



REGIONAL IMBALANCES IN DISTRIBUTION OF BULGARIAN HEALTH PROFESSIONALS

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ABSTRACT

Introduction: There are many factors influencing health inequities; health workforce availability and skill mix are among them. Regional distribution of health workers determines access to health services. The aim of this study is to analyse and to assess the distribution of health professionals among the statistical regions and districts in Bulgaria.

Methods and materials: The current study uses health professionals to population ratio, Gini index and Lorenz curve to measure and assess the proportionality of health workers distribution. Data are provided from the National Statistical Institute and European Health for All databases.

Results and discussion: In Bulgaria, health professionals per population ratio are comparable with the EU average except for the nurses. Beside the shortage of nursing professionals, geographically uneven distribution of health workers is among the main challenges in human resource management. Regional imbalances are significant among the districts in the country. More than half of the physicians are concentrated in 6 districts. The analysis shows an upward trend in imbalances, expressed as absolute or relative differences. The distribution of dentists is much more variant and diverse than this of physicians. The values of Gini index for specialised medical care also reveal considerable imbalances.

Conclusions: Different coefficients have proved the unequal distribution of health workers among the districts. Regional imbalances are not the only reason for health inequities in Bulgaria but they have significant influence in rural and remote areas and in regions with high unemployment, low incomes and ageing population.

Key words: health professionals, imbalances, inequity, distribution, access.

INTRODUCTION

Health sector is labour intensive sector and highly relies on the health workforce [1]. Human resources are the most important resources in health system. The quality of and the access to health services depends on availability, qualification and skills of health professionals. However, recent analyses predict a huge shortage of health professionals over the next decades worldwide, as well as in the European Union (EU) [2, 3]. Different countries face the challenge how to guarantee the human capital needed for

universal access and universal health coverage.

The scale and intensity of workforce shortages – in certain health professions and medical specialties or geographic areas - widely vary across the EU [4]. This enhances the existing imbalances in human resources among the countries and regions and deepens the inequities in access to health services.

Despite national and European policies and actions, inequalities in access to health services in Europe exist within and between countries [5]. There are many factors determining health inequities, one of which is health workforce availability and skill mix. Furthermore, in the EU, the freedom of movement and mutual recognition of qualifications facilitate migration of health professionals, which might increasingly affect some regions. The mobility processes deepen the existing imbalances between regions and countries and thus increase the inequities. These key workforce issues impede the ability of health systems in Europe to improve their performance in terms of access, quality and universal coverage.

Imbalances and regional inequities in distribution of health workers can be measured at the national and particularly the sub-national level. Geographic and skill mix imbalances usually reflect rural and remote areas. Different socio-economic development of the regions affects their ability to attract and to retain health professionals. The lack of policy incentives also contribute to regional imbalances.

The aim of this study is to analyse and to assess distribution of health professionals among the statistical regions and districts in Bulgaria.

METHODS AND MATERIALS

Different methods can be applied to capture the uneven distribution of health workers. The current study uses three of them. One popular method is the ratio of health professionals to population. At the national level, the ratio of physicians, dentists and nurses to population is compared to EU average, used as benchmark. Health professionals to population ratio are estimated also for each of the 6 statistical regions and 28 administrative districts in Bulgaria.

Other methods to analyse and compare imbalances in distribution of health workers are Gini index and Lorenz curve. The Gini coefficient measures the degree of concentration (inequality) of a variable in a distribution of its elements. It compares the Lorenz curve of a ranked empirical distribution with the line of perfect equality [6]. The Gini coefficient ranges between 0 (no concentration or per-

fect equality) and 1 (total concentration or perfect inequality). The Lorenz curve is a graphical representation of the distribution proportionality [6]. The Gini index for different health professionals (physicians, dentists, nursing professionals and nurses) is estimated for a 5-year period. The concentration of physicians compared with the number of population by districts is analysed for different medical specialties.

Data for the size of population and the number of health workers by profession and specialty for the 6 statistical regions and 28 districts are provided from the National Statistical Institute (NIS). Furthermore, data for EU average from European Health for All databases (WHO Regional Office for Europe) are included.

RESULTS AND DISCUSSION

Physicians to population ratio in Bulgaria has been increasing during the last years and in 2013, it was above the EU average - 397.67 in Bulgaria and 346.62 per 100000 population in EU respectively [7]. A slight increase in absolute number of physicians is observed but the main causes for the higher ratio are related to population diminution in Bulgaria. In 2013, the total number of general practitioners (GP) was relatively low – 62.93 per 100 000 population compared with an EU average of 79.47.

