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Dental schools in Brazil and their social, macro-regional and oral health policy repercussions

Cursos de Odontologia no Brasil e suas repercussões sociais, macrorregionais e sobre as políticas de saúde bucal

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ABSTRACT

Dentistry is a profession that has shown considerable growth in the last few years, as far as qualitative aspects and scientific production are concerned, and also in the number of undergraduate courses. **Objective:** to describe the profile of dentistry courses through official data and unofficial data, such as the existence of student support programs, gender disparities and availability of study places. **Material and Methods:** to this end, a survey of the 565 Dentistry courses registered by the Ministry of Education was carried out by three trained researchers and then of their respective websites and public domain information, followed by data analysis (R 4.1.2 R Core Team software, Vienna) and georeferencing (Qgis and ArcGis software). **Results:** as for the profile of the institutions that offer the course, 89.4% are private and as for the unofficial data, 63% of the sites do not have information regarding the teaching staff, 44.2% of the courses present a woman as coordinator and more than half report having at least one type of student support activity. It was possible to observe that the greatest availability of Dentistry vacancies is offered by private institutions and in courses coordinated by men. **Conclusion:** considering the information available on the college websites, it is important to keep them up to date and complete, so that students have access to the support activities that are relevant to their education.

KEYWORDS

Access to public information; Dental students; Faculties of dentistry; Gender equity; Public health.

RESUMO

A odontologia é uma profissão que tem apresentado crescimento considerável nos últimos anos, tanto no que diz respeito aos aspectos qualitativos e produção científica, como também no número de cursos de graduação. **Objetivo:** descrever o perfil dos cursos de odontologia por meio de dados oficiais e não oficiais, como a existência de programas de apoio estudantil, disparidades de gênero e disponibilidade de vagas de estudo. **Material e Métodos:** para tanto, foi realizado um levantamento dos 565 cursos de Odontologia cadastrados no Ministério da Educação por três pesquisadores treinados e, posteriormente, de seus respectivos sites e informações de domínio público, seguido da análise dos dados (R 4.1.2 R Núcleo Team software, Viena) e georreferenciamento (software Qgis e ArcGis). **Resultados:** quanto ao perfil das instituições que oferecem o curso, 89,4% são privadas e quanto aos dados não oficiais, 63% dos sites não possuem informações sobre o corpo docente, 44,2% dos cursos apresentam uma mulher como coordenadora e mais de metade refere ter pelo menos um tipo de atividade de apoio ao aluno. Foi possível observar que a maior oferta de vagas de Odontologia é oferecida por instituições privadas e em cursos coordenados por homens. **Conclusão:** considerando as informações disponibilizadas nos sites das faculdades, é importante mantê-las atualizadas e completas, para que os alunos tenham acesso às atividades de apoio pertinentes à sua formação.

PALAVRAS-CHAVE

Acesso à informação pública; Estudantes de Odontologia; Faculdades de Odontologia; Equidade de gênero; Saúde Pública.

INTRODUCTION

Dentistry is a profession that has shown great growth, especially in recent decades. As a consequence, there has been a rapid expansion of dentistry courses, associated with unequal distribution among the different regions of the country, impacting the number of dentists per region, contributing to the maintenance of disparities in the numbers of professionals present in each state. Moreover, one third of the vacancies offered are not being filled, which shows the discrepancy between the supply and the social need for more professionals [1-3].

Through the National Registry of Courses and Institutions of Higher Education (e-MEC) it is possible to access all dentistry courses registered in Brazil and their main characteristics, such as year of beginning of activities, availability of annual vacancies and geographic distribution. Through the information available on the websites of the dental courses, the gender distribution in the faculty is observed, confirming the phenomenon of the feminization of dentistry, a process that has been observed over the years [3], since the female presence is increasing both in clinical practice and in scientific production, and especially in teaching.

