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The teaching of medical clinic for dental students: a national screening of dentistry courses in Brazil

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Abstract The objective of this study is to evaluate the curricular components of systemically compromised patients in dentistry courses in Brazil until the pre-pandemic period through documental analysis. This study is a cross-sectional study that used a secondary data source based on the STROBE checklist. Publicly available data from regulated dentistry courses in Brazil in activity in 2020 were analyzed. Educational institutions were collected from the Ministry of Education online platform, then the website of each institution was searched on Google Search. Data were obtained by two trained examiners and calibrated by a gold standard, being tabulated in a standard Microsoft Excel spreadsheet, and exported to the Statistical Package for the Social Sciences software. At the end of the screening, 241 institutions were fully analyzed, where 75.1% had at least one discipline related to stomatology, special care in dentistry and hospital dentistry, with stomatology being mandatory. These three disciplines contemplate the knowledge of dentistry students in relation to systemic diseases and clinical medicine, and when it is not in the curriculum of the courses, it can cause insecurity in dentists in the care of these patients. Thus, in a post-COVID-19 pandemic context, where many patients have developed systemic impairments secondary to this infection, it will be necessary to increase dental education related to clinical medicine.
Descriptors: Education, Dental. Comorbidity. Clinical Medicine.

La enseñanza de clínica médica para estudiantes de odontología: un estudio nacional de los cursos de odontología en Brasil
Resumen El objetivo de este estudio es evaluar los componentes curriculares relacionados con pacientes sistémicamente comprometidos en los cursos de odontología en Brasil hasta el período prepandémico, a través de un análisis documental. Este estudio es transversal y utilizó una fuente de datos secundaria basada en la lista de verificación STROBE. Se analizaron los datos disponibles públicamente de los cursos de odontología regulados en Brasil que estaban en actividad en 2020. Las instituciones educativas fueron recopiladas de la plataforma en línea del Ministerio de Educación, y luego se buscó el sitio web de cada institución en Google. Los datos fueron obtenidos por dos examinadores entrenados y calibrados por un estándar de oro, tabulados en una hoja de cálculo estándar de Microsoft Excel y exportados al *software Statistical Package for the Social Sciences*. Al final del cribado, se analizaron completamente 241 instituciones, de las cuales el 75,1% tenía al menos una disciplina relacionada con estomatología, cuidados especiales en odontología y odontología hospitalaria, siendo estomatología obligatoria. Estas tres disciplinas contemplan el conocimiento de los estudiantes de odontología en relación con las enfermedades sistémicas y la medicina clínica, y cuando no están en el currículo de los cursos, pueden causar inseguridad en los odontólogos en la atención de estos pacientes. Así, en un contexto postpandemia de COVID-19, donde muchos pacientes han desarrollado afecciones sistémicas secundarias a esta infección, será necesario aumentar la educación odontológica relacionada con la medicina clínica.
Descriptores: Educación en Odontología. Comorbidad. Brasil. Medicina Clínica.

O ensino de clínica médica para estudantes de Odontologia: um levantamento nacional dos cursos de Odontologia no Brasil
Resumo O objetivo deste estudo é avaliar os componentes curriculares relacionados a pacientes sistemicamente comprometidos nos cursos de odontologia no Brasil até o período pré-pandêmico, por meio de análise documental. Trata-se de um estudo transversal que utilizou uma fonte de dados secundária baseada na lista de verificação STROBE. Foram analisados dados disponíveis publicamente de cursos de odontologia regulamentados no Brasil e em atividade em 2020. As instituições de ensino foram

