

Geographical distribution of physiotherapists in Brazil

Distribuição territorial dos profissionais fisioterapeutas no Brasil

Distribución territorial de los fisioterapeutas en Brasil

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ABSTRACT | One of the main global problems in the health field is the inequality of the distribution of health professionals between capitals and inland cities. The World Health Organization recommends recruitment and placement policies to make the access to health easier for these populations. Studies concerning the distribution of physiotherapists are still little known. This study analyzed the spatial correlation and the availability of physiotherapists in Brazil by resident population. It is a quantitative, analytical and descriptive study made through analysis of secondary data referring to the number of physiotherapists with definitive enrollment, by region, made available by the 16 Regional Councils of Physiotherapy and Occupational Therapy between May and September 2016, from databases of the 2010 IBGE Census and of the geographic coordinates in the Google Maps virtual system. Spatial analyzes were carried out through georeferencing, from a Geoprocessing Database, and ARCGIS 10.5 software was used to produce thematic maps. It was observed very high density of physiotherapists in the Southeast region and a large area of lack of these professionals in the North region, with influence of the economic development in the distribution of these professionals between those regions. The study concluded that in small cities, mainly in the inland parts of the North, there is not enough physiotherapists as recommended, and in regions with a greater economic development there are more professionals available for the job market.

Keywords | Physiotherapists; Spatial Analysis; Professional Training.

RESUMO | Um dos principais problemas mundiais no setor da saúde está na desigualdade da distribuição de profissionais da área entre as capitais e o interior. A Organização Mundial da Saúde recomenda políticas de recrutamento e fixação desses profissionais para facilitar o acesso à saúde para essas populações. Estudos relativos à distribuição territorial do profissional fisioterapeuta ainda são pouco conhecidos. Neste estudo analisou-se a correlação espacial e a disponibilidade de profissionais fisioterapeutas no Brasil por população residente. Constituiu-se em um estudo quantitativo, analítico e de caráter descritivo, feito por meio de análise dos dados secundários referentes ao número de profissionais fisioterapeutas com inscrição definitiva, por regiões do Brasil, disponibilizados pelos 16 Conselhos Regionais de Fisioterapia e Terapia Ocupacional no período compreendidos entre maio a setembro de 2016; a partir de bases de dados do Censo 2010 do IBGE e de coordenadas geográficas no sistema virtual *Google Maps*. As análises espaciais foram realizadas por meio de georreferenciamento, a partir de um Banco de Dados de Geoprocessamento, e para a produção dos mapas temáticos utilizou-se o software ARCGIS 10.5. Foi verificada uma densidade muito alta de fisioterapeutas na região Sudeste e uma ausência desses profissionais em grande área da região Norte, com influência do desenvolvimento econômico na distribuição desses profissionais entre as regiões. Concluiu-se que nas pequenas cidades, principalmente no interior da região Norte, não há um quantitativo de profissionais fisioterapeutas conforme o recomendado, e nas regiões onde há um maior desenvolvimento econômico ocorre

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um maior número de profissionais disponíveis para o mercado de trabalho.

Descritores | Fisioterapeutas; Análise Espacial; Capacitação Profissional.

RESUMEN | Uno de los principales problemas mundiales en el sector de la salud está en la distribución desigual de profesionales del área entre las capitales y el interior. La Organización Mundial de la Salud recomienda políticas de reclutamiento y fijación de estos profesionales para facilitar el acceso a la salud para esas poblaciones. Los estudios relativos a la distribución territorial de los fisioterapeutas todavía son poco conocidos. En este estudio se analizó la correlación espacial y la disponibilidad de profesionales fisioterapeutas en Brasil por población residente. Se constituye en un estudio cuantitativo, analítico y de carácter descriptivo, hecho a través de análisis de los datos secundarios referentes al número de fisioterapeutas con inscripción definitiva, por regiones de Brasil, puestos a disposición

