Distribution of dental schools in Minas Gerais state, Brazil, 2016

Distribuição das escolas de odontologia no estado de Minas Gerais, Brasil, 2016

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Resumo

Introdução: A distribuição geográfica das escolas de odontologia tem sido objeto de estudo no Brasil e em outras partes do mundo. **Objetivo:** Analisar a distribuição das faculdades de odontologia do Estado de Minas Gerais em 2016. **Metodologia:** Este é um estudo transversal. A análise da distribuição dos cursos foi realizada por regiões e cidades e categorizados por escolas públicas ou privadas. Todos os endereços de instituições foram geocodificados e mapeados para ilustrar a distribuição espacial dos cursos de odontologia em todo estado de Minas Gerais. **Resultados:** Em Minas Gerais foram encontradas 30 escolas de Odontologia sendo 23 (76,66%) privadas e 7 (23,34%) públicas. O maior número de escolas foram localizadas em regiões metropolitanas com melhores indicadores socioeconômicos. O número total de vagas anuais ofertadas pelos cursos de Odontologia foram de 2911, sendo 2310 em escolas privadas e 601 em públicas. **Conclusão:** A distribuição dos cursos de odontologia foi irregular e concentrada em regiões com melhores condições socioeconômicas.

Palavras-Chave: Educação em Odontologia, Escolas de Odontologia, Odontologia, Mapas

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Recebido em: 31/08/2016
Revisado em: 26/10/2016
Aceito em: 28/10/2016
Publicado em: 07/12/2016

Abstract

Introduction: *The geographical distribution of dentistry schools has been the object of study in Brazil and in other parts of the world.* ***Aim:*** *To analyze the distribution of dentistry schools in Minas Gerais state in 2016.* ***Methodology:*** *This is a cross-sectional study. The analysis of the courses distribution carried out by regions and cities and categorized by public or private schools. All the institutions addresses were geocoded and mapped to illustrate the spatial distribution of dental courses across Minas Gerais state.* ***Results:*** *In Minas Gerais were found 30 Dentistry schools that 23 (76.66%) were private and 7 (23.34%) public. The largest number of schools were located in metropolitan regions with better socioeconomic indicators. The number of annual vacancies the dentistry courses offered the 2911 vacancies in the Minas Gerais state that 2310 are in private schools and 601 in public courses.* ***Conclusion:*** *The distribution of courses were irregular and concentrated in regions with better socioeconomic conditions.*

Keywords: *Dental Education, Dental Schools, Dentistry, Maps*

Introduction

The dentistry, along with the medicine and nursing, constitute the basic nucleus of professionals of higher level of health in Brazil[1-4]. Despite the dentist to population rate recommendation, there is no consensus regarding the ideal number of dentist per capita and workforce geographic distribution plays a fundamental role in access to dental services[4-7].

The geographical distribution of schools offering tertiary courses in health sector especially dentistry course has been the object of study in Brazil and in other parts of the world[8-13]. A trend towards an increase in the number of courses in dentistry, especially in private schools, was shown across Brazil[1,3,8,14]. In 1991, there were 83 dental courses in operation and this number rose to 219 courses in 2013[15]. However, an inequality in the geographical distribution of schools and dentists is evident. Also, the number of trained dental surgeons does not seem to translate into effectiveness of the health system, given the large number of dental schools in Brazil and the extremely poor oral health condition of the population. Studies reported lack of access to dental services[1,6,7,11,16,17]. In 2013, a study showed that, in Brazil, 16 million people or 11% of the population over the age of 18 years had lost all their teeth and 44.4 percent (89.1 million people) had visited a dentist in the past 12 months before the research[18]. A recent study showed that the distribution of schools and dentists were irregular and there were 232 dental courses in operation; being 56 (24%) public and 176 (76%) private in 2015[19]. The same study showed a strong positive correlation between the distribution of the number of dental schools and the number of dentists[19]. The context of inequality in the distribution of dental schools may reflect the distribution of dentists and staff shortages of qualified health care, especially in remote areas, small municipalities and urban out skirts with difficult access[5,11,20-22]. Brazilian health system, known as Unified Health System (SUS) follows the universal health coverage model[23,24]. Consequently, the access to oral health services is offered by the government to all Brazilian citizens without extra (out-of-pocket) costs[6,7,24].

In Brazil, the dentistry course is offered by public and private educational institutions[14,15]. In public institutions, the student does not pay any course fees whilst in private schools the student pays a monthly fee or uses a model of university fees financing offered by the government or directly in the institution[14,15]. The entry requirements for dental students vary between institutions but the selection process usually consists of an entry test[14,15].

The aim of this study is to analyze the distribution of dentistry schools in Minas Gerais state in 2016.