coletadas da plataforma online do Ministério da Educação e, em seguida, o site de cada instituição foi pesquisado no Google. Os dados foram obtidos por dois examinadores treinados e calibrados por um padrão-ouro, sendo tabulados em uma planilha padrão do Microsoft Excel e exportados para o *software Statistical Package for the Social Sciences*. Ao final da triagem, 241 instituições foram totalmente analisadas, onde 75,1% tinham pelo menos uma disciplina relacionada à estomatologia, pacientes com necessidades especiais e Odontologia hospitalar, sendo a estomatologia obrigatória. Essas três disciplinas contemplam o conhecimento dos estudantes de odontologia em relação às doenças sistêmicas e à medicina clínica, e quando não estão no currículo dos cursos, podem causar insegurança nos dentistas no atendimento desses pacientes. Assim, em um contexto pós-pandemia de COVID-19, onde muitos pacientes desenvolveram comprometimentos sistêmicos secundários a essa infecção, será necessário aumentar a educação odontológica relacionada à medicina clínica.
Descritores: Educação em Odontologia. Comorbidade. Medicina Clínica.

INTRODUCTION

Recently, the COVID-19 pandemic has led to changes in the ways of teaching dentistry[1] and knowledge about patients with oral alterations[2] and systemic impairment has never been so imperative, in addition to knowledge on biosafety conducts[3].

Oral stomatology[4], hospital dentistry[5] and special care dentistry[6] are relatively recent dental specialties. Approved as specialties in the 1990s, its contents, along with periodontics and oral surgery[7], are the main ones related to the general health status of patients[4-7]. They emerged after the great Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS) pandemic of the 1980s, showing the importance of knowledge about the patient's general health status for dental planning, introducing the dental surgeon in the study of general medical practice[8].

Most of the curricular components of systemic patients are still studied in the first semesters of the courses, in basic disciplines, and much is lost throughout the teaching process, as the main focus is prioritizing techniques and practices in dentistry and purely dental planning[9].

The National Curriculum Guidelines indicate that the dentistry curriculum should prepare students to care for individuals with special needs, including those in healthcare institutions, such as hospitals. This training is essential to ensure that future professionals understand and actively engage with health policies across various life settings, structuring their professional practice and integrating collaboratively with interprofessional teams.[10]

The objective of this study is to evaluate the curricular components of systemic patients in dentistry courses in Brazil until the pre-pandemic period through document analysis.

METHOD

Type of study and inclusion and exclusion criteria

This was a cross-sectional study using a secondary data source (documentary) based on the STROBE checklist for cross-sectional studies11. Publicly available data from regulated dentistry courses in Brazil were analyzed, and even though these data do not involve humans directly or their information, all national and international ethical precepts were followed, including what establishes resolutions 466/2012 and 510/2016 of the national health council.

This study included all Higher Education Institutions (HEIs) accredited by the Ministry of Education (MEC) of Brazil with undergraduate dentistry courses in activity in 2020 (before COVID-19 pandemic). The exclusion criteria were as follows: HEIs with no graduated students (curriculum consolidation), HEIs with unavailable curricular information on their website, and HEIs in which the dentistry course was in the cancelation process.

Data search

Initially, the online platform of the MEC (e-MEC; https://emec.mec.gov.br) was consulted using the advanced search

tool to gather official information on undergraduate dentistry courses in each federal state. The following information was collected: institution name and acronym, funding (public or private), the date that the dentistry course initiated, authorized number of seats, operating status, National Exam of Student Performance (Enade) score, and course grading given by the MEC. The host state, total workload, and status of the dentistry course were also obtained. All data were collected on May 16, 2020, and all evaluated *e*-MEC data were used in this study.

Data related to the curriculum were consolidated in a four-step approach to select items[12]. First, a thematic review of questionnaires evaluating the study profile in E-learning was accessed to understand the important items required to investigate this profile[12-15]. Second, a teaching expert designed a structured form based on the information previously described. Third, the items were evaluated by three specialists: a doctor in health education, a doctor in teaching, and a doctor in biostatistics. Fourth, minor item disposition corrections (objectification of responses) were made based on the suggestion of the three specialists, and the questionnaires were launched. This process was conducted over 4 days (one process per day) to minimize fatigue bias, and the meetings were conducted via videoconference due to the COVID-19 pandemic.