por los 16 Consejos Regionales de Fisioterapia y Terapia Ocupacional en el período de mayo a septiembre de 2016, a partir de las bases de datos del Censo 2010 del IBGE y de las coordenadas geográficas en el sistema virtual Google Maps. Los análisis espaciales se realizaron por medio de georreferenciación, a partir de un Banco de Datos de Geoprocusamiento, y para la producción de los mapas temáticos se utilizó el software ARCGIS 10.5. Se verificó una densidad muy alta de fisioterapeutas en la región Sudeste y una ausencia en gran área de la región Norte, con influencia del desarrollo económico en la distribución de estos profesionales entre las regiones. Se concluyó que en las pequeñas ciudades, principalmente en el interior de la región Norte, no hay un cuantitativo de profesionales fisioterapeutas según lo recomendado, y en las regiones donde hay mayor desarrollo económico, el número de profesionales disponibles para el mercado de trabajo también es mayor.

Palabras clave | Fisioterapeutas; Análisis Espacial; Capacitación Profesional.

INTRODUCTION

One of the main problems in the health field worldwide is in the inequality of professional distribution between rural and urban zones, capitals and inland cities. The World Health Organization (WHO) recommends policies for recruitment and placement of medical professionals to make access to health easier for these populations¹.

Regionalization stands out as a State tool, including space cuts for planning and territorial management of public policies. For this, several criteria are used to identify and design each region according to the specific objectives and the various socioeconomic contexts. In the health field, regionalization has the objective of promoting the most efficient use of resources in the territory, increasing access and quality of health care^{2,3}.

According to Tavares et al.⁴, studies on the distribution of physiotherapists in the health system, regarding the percentage of municipalities that have this kind of professional, are still little known.

In a study by Silva and Bacha⁵, the correlation between the offer of health services, the Gross Domestic Product (GDP) and the Human Development Index (HDI) was evidenced; as the GDP of the region increases, health spending also rises. Higher income level probably demands search for more complex prevention and treatment services. In regions with

high HDI, economic growth is reflected in the improvement of the population's quality of life, also reflecting in the higher concentration of professionals in these regions.

According to data recorded by the Federal Council of Physiotherapy and Occupational Therapy (Coffito), in 1995, 16,068 physiotherapists were registered in Brazil. In 2005, there were 79,382 professionals⁶. Of these, the highest percentage was located in the Southeast region, and the lowest percentage was in the North. However, a mapping of the necessity and availability of physiotherapists have never been made in Brazil's physiotherapy history, which makes the opening of new undergraduate courses in physiotherapy to stimulate the placement of these professionals in the regions needed more difficult.

Thus, this study aimed to analyze the spatial correlation and the availability of physiotherapists in Brazil by resident population through mapping, which will contribute to a better distribution of professionals according to regional needs.

METHODOLOGY

This research consisted of a quantitative, analytical and descriptive study, developed through analysis of the secondary data collected regarding the number of

physiotherapy professionals with definitive enrollment by Regional Councils in Brazilian regions, made available (sent in official reports via e-mail) by 16 Regional Councils of Physiotherapy and Occupational Therapy (Creffito) between May and September 2016; based on data bases related to the 2010 Census of the Brazilian Institute of Geography and Statistics (IBGE)⁷ and to the latitude and longitude geographical coordinates in the Google Maps virtual system.

By using documentary analysis, this research was exempted from the analysis of the Committee of Ethical Conduct in Research Involving Human Beings of the Center for Biological Sciences and Health of the State University of Pará, under protocol no. 05/16 on April 25, 2016

Spatial analyzes were carried out through georeferencing from a Geoprocessing Database (BDGEO), and the ARCGIS 10.5 software was used to produce thematic maps.

RESULTS

The results present the survey, the systematization and the interpretation of the professionals quantitative of the respective Regional Councils. Regarding the counting of professionals with final enrollment, the data received from the 16 Regional Councils until September

2016 showed 206,170 registered physiotherapists, representing a potential growth in the number of new professionals (Figure 1).

Considering the concentration of physiotherapy professionals in Brazil, we observed two very dense focuses in the Southeast region, one in the state of São Paulo and another in the state of Rio de Janeiro. On the other hand, we can observe a large area with absence of professionals, mainly in the North region, more precisely in states such as Acre, Amazonas, Roraima, Amapá and Pará (Figure 2).