Methods

This is a cross-sectional study using free access to data sources. Therefore, it was not submitted to the ethics committee. The methodology was based on previous studies that have investigated the distribution of dental schools in India, Chile, EUA and Brazil[10,11,19,21]. Minas Gerais is one of the 27 States of Brazil and is located in the Southeast of the country. It is the fourth state with the largest land area and its estimated population in 2015 was 20 million people[25]. (Figure 1).

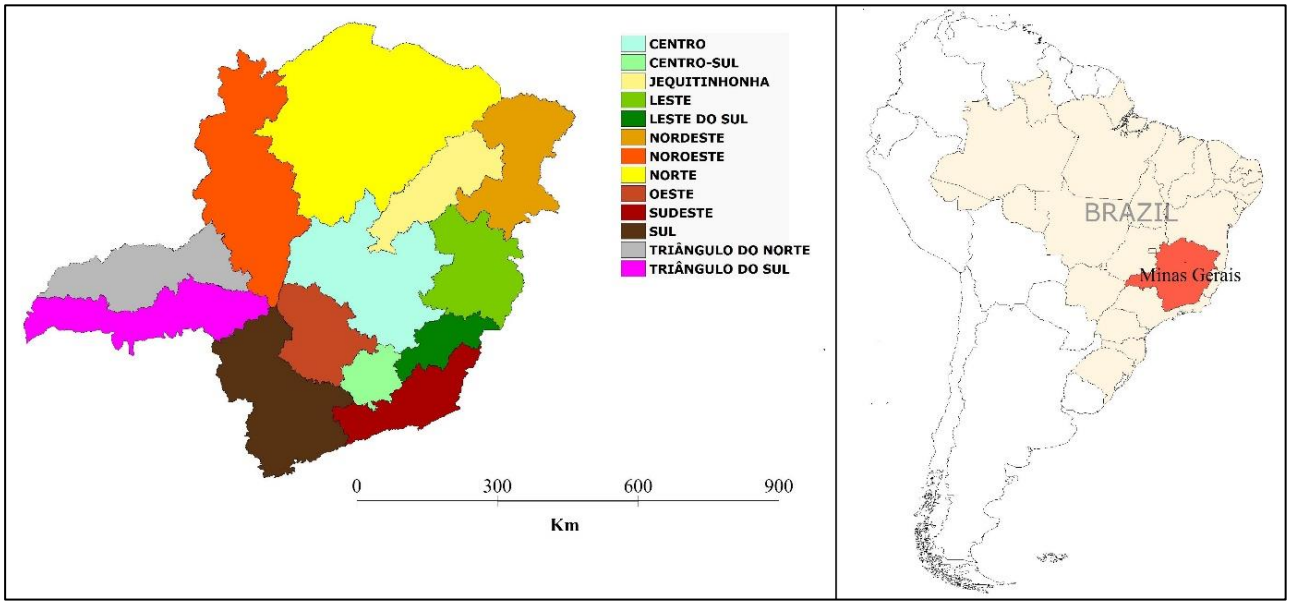

FIGURE 1. Geographical location of Minas Gerais state and regional division, Minas Gerais, Brazil, 2016.

The complete list of dental schools in Minas Gerais was obtained from the Ministry of Education (MEC) website[26] and the National Institute of Studies and Educational Research Anísio Teixeira (INEP) and crosschecked with the list provided by the Federal Council of Dentistry (CFO) between June and July 2016[15,27]. Then the data were compared to the data of official websites of educational institutions that offer the dentistry course. Collecting the data in the same period from all websites is important because both the list of faculties and the list of dentists available in the databases can suffer updates at any time. In addition, it was adopted as a criterion the number of courses offered and not the number of institutions that offer the dentistry course. This standardization is important because in Brazil an educational institution (public or private) can offer more than one course of dentistry. However, as the data were obtained from different databases consistency issues can arise and we strive to minimize this problem with a cross checking between the databases.

The analysis of the courses distribution carried out by states and categorized by public or private schools. A digital cartographic base of Brazil by the Brazilian Institute of Geography and Statistics (IBGE) was used[28]. All the institutions' addresses were geocoded and the maps of the spatial distribution of dental courses were developed in TerraView computer software ® (Version 4.2.2)[29].

Results

All dentistry courses registered in the MEC and the CFO were located and georeferenced. The distribution of the dental courses was uneven between public and private dentistry courses and across regions of Minas Gerais state. In Minas Gerais were found 30 Dentistry schools that 23 (76.66%) were private and 7 (23.34%) public. The city with the highest number of schools was Belo Horizonte (capital) with five schools followed by Juiz de Fora (Southeast region) with three schools. (Figure 2).