Therefore, the website of each HEI was searched using the full name of the institution on Google Search. The page referring to the dentistry course of each HEI was then searched for the core curriculum, number of subjects, workload, presence of optional subjects, and the presence of subjects offered in a DE format. Extracurricular services and programs (tutoring, extension, scientific initiation, scientific events, and scientific meetings organized by students) as well as specialization and postgraduate programs were verified on the websites. When there was no information on the institution's website about what the research aimed to evaluate, we contacted the institutional e-mail for clarification. All searches were conducted between May 20 and June 2, 2020.

Training and calibrating the examiners

Previously, two examiners were trained and calibrated by a gold standard (18 years of PhD in dentistry) to analyze the type of curriculum, extracurricular services and programs, and specialization and postgraduate programs on the websites. First, theoretical training was provided to differentiate between strictu sensu and lato sensu courses and to identify extracurricular services and programs (search for official notices).

Second, 10% of the total sample (n=55/551) was randomly selected ("=random") command in Microsoft Excel, Microsoft Corporation®) from the non-included HEIs, and websites were shown by the gold standard researcher only once to two examiners, simultaneously. The two examiners evaluated the curriculum individually, and data from the analyses were tabulated in Microsoft Excel; the kappa value intraexaminer was calculated by the gold standard researcher (kappa = 0.892).

Therefore, the search was performed independently by the two examiners, and when no consensus was reached on the interpretation of data available on the HEI, the gold standard researcher gave a final interpretation.

Statistical analysis

Data were tabulated in a standard Microsoft Excel spreadsheet and exported to the Statistical Package for the Social Sciences (SPSS, version 20.0 for Windows) software, in which the analyses were performed adopting a 95% confidence level.

Categorical data (region, HEI funding, ENADE score, MEC grade, optional subjects, master's degree program, doctoral program, specialization course, tutoring program, extension program, scientific initiation program, scientific events, scientific meetings organized by students, and institutional YouTube channels) are expressed as absolute and percentage frequencies and crosschecked against the availability of stomatology, special care in dentistry (SCD) and/or hospital dentistry (HD) (dependent variable) using Fisher's exact test and Pearson's chi-squared test. Continuous variables (total workload, workload of optional subjects, years of activity, and seats offered) were showed as mean ± standard deviation and associated with the dependent variables by Mann-Whitney test (non-parametric data).

Multiple linear regression (multivariate analysis) with the outcome of the presence of workload of stomatology, special care dentistry or HD was applied using all variables to reduce confounding bias. The adjusted beta (95% confidence interval) were plotted.

RESULTS

At the end of the screening, 241 HEIs were included and fully evaluated. Most of them (n = 101) were from the Southeast of the country, followed by 50 HEIs from the Northeast of the country, 46 HEIs from the South of the country, 23 from the North region and 21 from the Midwest region (Table 1).

Of the 241 institutions evaluated, 181 (75.1%) had at least one discipline related to stomatology, special care dentistry or HD. The most frequently observed discipline was Stomatology (n=157, 65.1%) (p<0.001), which was mandatory in all courses in which it was evaluated. Special Care Dentistry was observed in 108 (44.8%) HEI, being mandatory in 87 (81.3%) and optional in 20 (18.7%). Hospital dentistry was described in only 60 HEI (24.9%), being mandatory in 41 (68.3%) and optional in 19 (31.7%) (Table 1).

The region of the HEI did not influence the frequency of any of the three majors analyzed (p=0.073), most were of a private nature (n=193, 80.8%), had a score of 3 Enade (n=77, 38, 1%) and grade 4 at the MEC (n=119, 57.8%). Private HEIs had a lower frequency of stomatology courses (p=0.019) and HD subjects were directly associated with grades 4 and 5 on the MEC (p=0.007) (Table 1).