In Figure 3 we can observe the spatial distribution of physiotherapists by federative units.

It can be observed that the region with the greatest number of professionals in relation to the population is the Southeast, with 1.34 professionals per thousand inhabitants, showing the inequality in the distribution of physiotherapists among the localities. The lack of physiotherapy professionals in the North is also noticed, since in every municipality of the region, for every 1,000 inhabitants there is less than 0.5 professional (Table 1).

Table 2 shows that the region with the highest HDI is the Southeast, which also has the highest percentage of physiotherapy professionals (55.93%). However, the Northeast region has the lowest HDI among the regions (0.591), although the North has the lowest percentage of physiotherapy professionals (3.65%).

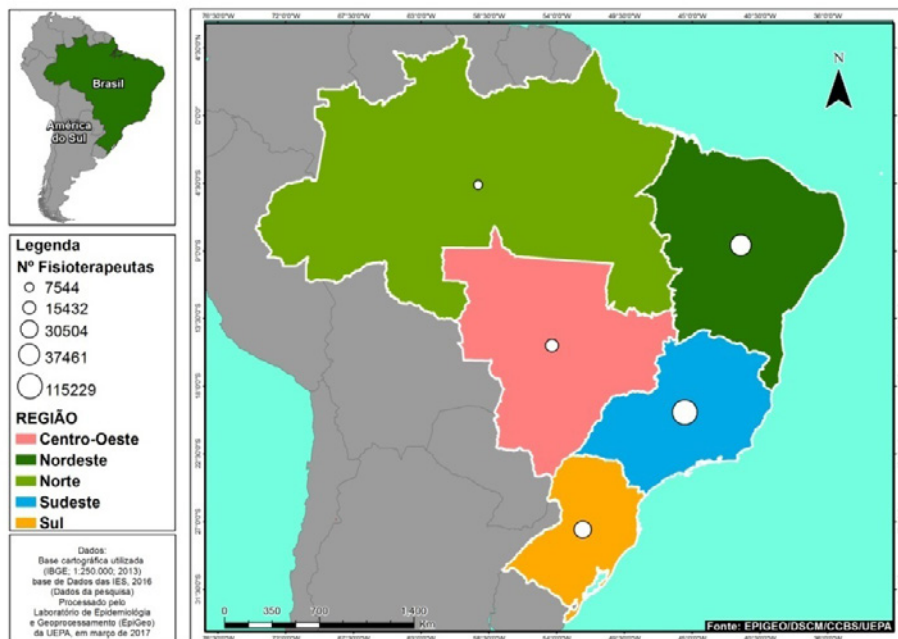


Figure 1. Distribution of physiotherapists by region

Source: Research data, 2017.

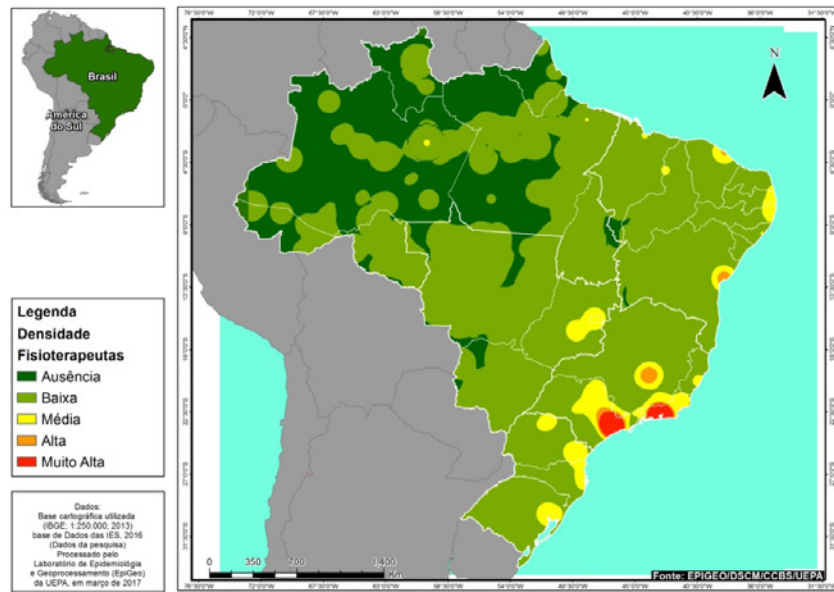


Figure 2. Density of professional physiotherapists in Brazilian territory
Source: Research data, 2017.