Bulgaria is one of the countries with the highest density of dentists in Europe. Since 1990, the number has been increasing steadily and in 2013, reached 100.38 per 100 000.

It was far above the EU average of 67.29 per 100 000 population [7].

Unlike the number of physicians and dentists, the nursing professionals per population ratio have been steadily decreasing since 1990. In 2013, Bulgaria lags far behind the EU average. The country has a very low proportion of nurses compared to the EU average – the proportion is almost 1.7 times lower than in the EU [7]. There is a slight upward trend in the number of nurses since 2005, but most of them seek employment abroad due to both low recognition and inadequate remuneration [8].

Beside the shortage of nursing professionals and nurses particularly, geographically uneven distribution of health professionals is among the main challenges in human resource management in Bulgarian health system. The number of physicians per 10 000 population in the west part of the country (Northwest and Southwest regions) exceeds the average value for Bulgaria (Table 1). In the Northwest region, this proportion increases due to population ageing and diminution, while in the Southwest region the number of physicians rise due to the higher concentration of health care establishments in the capital Sofia. In the Southwest and South central region, the number of dentists per 10 000 population is significantly higher than the index values in the other regions. The availability of health professionals in the Southeast and North central regions lags behind the regions, where there are medical universities and university hospitals.

Table 1. Health professionals per population ratio by statistical regions, 2015

Statistical regions	Physicians per 10 000	Dentists per 10 000	Nursing professionals per 10 000	Nurses per 10 000	GPs per 10 000	Population per physician	Population per GP
Total for the country	40.64	10.50	66.30	66.30	6.20	246	1614
Northwest	42.65	7.91	68.52	68.52	7.16	234	1397
North central	31.99	8.03	60.14	60.14	5.29	313	1892
Northeast	37.85	9.62	59.93	59.93	6.40	264	1564
Southeast	34.11	8.41	60.83	60.83	5.94	293	1684
Southwest	42.97	12.06	67.17	67.17	6.32	233	1582
South central	38.22	12.99	62.01	62.01	6.07	262	1649

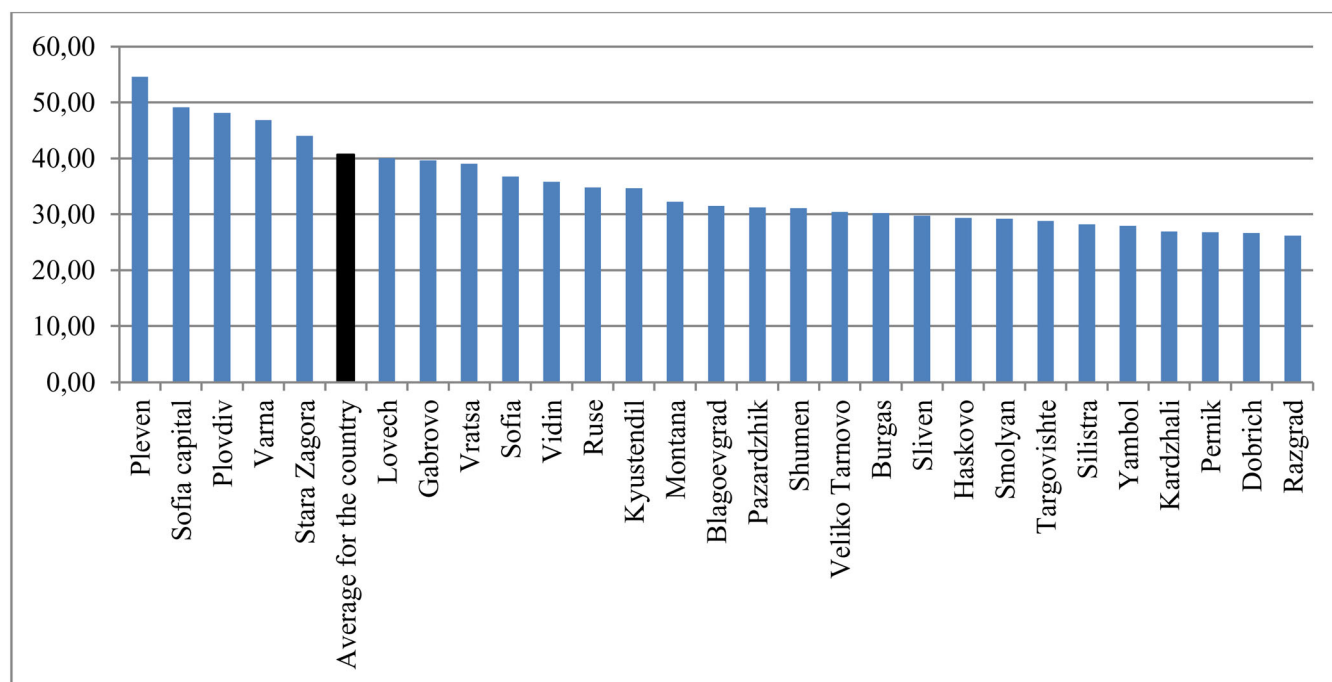
Source: NIS, 2016.