Furthermore, according to the National Curricular Guidelines for Undergraduate Dentistry [4], institutions should create mechanisms to take advantage of the knowledge acquired through extracurricular activities. For this reason, data were collected regarding the existence of student support programs, such as Academic League, Tutorial Education Program (PET), psychological support, extension activities, tutoring, and scientific initiation.

Thus, the present study aimed to describe the profile of dentistry courses through official data and unofficial data, such as the existence of student support programs, gender disparities and availability of study places.

METHODOLOGY

Study design

This is a cross-sectional study.

Study population and sample

A survey was made of all the Dentistry courses in Brazil registered by the Ministry of Education

through the National Registry of Courses and Institutions of Higher Education (e-MEC) until July 28, 2020, the date of processing of the report. In a second step, the websites of the respective courses were searched using the Google search engine. Since it is public domain data, there was no need for approval from the Research Ethics Committee.

The Dentistry courses whose sites were not located in the search engine after three attempts, from the name of the course and the acronym of the institution, added to the information of the municipality or in a search within the general site of the university, had only the information from e-MEC considered.

Data collection

For data collection, Google Forms was used as a guiding instrument, using a questionnaire divided into two stages: the profile of the Dentistry Courses based on the official data from e-MEC and the unofficial data on teachers and students found on the websites of the courses, thus characterizing information from the public domain. A double check of the data was performed through the random selection of 30 Dentistry schools, in which the three researchers re-evaluated the e-MEC and the websites, aiming to verify the standardization of the collection.

In the first stage of the research, variables were collected regarding the general characteristics of the course, from the e-MEC registry, such as the name and acronym of the University, duration of the course in years, type of activity (activated, deactivated, or not yet started), geographical location (city, state, and region of the country where it is located), start date, nature of the institution (public or private), minimum workload, availability of annual vacancies, and shifts in which classes take place.

The second stage deals with the data collected from the websites of the Dentistry schools. These include the availability of student support services (existence of monitoring, scientific initiation, Tutorial Education Program - PET, Academic Directory, extension projects, and possibility of psychological support); the availability of complaint services (ombudsman on the college website, ease of access to the complaint channel, possibility of anonymous registration or need for identification,

presentation of the complaint channel as telephone, online form, e-mail, in-person, letter); the existence of preventive materials about harassment and type of material about harassment (booklet, video, educational text); as well as the evaluation of gender disparity through the total number of male and female professors and gender of the course coordinator.

The third stage correlates the existence of dentistry courses with the number of inhabitants of Brazilian municipalities, with the number of dental procedures per capita, and with the Municipal Human Development Index (MDI). The dental procedures encompassed were individual ATF per session, scraping smoothing and polishing (RAP) per sextant, restoration in posterior permanent tooth, and permanent tooth exodontia, collected from the Health Information System for Primary Care (01/2019 to 12/2019). Data regarding the Municipal Human Development Index and its components (HDI, education HDI, longevity HDI, income HDI) were extracted from the Atlas Brazil library. The population of Brazilian municipalities in 2019 was obtained through estimates generated by the Brazilian Institute of Geography and Statistics (Figure 1).

Data analysis

Quantitative variables were evaluated using measures of central tendency and variability. And the qualitative variables were evaluated using absolute and relative frequencies.

Georeferencing

By using the address of the dental schools, it was possible to perform the georeferencing using the ArcGis software and create the maps with the Qgis software, using the variables related to the course load, availability of annual vacancies, and character of the institution.

RESULTS

On July 28, 2020, the processing date of the report made by e-MEC, there were 565 registered courses of Dentistry. Of these courses, 86.4% were active, 0.5% inactive, and 13.1% had not yet started. Regarding the duration of the course, the vast majority (76.8%) is 5 years long. As for the geographical distribution, it can be observed that the largest concentration of courses is in the Southeast region, which represents more than a third of the total amount, reaching the percentage of 36.5%. With regard to the shift of curricular activities, only 6.9% of the courses take place exclusively in the evening shift.

