce in Nur-Sultan, Shymkent, and Almaty cities of Kazakhstan in comparison to average regional and national rates. In addition, the study reported on the basic health indicators for the period from 2015 to 2019 in relation to the available GP workforce. It is important to understand both availability and distribution of manpower to enable appropriate planning and implementation of strategies targeted on forecasting of the future manpower demands and supply to make them meet [10]. Apart from avoidance of labor shortage, this might help to minimize the inconsistencies related to manpower maldistribution, which has negative impact on patient satisfaction with the overall quality of medical services [11].

Our study revealed much variability in the proportion of GPs out of the total number of medical doctors during 2015–2019 and this was also true for

Table 4: Infant mortality in Nur-Sultan, Almaty, and Shymkent cities, average regional and average national rates in dependence with the per capita GP supply, 2015–2019

Locality	Indicator	Year				
		2015	2016	2017	2018	2019
Average regional rate	Infant mortality per 1000 live births	9.55	9.00	8.40	7.89	8.16
	Supply of GPs per 10,000 population	4.55	4.55	4.72	4.69	4.80
Almaty	Infant mortality per 1000 live births	8.17	8.91	7.58	6.93	8.36
	Supply of GPs per 10,000 population	4.72	4.69	4.74	4.97	6.01
Shymkent	Infant mortality per 1000 live births	11.43	11.12	9.98	8.37	8.37
	Supply of GPs per 10,000 population	5.26	4.95	5.26	5.23	5.45
Nur-Sultan	Infant mortality per 1000 live births	6.84	7.51	6.75	5.92	6.17
	Supply of GPs per 10,000 population	4.59	4.88	4.62	4.55	4.35
Average national rate	Infant mortality per 1000 live births	9.76	9.37	8.59	7.93	8.03
	Supply of GPs per 10,000 population	7.98	7.47	7.37	7.15	7.14

GP: General practice.

per capita rates of GP supply. These variations might be explained in a variety of ways, including increasing number of other medical professionals due to consecutive implementation of the series of health-care reforms that were focused on improved management of human resources. However, GPs are considered to be very important for Kazakhstani primary health care and thus, per capita growth in national GP supply is mainly due to a planned increase in GP numbers [12].

Internationally, GPs are the key players in provision of primary care services since they are responsible for primary identification and treatment of a wide spectrum of health problems. Besides, their responsibility includes referrals of selected patients for specialized care and provision of health promotion [13]. Still, it is difficult to recruit and retain professionals in GP. Such, in UK during the past year (from June 2019 to June 2020), the number of full time equivalent GPs fell by 2.3%. Although striking, this decline is not surprising as even before the pandemic, GPs were facing rising patient demand in a situation of chronic underfunding and toppling workloads. Moreover, a growing pressure was caused by ageing of the population served, which often presented with complex health conditions. In addition, the shift from hospital-based care to community-based care widened the role played by GP in health care. The COVID-19 pandemic further exacerbated these problems and many professionals went above and beyond their call of duty [14].

Even though more than half of all medical doctors in Kazakhstan are GPs, their supply is insufficient when comparison with countries of the European Union is made. Such, in 2013, the national GP supply in Austria constituted 76.95/100,000 population; while in Belgium, it equaled 111.67/100,000 population and in France, it was as high as 160.11/100,000 population. The national levels of GP supply in Kazakhstan are more close to those reported for the South-east Europe Health Network members (57.79/100,000

population in 2013) and for the WHO European Region (64.57/100,000 population in 2013). Of interest is the fact that in 2013, the national levels of GP supply in the Central Asian Republics Information Network members were even lower (39.45/100,000 population) [15].

At present, there are enough data to conclude that greater availability of GP workforce is associated with better population health indices. For instance, socio-economically disadvantaged communities are commonly characterized by higher mortality and morbidity rates and fewer GPs per head. In contrast, developed countries with high availability of GP workforce have better health indices, especially those that are more amenable to primary care [16]. By way of illustration, in UK, the reduction of in-hospital mortality was more strongly associated with GP supply than with the number of hospital beds available [17]. Another sample could be made of a population-based study that was carried-out in the USA, which reported on better identification of colorectal cancer at early stages in geographic areas with high GP supply in contrast with the areas with high supply of specialist medical doctors [18]. Moreover, higher GP supply was associated with lower rates of reporting poor health after adjustment for different factors that are related to subjective health perception [19].

Probably, the best argument in favor of comprehensive primary health care is reduced mortality that is directly correlated with increasing GPs supply. Ample evidence exists on the impacts of availability of primary care on decreased rates of all-cause, cardiovascular, and cancer-related mortality [20]. Furthermore, every 10 additional GPs per 100,000 population contribute to a 51.5-day increase in life expectancy [21]. Besides, every additional primary care physician per 10,000 population is associated with a decrease in all-cause mortality, which is equal to 15.1 deaths per 100,000 population [22]. An increase of one GP per 10,000 population in Brazil contributed to a reduction of 7.08 infant deaths per 10,000 live births [23]. Thus, adequate supply of GP workforce impacts population health in a variety of ways.

Conclusion

The decreasing rates of all-cause mortality and declining numbers of heart and infant deaths are commonly observed in response to increasing availability of GP workforce in many countries across the globe. For a country with transition economy like Kazakhstan, primary health care is of utmost importance for improvement of the population health. Increasing availability of GP workforce is generally associated with many favorable outcomes, to which belongs increased life expectancy. Availability of GP

workforce is probably the most important determinant related to better health, lower all-cause mortality, and reduced disease-specific death rates in any population. Notwithstanding that it is important to bear in mind other factors influencing population health, GPs are the front men of any health-care system and they are crucial for the provision of quality primary care. Finally, there is a need for longitudinal studies focusing on the impact of increasing GP supply on health status of Kazakhstani population.

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