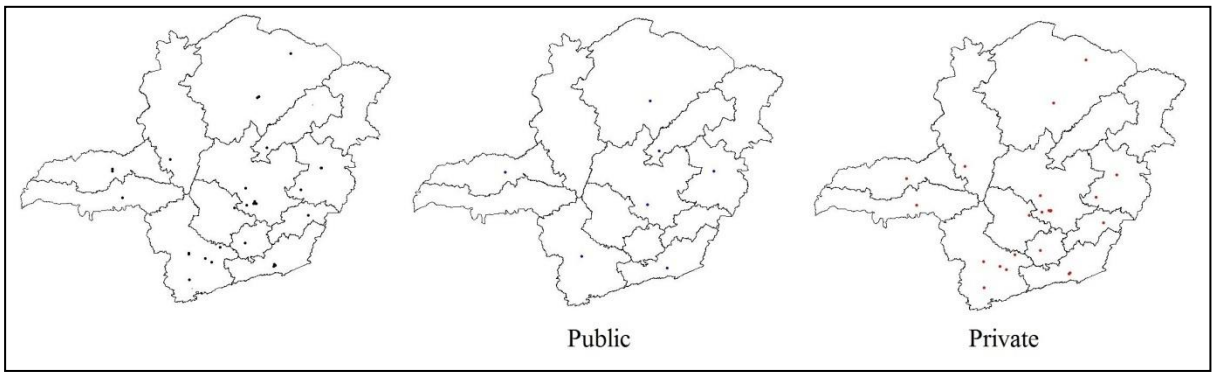

FIGURE 2. Distribution of dentistry schools in Minas Gerais state, Brazil, 2016.

The central region concentrated the highest number of dentistry schools and followed by the southern region. In the Northeast region not found dentistry school while in five regions there are no public schools. (Table 1).

About the regions that offer dentistry courses, the region of Jequitinhonha was the only one to offer dentistry course by public institution and is located in the Diamantina city. (Table 1 and 2).

Table 1. Distribution of public and private dentistry courses, Minas Gerais, 2016.

Region	Public	Private	Total
Centro	1	6	7
Centro-Sul	0	1	1
Jequitinhonha	1	0	1
Leste	1	1	2
Leste (Sul)	0	1	1
Nordeste	0	0	0
Noroeste	0	1	1
Norte	1	2	3
Oeste	0	1	1
Sudeste	1	3	4
Sul	1	5	6
Triângulo (Norte)	1	1	2
Triângulo (Sul)	0	1	1
Total	7	23	30

The largest number of schools were located in metropolitan regions with better socioeconomic indicators. Regarding the number of annual vacancies the dentistry courses offered the 2.911 vacancies in the Minas Gerais state that 2.310 are in private schools and 601 in public courses. Only in the central region, where is located the state capital (Belo Horizonte), they are offered 744 vacancies in dentistry courses that are offered in 600 private institutions and 144 in public. The South region is the one that has five cities offer dentistry courses being one public and five in private institution. The only dentistry course offered by a state university (public institution) is located in the city of Montes Claros. (Table 2).

Table 2. Distribution of the number of vacancies in the dentistry courses, Minas Gerais, 2016.

City	Region	Vacancy		
		Public	Private	Total
Alfenas	Sul	100	160	160
Belo Horizonte (capital)	Centro	144	420	564
Betim	Centro	0	100	100
Diamantina	Jequitinhonha	60	0	60
Governador Valadares	Leste	80	50	130
Ipatinga	Sudeste	0	100	100

Itaúna	Oeste	0	100	100
Juiz de Fora	Sudeste	81	200	281
Lavras	Sul	0	60	60
Matipó	Leste (Sul)	0	120	120
Mato Verde	Norte	0	60	60
Montes Claros	Norte	56	60	116
Patos de Minas	Noroeste	0	100	100
Pouso Alegre	Sul	0	120	120
São João Del Rei	Centro-Sul	0	160	160
Sete Lagoas	Centro	0	80	80
Três Corações	Sul	0	36	36
Uberaba	Triângulo (Sul)	0	180	180
Uberlândia	Triângulo (Norte)	80	84	164
Varginha	Sul	0	120	120
Total	-	601	2310	2911

Discussion

In Brazil, there was a significant increase in the number of dental courses, in particular of the courses offered by private institutions. In absolute numbers, Brazil evolved from 83 courses in 1991 to 174 in 2004, and the largest increase was in the number of private institutions[8]. Lucietto et al. (2008) reported the existence of 188 dental schools in Brazil, being 134 (71 percent) private and 54 (29 percent) public[12]. Another study showed an increase of dental courses from 83 courses in 1991 to 219 dental courses in 2013 a total[14]. According to CFO data, in 2015 there were twenty-five dentistry courses in operation in the state of Minas Gerais, where six in public institutions and nineteen in private[27]. In this study were identified 30 dentistry courses operating in the Minas Gerais state in 2016. Compared to 2015 there was an increase of 5 courses (one public and four private). In addition, there was a variation in the distribution of public schools and private in Minas Gerais. In Brazil, the MEC is responsible for regulation of undergraduate courses and the criteria are not clear for implementing of new dentistry courses.