The gender distribution among the coordinators of the dental courses was as follows: 44.2% are women and no record was found in 6.5% of the colleges (Table I). Although the great majority has a website (83.2%), many of them do not have information related to the faculty, since 63.0% of them do not have this information available on their websites. More than half (63.5%) of the courses offer extension projects as an additional service for students, while

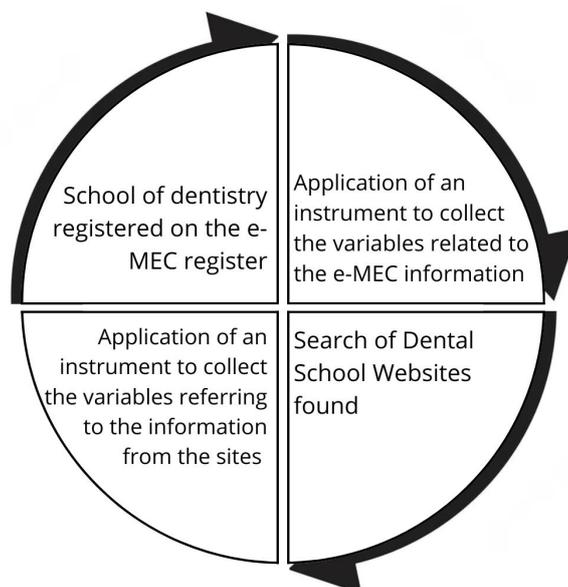


Figure 1 - Data Collection Flowchart.

Table I - Description of the Dentistry courses registered in e-MEC in Brazil, 2021

Variables					
Course Activity	Active	Did not start	Inactive		
	488 (86%)	74 (13,1%)	3 (0.9%)		
Course Length	4 years	4.5 years	5 years	More than 5 years	
	105 (18.6%)	22 (3.9%)	434 (76.8%)	4 (0.7%)	
Region of the country	South	Southeast	Midwest	North	Northeast
	90 (15.9%)	206 (36.5%)	63 (11.1%)	48 (8.5%)	158 (28%)
Character Institution	Public	Private			
	60 (10.6%)	505 (89.4%)			
Shift	Daytime	Evening			
	526 (93.1%)	39 (6.9%)			
Course Coordinator	Woman	Man	Not Informed		
	250 (44.2%)	278 (49.3%)	37 (6.5%)		
Has a website	Yes	Website tab	Not found		
	34 (6%)	470 (83.2%)	61 (10.8%)		
Scientific Initiation	Yes				
	263 (52.2%)				
Tutorial Education Program	Yes				
	24 (4.8%)				
Monitoring scholarship	Yes				
	98 (19.4%)				
Academic directory	Yes				
	41 (8.%)				
Availability of additional services	Extension Project	Psychological support	Not Informed	Other	
	275 (48.6%)	85 (15%)	206 (36.4%)	29 (5.2%)	
Link to ombudsman	Yes				
	377 (74.8%)				
Accessible link	Yes				
	264 (52.4%)				
The complaint record	Can be anonymous	Needs identification	Inactive		
	68 (18%)	300 (79.6%)	9 (2.4%)		
Prevention against harassment	No				
	449 (89.1%)				
Harassment prevention material	Primer	Online text	News	Other	
	9 (16.4%)	18 (32.7%)	9 (16.4%)	19 (34.5%)	

the presence of psychological support appears in 15.0% of the institutions. There is a link to access the Ombudsman's Office available in 74.8% of the registered courses, and 52.4% of them are available on the main page. However, only 18.3% of them have anonymous access to the Ombudsman's office. In addition, 10.9% present some kind of educational material about harassment, such as online text (32.7%) and others (34.5%).

In analyzing the characteristics of Dentistry courses by region (Table II), it is possible to observe that the Midwest region presents the highest percentage of private institutions (91.9%), while the South region presents the highest percentage of courses offered at public institutions. It is also in the Central-western region that there is the lowest percentage of female course coordinators (25.8%) (Figure 2).