Note: Nursing professionals include nurses, midwives, doctor's assistants, laboratory assistants, dental technicians and other medical specialists.

Regional imbalances in distribution of health workers become even greater among the 28 districts in the country. More than half of the physicians in Bulgaria are concentrated in 6 districts – Sofia-capital (22.3%), Plovdiv (11.1%), Varna (7.6%), Stara Zagora (4.9%), Pleven (4.7%) and Burgas (4.4%). An analysis of physicians per population ratio exposes significant differences between the districts - from 54.61 per 10 000 population in Pleven and

49.14 in Sofia-capital to 26.63 per 10 000 in the district of Dobrich and 26.19 in Razgrad (Figure 1). Same varieties are observed in primary health care – in the district of Pleven, for example, the number of GPs per population is twice higher than in the district of Razgrad [9]. The analysis shows an upward trend in imbalances between the districts in Bulgaria, expressed as absolute or relative differences.

Fig. 1. Physicians per 10 000 population ratio by districts in Bulgaria, 2015.



Source: NIS, 2016.

Similar imbalances are observed in distribution of dentists by districts: there is a 2.8 times difference between the district with the highest and the district with the lowest ratio of dentists per population. Although Bulgaria has a high national level of dentists to population ratio, the country experiences health worker shortages or surplus in certain geographical areas. During the last years, the number of dentists has significantly risen due to development of private sector and prevailing proportion of patient payments. In 2015, nursing professionals per population ratio also varied between the districts – from 42.33 per 10 000 in the district of Pernik, to 82.90 in the district of Pleven [9]. The differences grow further if we analyse the regional distribution of nurses in the country.

Diverse inequities in the distribution of health work-

ers by districts in Bulgaria can also be illustrated using Gini index and Lorenz curve. As the Gini index reveals, in the country, the distribution of physicians is more and fairly equally. The index values range between 0.08 and 0.1, but there is an increasing trend during the last years (Table 2). In contrast, the distribution of dentists is much more variant and diverse. Dentists are heavily concentrated in the capital Sofia and several big towns and especially sparse in smaller towns and rural areas. The disproportionate allocation of these health professionals in urban areas can be explained with the development of dental services market in the country and differences between big towns and other types of residence [10]. The Gini index confirms this conclusion; its values exceed these for the other health workers (Table 2).

Table 2. Gini index by districts, 2011-2015

Health professionals	2011	2012	2013	2014	2015
Physicians	0.07958	0.07818	0.09097	0.09026	0.09887
GPs	0.02138	0.00916	0.0121	0.01586	0.01202
Dentists	0.12025	0.13912	0.13084	0.134	0.12398
Nursing professionals	0.03933	0.05575	0.06258	0.05516	0.05859
Nurses	0.03434	0.05917	0.06106	0.0495	0.05299

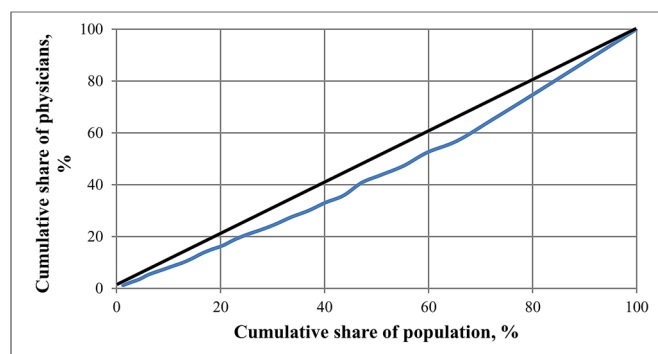
Note: Own calculations, according to data of NSI, 2016.