This study presented higher prevalence of private colleges and which were similar to previous study with national data [19]. The highest concentration of dentistry courses were in regions with better socioeconomic and population as indicators. The redistribution of dentistry course for regions with the worst social indicators or the places where there is a lack of oral health workforce can potentially retain more dentists in these areas and the improvement of access to dental treatments[11]. Previous study conducted in an Australian university showed that 83 percent of graduated dental students remained in their school region[30]. However, the increase in the number of schools and consequently the number of graduated students may not mean improved access to public or private dental service with quality[4,6,7,9,16,18]. The dentistry schools redistribution for regions with fewer schools can help the training of graduated dentists working in distant regions of the schools and attract retain or motivate relocation of dentists into these regions because the schools represent a possibility of specialist support and post-graduating courses. In particular, for the public schools that often provides services to the low-income population and cannot pay for dental treatment. However, in Brazil, when comparing the expansion of dental schools by region there was a great expansion for poor regions such as the Northeast that increased from 30 in 2008 to 51 in 2015[19]. In Brazil, the inequality in the distribution of dental schools ends up reflecting the unequal dentists' distribution[5,19].

In the United States of America, there are 65 dental schools, of which 40 are public, 20 private and 5 mixed and the geographical distribution is not regular, but there are more public dental schools than private[13]. Study in India showed that there was a variation in the distribution of dentistry schools and identified 289 schools (39 public and 250 private) for a population of more than 1 billion[10]. Proportionally Brazil has more dental schools than US and India. In

Chile, the number of dentistry schools skiped from 5 in 1997 to 34 in 2011 and the largest increase was for private schools [20]. Studies have also shown that the increase in the number of course has been driven by market criteria and the consequences can be negative with a decrease in income and unemployment in Brazil[3-5,9,12,18]. The present study showed the concentration of dental schools in more developed regions and in major urban centers[10]. It is not clear whether the increase in the number of private or a public school in Minas Gerais has improved the access of individuals from low socio-economic backgrounds and from minority population groups to study dentistry. However, the student government funding and public universities have suggested alternatives to the many students who wish to enter and complete the course, especially in poorer regions.

In this study, the Northeast region does not have dentistry courses in operation. Previous study in Brazil showed a strong positive correlation between the number of dental schools and the number of dentists[19]. Studies indicated that the distribution of the workforce in health and in dentistry are characterized by concentrations of workers in urban areas and shortages in remote areas or small towns[4,5,10,11,17,19,21]. These facts reinforce the need to motivate professionals to work in these areas and offer better employment and income conditions. Therefore, the regions with the worst oral health conditions are the regions with the lowest number of faculties and professionals[4,5,14]. Studies in Australia pointed out the need for dental workforce establishment and re-enforcement establishing not only in rural areas, but also in socially disadvantaged areas[19,30]. Incentives have been suggested and are utilized in several countries for relocation professionals to the regions with the worst oral health indicators[14].

Another reason that may have contributed to the increase in the number of dentistry courses in Minas Gerais were the strategies to increase the oral health public workforce. It occurred to cope with the poor oral health conditions presented by national epidemiological surveys[6,7,16,17]. These strategies included the increased offer of jobs in the public sector, according to the implementation of the Unified Health System (SUS), promoted by the insertion of the dentistry in the Family Health Strategy (ESF), the restructuring of the National Policy of Oral Health (PNSB) and the creation of Oral Health Specialized Centers (CEO). However, 73 % of dental consultations in Brazil were made by private dentists[18].

It was not possible to evaluate the distribution of dental applicants and graduated dental students because the information available was outdated and represented limitations of the study. The duration, curriculum and quality of the courses offered were not objects of this study although it is an important issue for future studies on dentistry workforce distribution in Minas Gerais state and Brazil.

Conclusion

There was an increase in the number of dental schools in Minas Gerais, mainly in private courses. The distribution of courses were irregular and concentrated in regions with better socioeconomic conditions. Studies on the distribution of dentistry schools can provide subsidies for the planning of actions for the redistribution in dentistry workforce and in directing the future professionals for regions with the worst indicators of oral health.

Acknowledgments

The authors acknowledge the INPE for kindly providing TerraView ® software access and Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES).

Conflict of interest

The authors report no conflict of interest.

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