In Table III it can be seen that the Southeast region has the oldest average starting year, dating back to 1998 (sd - 27.72), while the region with the most recent average starting date is the Midwest and Northeast regions, dating back to 2008, with a standard deviation of 17.04 and 21.8, respectively. The average minimum course load across regions ranged from 4240 - dp 320.5 (North) to 4393- dp 562.6 (South). The number of annual openings reached the highest average in the Southeast region, with 147.4 (sd 154.8) per course, followed by the Northeast (147.3 - sd 84.38), North (139.2 - sd 83.73), Midwest (130.3 sd 64.59), and South (95.2 - sd 37.92) regions. In relation to the average number of teachers,

the South region had the highest number, with 35.5 (sd - 30.15) teachers, followed by the Southeast (33.9 - sd 25.09), Center-West (29.6 - sd 18.59), Northeast (29.4 - sd 23.37), and North (24.5 - sd 20.86). The highest average of female faculty members is also found in the South, with 17.9 (sd - 15.52) faculty members, followed by the Southeast (17.6 - sd 13.83), Northeast (16.8 - sd 13.79), Midwest (15.3- sd 10.63) and North (14 - sd 12.2).

Regarding the Municipal Human Development Index (IDHM), those places that have dentistry courses presented better values in all aspects: IDHM in 2010 and IDHM in 2019 in its three requirements alone (longevity, education and income) (Table IV).

Table II - Dentistry Courses by Region, based on eMEC and websites, in 2021

Variables according to national regions	South n (%)	Southeast n (%)	Midwest n (%)	North n (%)	Northeast n (%)
Character of the institution					
Public	11 (12.2)	22 (10.6)	5 (8.1)	5 (10.4)	17 (10.8)
Private	79 (87.8)	185 (89.4)	57 (91.9)	43 (89.6)	141 (89.2)
Gender of Coordinator					
	n (%)	n (%)	n (%)	n (%)	n (%)
Woman	38 (42.2)	93 (44.9)	16 (25.8)	24 (50)	79 (50)
Man	47 (52.2)	102 (49.3)	39 (62.9)	22 (45.8)	68 (43)
Not Informed	5 (5.6)	12 (5.8)	7 (11.3)	2 (4.2)	11(7)
Link to the ombudsman					
Yes	70 (77.8)	132 (63.8)	40 (64.5)	32 (66.7)	103 (65.2)
Accessible link					
Yes	50 (55.6)	90 (43.5)	29 (46.8)	28 (58.3)	67 (42.4)
Prevention against harassment					
Yes	15 (16.7)	18 (8.7)	2 (3.2)	10 (20.8)	10 (6.3)

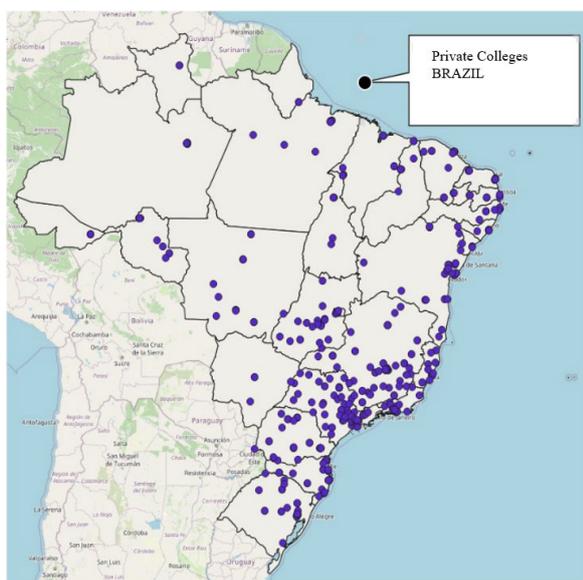


Figure 2 - Dentistry Courses at Private and Public Institutions.