As presented in figure 2, about 70% of the population in Bulgaria is served by approximately 60% of the physicians. The distance between the Lorenz curve (the observed distribution of the indicator) and the “ideal distribution line” (45-grade line) represents the degree of in-

equality. The Lorenz curve shows that there aren't significant deviations in the distribution of physicians in accordance with the number of population. It has to be noticed that Gini index and Lorenz curve are not measures for availability and sufficiency of health professionals and the

results do not show if the supply of health workers corresponds to their demand. These are measures only for equity of distribution.

Fig. 2. Lorenz curve for distribution of physicians, 2015



The next step of the analysis concerns different medical specialties and differentiation of primary and specialised medical care. Primary medical care is a key sector of health system and the access to health services depends to a great extent on availability and distribution of general practition-

ers. The Gini index shows that the distribution of GPs by districts is less unequal than this of physicians in general (Table 2). But the presented coefficient does not assess differences between urban and rural areas. There is a considerable shortage of GPs in the rural areas in Bulgaria. In 2015, the number of population per GP varied significantly – from 1 235 in the district of Pleven to 2 443 in the district of Razgrad [9]. The shortage of GPs in rural areas impedes the access of population to primary health services.

There is also a shortage of physicians in specialised medical care. The specialists in intensive care, nephrology, oto-rhino-laryngology, psychiatry, clinical laboratory, radiology, obstetrics and gynecology and communicable diseases have been decreasing in recent years [11]. Imbalances are also observed in their distribution –with predominant concentration in university centers and considerable shortage in small towns and rural areas. Although diseases of the circulatory system are the leading cause for deaths, in 2015, for example, the number of specialists in cardiology per population varied significantly among districts – from 0.35 per 10 000 in the district of Targovishte to 2.74 in Sofia-capital or 7.83 times difference (9NIS, 2016). Similar imbalances exist also among the other specialties as shown in Table 3.

Table 3. Imbalances in distribution of specialists by districts, 2015

Specialty	Giniindex	Specialty	Giniindex	Specialty	Giniindex
Communicable diseases	0.01521	Other specialty	0.09593	Cardiology	0.19046
Psychiatry	0.03375	Clinical laboratory	0.09774	Urology	0.19806
Internal medicine	0.04418	Neurology	0.09898	Oto-rhino-laryngology	0.20129
Pneumology	0.05240	Surgery	0.13468	Paediatrics	0.06407
Radiology	0.13672	Dermato-venerology	0.24931	Physiotherapy	0.06965
Obstetrics and gynaecology	0.15839	Ophthalmology	0.26244	Orthopaedics and traumatology	0.20370

Note: Own calculations, according to data of NIS, 2016.

By contrast with primary care, the values of Gini index for specialised medical care reveal more significant imbalances in distribution of physicians. The most impressive disproportions are observed in oto-rhino-laryngology, orthopaedics and traumatology, dermato-venerology and ophthalmology (Table 3). These disproportions can be considered as access barriers to specialise medical care in some districts. According to the results from analysis, in districts with high infant mortality, specialists per population ratio is lower. For example, in Lovetch and Sliven – districts with the highest infant mortality in the country – the number of specialists in paediatrics and in obstetrics and gynaecology are far below the average values for Bulgaria [9]. These big differences can be interpreted as examples for inequities in access, which are confirmed also from the analysis of regional distribution of health professionals.

CONCLUSIONS

Regional imbalances in distribution of physicians concern supply of health services and access to medical care. The shortage of health professionals is not the only reason for health inequalities in Bulgaria but it has significant influence in rural and remote areas, as well as in regions with high unemployment, low incomes and ageing population.

The different coefficients as health professionals per population ratio and Gini index have proved the unequal distribution of health workers among the districts in the country. Uneven allocation of health care establishments is a prerequisite for the distribution of health professionals with the biggest imbalances in specialised medical care.

The causes for regional imbalances are different. To a certain extent, they are historically determined and are connected with the extensive development of the health system until the beginning of 1990s. Lack of reforms in hospital sector and absence of consequent policy actions during the last 25 years have deepened the inherited dispro-

portions. Taking into account the significant percentage of private payments, a relationship between socio-economic development of the region and supply of health services can be found. Last but not least, the opportunities for specialisation, continuous training and carrier development make some districts more attractive for health professionals than others. Nevertheless, the regional imbalances in distribution of health workers create inequities in access to health services.

The regional imbalances cannot be eliminated; it is impossible to have absolutely equal distribution of resources between regions, sectors or health care establishments in the health system. But high concentration of health care establishments and health workers in some regions and shortage of resources in others causes inequities in access to medical care and different opportunities for population to use health services. These disproportions can increase health inequalities between regions and socio-economic groups.

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