Regarding the characteristics of each course, most have optional majors in their curriculum grade (n=196, 92.5%), 111 (46.4%) have a strictu sensu master's degree, 81 (33.9%) have a doctorate *strictu sensu* and 163 (68.2%) have *lato sensu* specialization (Table 2).

Regarding undergraduate programs, 221 courses have a tutoring and research program (89.4%), and 216 (91.5%) have an extension program. Only 82 HEI have online learning (34.6%), 148 (62.4%) have scientific meetings and 198 (82.8%) have their own scientific events (Table 2).

The average lifespan of the courses was 29.70 ± 25.97 years, the average number of students per class authorized by the MEC was 139.80 ± 151.27 students and the total of credits (in hours) and mandatory disciplines were, respectively, 4373.94 ± 399.45 and 59.67 ± 30.77 class hours (Table 2).

The presence of a stomatology discipline was directly associated with *strictu sensu* graduate programs at the master's (p=0.006) and doctoral (p=0.005) degrees. The presence of a special care dentistry discipline was directly associated with tutoring programs (p=0.022), research programs (p=0.022) and higher number of students in a class authorized by the MEC (p<0.001) (Table 2).

The presence of HD disciplines was not associated with any of the characteristics of the courses evaluated and, in general, the presence of disciplines related to clinical medicine was directly associated with *strictu* sensu post-graduation programs at the master's (p=0.003) and doctoral (p=0.002) levels, lato sensu specialization (p=0.034), tutoring programs (p=0.037), research programs (p=0.010), and the number of students in a class by the MEC (p=0.010) (Table 2).

The number of credits allocated to clinical medicine subjects was directly correlated with the lifespan of the course at the HEI (p=0.037) due to an increase in the study hours allocated to the stomatology subject (p=0.004). The number of credits related to HD was directly correlated to the number of students in a class authorized by the MEC (p=0.001) (Table 3).

In multivariate analysis, the number of credits allocated to clinical medicine subjects showed inverse collinearity with lato sensu specializations (p=0.002) and direct collinearity with the MEC course grade (p=0.008) and with the lifespan of the course at the HEI (p=0.040) (Table 4).

DISCUSSION

In a survey carried out in 2016, 220 HEI who had a Dentistry course were identified in Brazil. A total of 96 of them were located in the Southeast of Brazil, 43 in the Northeast, 40 in the South, 22 in the North and 19 in the Midwest region of the country[15]. This data corroborates the findings of our study, where we identified the same sequence of regions in relation to the number of dentistry courses. By comparing these two surveys, it was observed that in three years there was an increase of 21 dentistry courses in the country, and the Northeast region had the highest growth.

Table 1. Geographic distribution and impact of quality and classification of the course (private/public) on the provision of subjects related to clinical medicine in the 241 HEIs evaluated in Brazil.