Table III - Characteristics of dental courses and faculty by country region, 2021

Variables	South	Southeast	Center-West	North	Northeast
Hourly load					
average (SD)	4317 (351.4)	4393 (562.6)	4318 (411.7)	4240 (320.5)	4279 (392.5)
median	4200	4182	4066	4110	4180
Annual openings					
average (SD)	95.2 (37.9)	147.4 (154.8)	130.3 (64.6)	139.2 (83.7)	147.3 (84.48)
median	90	120	120	100	120
Teachers					
mean (SD)	35.5 (30.2)	33.9 (25.1)	29.6 (18.6)	24.5 (20.9)	29.4 (23.47)
median	27	30	30.5	21	19.5
Woman teachers					
average (SD)	17.9 (15.5)	17.6 (13.8)	15.3 (10.6)	14 (12.2)	16.8 (13.8)
median	13	16	15.5	11.5	12

Table IV - Relationship of the courses with the number of dental procedures per capita and IDHM

Variables	Average (SD)	Median
Individual ATF per sessions per capita in 2019		
No course	13.6 (22.2)	6.256
Has course	8.0 (11.36)	4.239
RAP per sextant per capita in 2019		
No course	11.89 (16.0)	6.974
Has course	6.868 (8.1)	4.512
Restoration in a permanent posterior tooth per capita in 2019		
No course	30.05 (33.04)	20.33
Has course	12.4 (17.48)	7.331
Permanent tooth exodontia per capita in 2019		
No course	19.42 (18.06)	14.78
Has course	7.711 (11.01)	4.494
HDHM in 2010		
No course	0.6539 (0.07031)	0.659
Has course	0.7344 (0.05955)	0.7445
IDHM Education in 2010		
No course	0.5524 (0.09094)	0.553
Has course	0.659 (0.0776)	0.6665
IDHM Longevity in 2010		
No course	0.7993 (0.04475)	0.805
Has course	0.8307 (0.03437)	0.837
IDHM Income in 2010		
No course	0.637 (0.07865)	0.645
Has course	0.7257 (0.06954)	0.7385

With the georeferencing it was possible to visualize some of the results through the distribution among the different regions of Brazil, such as the character of the public or private institutions.

Figure 3 shows the concentration of Dentistry courses, as well as the availability of annual openings. The concentration of courses is greater in the Southeast region, while the greatest availability of vacancies occurs in the Southeast, Northeast and North regions, respectively.

DISCUSSION

The National Curricular Guidelines for Undergraduate Education in Dentistry [4] provides the necessary competencies and skills for a dentist, as well as the characteristics that all courses must have: core content, supervised internship, end-of-course work, and also complementary activities. Institutions should, as stated in Article 8 of Resolution No. CNE/CES 3 of February 19, 2002 [5], create mechanisms to take advantage of knowledge, such as monitoring and internship, scientific initiation and extension programs. Moreover, from the theoretical point of view, the possibility of performing extracurricular activities contributes to reduce the dropout of college students, since they generate better social integration of the academic to the environment [6]. It is also noteworthy that the support for academics guarantees equal conditions of access, permanence, and conclusion of studies at the higher education level [7]. With the results, it can be observed that the most reported activity on the websites of the dentistry schools was “extension project,” which appeared in 63% of the websites, followed by scientific initiation, reported in just over 50% of the institutions. The other activities, such as monitoring, academic directory, academic