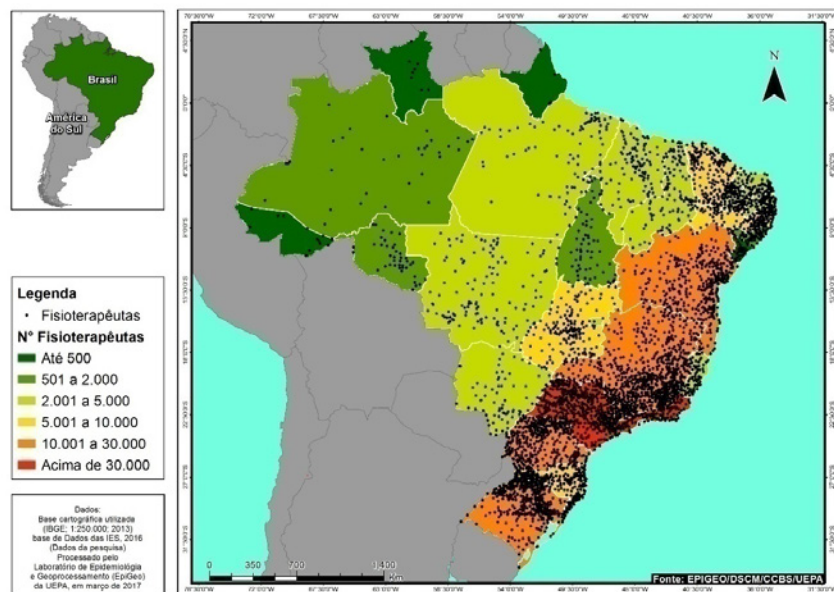


Figure 3. Spatial distribution of physiotherapy professionals by federative units
Source: Research data, 2017.

Table 1. Number of physiotherapists per thousand inhabitants

Region	Number of inhabitants	Number of professionals	(P/I)*1000
Midwest	15,660,988	15,363	0.98
Northeast	56,915,936	37,346	0.66
North	17,707,783	7,520	0.42
Southeast	86,356,952	115,309	1.34
South	29,439,773	30,632	1.04
Total	206,081,432	206,170	1.00

Source: Research data, 2017.
*P/I: professionals per inhabitant

Table 2. Average HDI, quantity and percentage of physiotherapist by region

Region	Average HDI*	Professionals	
		Quantity	Percentage
Midwest	0.689	15,363	7.45
Northeast	0.591	37,346	18.11
North	0.608	7,520	3.65
Southeast	0.699	115,309	55.93
South	0.714	30,632	14.86
Total	-	206,170	100.00

Source: Research data, 2017.
*Average HDI of Brazilian municipalities by region

DISCUSSION

According to the results presented, a possibility to explain the low quantitative and unequal distribution of physiotherapists in municipalities located in the inland part of the North and Midwest regions may be related to several factors, such as their large area (45% and 19% of the national territory, respectively), the population dispersion and the difficulty of getting to health centers, creating a barrier to health services accessibility, mainly by rural (Midwest) and riverside (North)⁴ dwellers.

In this sense, according to Tavares et al.⁴, studies concerning the distribution of physiotherapist quantitative and their percentages by municipalities in the health system in Brazil show that this arrangement is not precise, which detracts from the real relevance of the profession to improve quality in public health, and the importance of having this professional inserted in networks of the Unified Health System (SUS), leading to a large concentration of physiotherapists only in large population centers.