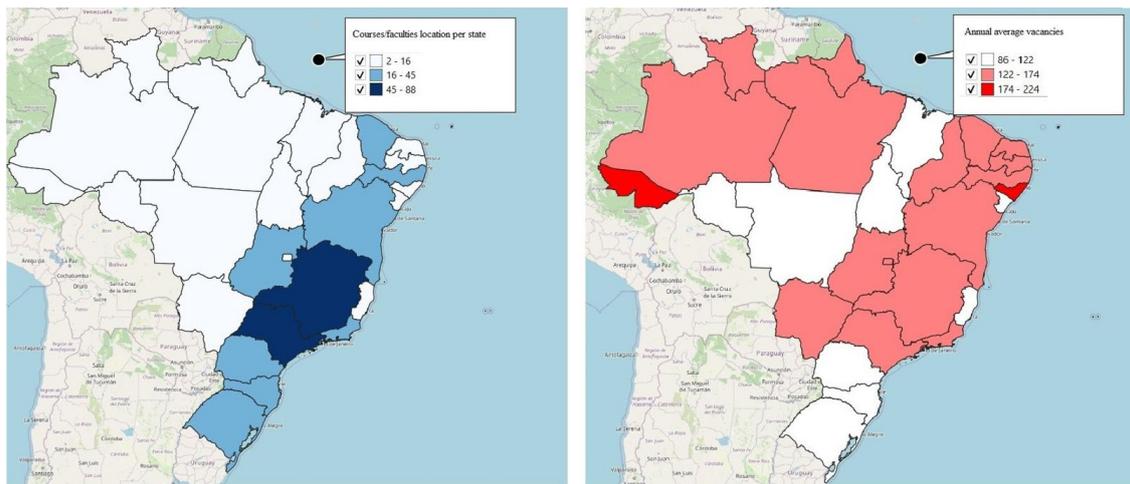


Figure 3 - Dentistry courses by region and distribution of annual openings.

leagues, and tutorial education program are reported in less than 10% of the sites.

Still, the Brazilian Association of Dental Teaching [8] contributes to the improvement of DCN, bringing some guidelines such as: definition of the number of vacancies according to the epidemiological reality of the population attached to the course and the number of HEIs that offer a dentistry course in the region; minimum workload of four thousand hours; minimum time for completion of the course of five years. The data analysis showed that 22.4% of the courses did not reach the minimum duration of 5 years. Faced with this panorama, when looking at the quality indicator that evaluates the courses, the National Student Performance Exam (ENADE), it can be observed that of the dentistry courses that participated in the last exam [9], 40% of them scored 3, 27.7% scored 4, 23.9% scored 2, and only 6.7% scored 5, the maximum grade in the exam.

And despite the concern in defining the number of vacancies according to the epidemiological reality of the population, the rapid expansion of Dentistry courses in Brazil, observed mainly in recent years, together with the asymmetry in geographic distribution, further contributes to regional disparities with respect to the supply of dentists and causes an increase in the supply of vacancies disproportionate to the needs of the population [1]. According to the results of this research, it can be observed that the Southeast region, besides presenting the highest concentration of courses, also presents the highest average of annual vacancies, which indicates the maintenance of the current trend

in concentrating more professionals in the area in the Southeast region.

Over the years, the feminization of health professions has been observed in both developed and developing countries [3]. The presence of women is increasing both in clinical practice and in scientific production. In the area of Health Sciences there is an increase in the number of women, and the significant majority of female doctors work in teaching, a profession traditionally linked to women [10]. The feminization process is also observed in Dentistry, a profession that in past decades was mostly practiced by men [11]. The publication “Current profile and trends of the Brazilian dentist-surgeon” [12], shows the beginning of this trend of feminization in Brazil, since in the age range of 65 to 70 years, only 20% of dental professionals are women; at the age of 25 years, 70% of dental surgeons are female. These data are in agreement with Costa, Duraes, and Abreu [11]. With the data collected in this study, it was observed that only 37% of the dental schools present more information about the faculty on their websites, and that in those where the faculty is presented, there is a similar distribution between men and women; in the coordination of the courses there is a little more than 40% of women assuming this position on the national average, but in some regions, such as the Midwest region, there are greater discrepancies, with only 25% of women in the coordination. Still, the spaces of greater prominence, as the grids of congresses and publications of greater impact continue having men in their great majority as protagonists [13]. And although Brazilian women are more than half of the country’s population, present higher educational levels and work more

than men, they have one of the lowest participations in spaces of power in the world [14]. With this in mind, the importance of representativeness is highlighted in order to create more inclusive environments that are prepared to attend to the specificities that make up each minority group.