WHO, regarding the number of physiotherapists per inhabitant, recommends one professional for every 1.5 thousand inhabitants, according to information from the Brazilian Indicators and Basic Data (IDB-2000) (DATA SUS, 2017), using the calculation of the number of health professionals per thousand inhabitants in a given geographic space. The study by Domingues⁸ found 0.66 professionals per thousand inhabitants, confirming the results of this study, which presented less than 0.5 professional per thousand people.

Nehme et al.⁹ found that the relation between physiotherapists and the number of inhabitants in the states of Rio de Janeiro and Espírito Santo were the best. Considering what WHO recommends on the relation professional health per inhabitant and that 10% of the Brazilian population presents some incapacity, it is verified that, in most states, the lack of professional coverage is evident, even in the states where the distribution seems to be more uniform.

The study by Tavares et al.⁴ regarding the number of physiotherapists, based on data from the National Register of Health Establishments (CNES), identified that there were 53,181 registered physiotherapists, and that about 90% of the jobs they were inserted were specialized services. The authors⁴ showed that the ratio of physiotherapists per thousand inhabitants ranged between 0.07 (in small cities in the North) and 0.52 (in the metropolises of the South). North and Northeast small

towns were the main municipalities without the presence of physiotherapists.

Among the Midwest states, the Federal District has the highest average HDI, equal to 0.824, and the state of Goiás has the highest percentage of physiotherapy professionals (35.89%).

In the study by Tavares et al.⁴, as for the percentage of cities with physiotherapists in regions and states, the North region showed only 40% of registered municipalities and a high percentage of localities without records of physiotherapists.

Compared with results of researches associated with other similar studies, the North region always shows the lowest indexes. Its inland population corresponds to 67% of the total population of the region, and its rural territory presents low demographic density and low health care⁹.

For Silveira and Pinheiro¹⁰, a possible indicator for the poor distribution of professionals in Northern Brazil could be associated with geographical factors, such as long distances from large urban centers and low demographic density of the region.

According to Lima et al.¹¹, a possible cause for the low presence of professionals in a given region often results from the lack of integration between health services that direct patients to large centers. This adds to the precariousness of transportation and communication services, which makes it difficult to structure integration, regional development planning and population access to health services, according to SUS guidelines.

In an analysis by Nehme et al.⁹ regarding the geographic distribution and the number of physiotherapists in the state of Rio Grande do Sul, it was observed that most professionals are concentrated in the metropolises, and that this concentration of physiotherapists occurred where there were higher education institutions with physiotherapy courses, denoting a causal relationship between the occurrence of undergraduate courses and the increase of professionals in the same territory.

Other reasons that may justify regional inequalities are the high concentrations of resources and technologies in some regions, especially in capitals, opposed to the shortage of professionals, technologies and investment capacity, coupled with the socio-spatial diversity of some territories, such as the North region¹¹.

The results obtained in this study indicate an imbalance in the distribution of professionals in all regions. There still are states where physiotherapist coverage is not adequate, according to WHO recommendations based on population quantitative.

Regarding the distribution of physiotherapists and the population's demand for professional performance, it is necessary to create future strategies geared towards the development and reduction of regional inequalities concerning the scarcity of physiotherapy in national territory.

Duarte et al.¹² ratify the importance of geographic distribution, identifying different possibilities in the formulation and implementation of public policies, making public health dialogue easier with other regional policies, in order to articulate the planning integration in the territory.

The use of technologies such as geoprocessing in the construction of the mapping of physiotherapist professionals made the analysis of the spatial distribution possible, resulting in a resource for the management and control of health services.

CONCLUSION

The distribution of physiotherapists in Brazil allowed us to verify that in small cities, mainly in the inland part of the North region, there is no quantitative of physiotherapists recommended, whereas in the greater economic development regions there are more professionals available for the labor market, characterizing an influence of the economic development in the presence of these professionals in certain regions.

As a reflection resulting from this study, and for this scenario to be modified, there are essential policies to be established to meet the demands of the distribution found, with a monitoring of the professionals' needs for each region and state by the Federal and Regional Councils of Physiotherapy and Occupational Therapy.

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