The Ombudsman Offices are the communication channel between citizens and the Institutions and serve as a means to make complaints, suggestions, compliments and denounces. Law No. 13,460 of June 26, 2017 [15] establishes the Federal Executive Branch Ombudsman System in federal public administration bodies, such as Public Universities. However, there is the problem of underreporting of reports, among the reasons that keep victims silent are the need to keep their jobs, ignorance of laws, lack of another body or person to turn to, and the need for identification [16]. Data regarding the existence or not of complaint channels were collected in view of their mandatory nature, and even so, most regions of the country present a little more than 60% of the courses with a link to the ombudsman. The importance of these channels is made explicit by authors such as Aguilar and Baek [17], who evaluated the underreporting of harassment cases in the academic environment and obtained the result that students are 1.6 times more likely to not report their experiences when compared to professors and employees. If the perpetrator was identified as a faculty member, respondents were 1.5 times more likely to not report the incident. In addition, 90% of the perpetrators were men. The study shows that when harassment generally occurs through power asymmetries, i.e., scenarios in which the perpetrator is in a position of power in relation to the person being harassed, this makes it even more difficult to report it. For this reason, we also collected the existence of materials that address this theme on the colleges' websites, and a little more than 10% of them have some kind of information related to the theme, such as primers, online texts, courses, news, and e-books.

The Human Development Index is formed by three indicators, which are longevity, education, and income. Longevity allows for the evaluation of access to quality health care in order to avoid premature death; education is fundamental for the construction of autonomy and the expansion of healthier choices; income, in turn, makes it possible to expand life opportunities and ensure access to basic needs such as sanitation and food. The Municipal Human Development Index

evaluates the same indicators at the municipal level [18]. According to Casqueiro et al. [19], there is a positive effect of 3.4% on income per capita in municipalities that have university campuses, which can be explained due to the salaries of employees, as well as investment in works, spending of students coming from other regions, in addition to the services that can be inserted as a result of the campuses, such as restaurants, bookstores, photocopies, in order to contribute to the economy of the municipality. Moreover, in the long term it generates an increase in the level of education and qualification of the workforce, findings that are in line with the present study, since it has shown a positive impact on the IDHM.

CONCLUSION

With this study, it can be concluded that private institutions are responsible for offering almost 90% of all dentistry courses in the country. In view of the results, it is possible to highlight the importance of keeping the websites with as much up-to-date information as possible, so that, especially students, they can have access to relevant information for their training. In this sense, it is recommended the dissemination of data beyond the extension and scientific initiation actions, and that include the prevention of harassment.

With regard to national curriculum guidelines, a quarter of Dentistry courses do not reach the minimum duration of 5 years and concerns the concentration of vacancies and, consequently, of professionals, in the Southeast region.

Finally, this study caught the still low percentage of course coordination occupied by women, with emphasis on some regions, such as the Midwest, where discrepancies are greater, with only 25% of women in leadership positions. In the wake of gender discussions and prevention of harassment in its various forms, the number of dentistry course websites that address the issues is very low, providing booklets, online texts, courses, news and e-books.

Regarding the Municipal Human Development Index, the locations that have dentistry courses showed better values, demonstrating the importance of better planning the availability of vacancies and the relevance and social repercussions of dentistry courses, so that this training can also contribute to the Unified Health System and all the public policies involved.

Author's Contributions

RMS: Conceptualization, Methodology, Formal Analysis, Investigation, Resources, Data Curation, Writing, Original Draft Preparation, Review and Editing. **LDM:** Conceptualization, Methodology, Formal Analysis, Investigation, Resources, Data Curation, Writing, Original Draft Preparation, Review and Editing. **GAB:** Conceptualization, Methodology, Formal Analysis, Investigation, Resources, Data Curation, Writing, Original Draft Preparation, Review and Editing. **ABB:** Software, Validation, Formal Analysis, Data Curation. **JBH:** Writing, Review and Editing. **MN:** Conceptualization, Methodology, Writing, Review and Editing, Visualization, Supervision, Project Administration.

Conflict of Interest

The authors declare that there are no conflicts of interest in this work.

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Regulatory Statement

The study used public and secondary data and was authorized by the research committee of the Faculty of Dentistry at UFRGS.

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