Variable	Total	Stomatology			Special Care Dentistry			Hospital Dentistry			Subject		
		No	Yes	*p*-Value	No	Yes	*p*-Value	No	Yes	*p*-Value	No	Yes	*p*-Value
Region													
North	23 (9.5%)	10 (11.9%)	13 (8.3%)	0.073	15 (11.3%)	8 (7.4%)	0.547	17 (9.4%)	6 (10.0%)	0.388	9 (15.0%)	14 (7.7%)	0.257
Northest	50 (20.7%)	10 (11.9%)	40 (25.5%)		25 (18.8%)	25 (23.1%)		39 (21.5%)	11 (18.3%)		8 (13.3%)	42 (23.2%)	
Midwest	21 (8.7%)	5 (6.0%)	16 (10.2%)		9 (6.8%)	12 (11.1%)		12 (6.6%)	9 (15.0%)		4 (6.7%)	17 (9.4%)	
Southest	101 (41.9%)	41 (48.8%)	60 (38.2%)		57 (42.9%)	44 (40.7%)		78 (43.1%)	23 (38.3%)		26 (43.3%)	75 (41.4%)	
South	46 (19.1%)	18 (21.4%)	28 (17.8%)		27 (20.3%)	19 (17.6%)		35 (19.3%)	11 (18.3%)		13 (21.7%)	33 (18.2%)	
Classification of the HEI													
Public	46 (19.2%)	9 (11.0%)	37 (23.6%)*	*0.019*	26 (19.8%)	20 (18.5%)	0.795	32 (17.9%)	14 (23.3%)	0.354	8 (13.8%)	38 (21.0%)	0.226
Private	193 (80.8%)	73 (89.0%)*	120 (76.4%)		105 (80.2%)	88 (81.5%)		147 (82.1%)	46 (76.7%)		50 (86.2%)	143 (79.0%)	
Enade grade													
1	8 (4.0%)	3 (4.2%)	5 (3.8%)	0.083	4 (3.6%)	4 (4.4%)	0.895	4 (2.6%)	4 (8.2%)	0.101	3 (6.3%)	5 (3.2%)	0.737
2	51 (25.2%)	24 (33.8%)	27 (20.6%)		27 (24.1%)	24 (26.7%)		41 (26.8%)	10 (20.4%)		14 (29.2%)	37 (24.0%)	
3	77 (38.1%)	29 (40.8%)	48 (36.6%)		41 (36.6%)	36 (40.0%)		63 (41.2%)	14 (28.6%)		18 (37.5%)	59 (38.3%)	
4	53 (26.2%)	13 (18.3%)	40 (30.5%)		32 (28.6%)	21 (23.3%)		35 (22.9%)	18 (36.7%)		11 (22.9%)	42 (27.3%)	
5	13 (6.4%)	2 (2.8%)	11 (8.4%)		8 (7.1%)	5 (5.6%)		10 (6.5%)	3 (6.1%)		2 (4.2%)	11 (7.1%)	
MEC grade													
3	70 (34.0%)	23 (33.3%)	47 (34.3%)	0.316	41 (36.9%)	29 (30.5%)	0.093	60 (39.5%)*	10 (18.5%)	*0.007*	15 (31.3%)	55 (34.8%)	0.710
4	119 (57.8%)	43 (62.3%)	76 (55.5%)		65 (58.6%)	54 (56.8%)		83 (54.6%)	36 (66.7%)*		30 (62.5%)	89 (56.3%)	
5	17 (8.3%)	3 (4.3%)	14 (10.2%)		5 (4.5%)	12 (12.6%)		9 (5.9%)	8 (14.8%)*		3 (6.3%)	14 (8.9%)	

*$p<0.05$, Fisher's exact test or Pearson's chi-square (n, %).

Table 2. Influence of course characteristics on the provision of clinical medicine-related subjects in the 241 HEIs evaluated in Brazil.

Variable	Total	Stomatology			Special Care Dentistry			Hospital Dentistry			Subject		
		No	Yes	*p*-Value	No	Yes	*p*-Value	No	Yes	*p*-Value	No	Yes	*p*-Value
Course characteristic													
Optative disciplines	196 (92.5%)	60 (93.8%)	136 (91.9%)	0.638[a]	102 (91.9%)	94 (93.1%)	0.746[a]	146 (92.4%)	50 (92.6%)	0.964[a]	38 (92.7%)	158 (92.4%)	0.950[a]
Master´s degree	111 (46.4%)	28 (34.1%)	83 (52.9%)*	*0.006*[a]	55 (42.0%)	56 (51.9%)	0.128[a]	78 (43.6%)	33 (55.0%)	0.125[a]	17 (29.3%)	94 (51.9%)*	*0.003*[a]
Doctorate degree	81 (33.9%)	18 (22.0%)	63 (40.1%)*	*0.005*[a]	40 (30.5%)	41 (38.0%)	0.227[a]	56 (31.3%)	25 (41.7%)	0.141[a]	10 (17.2%)	71 (39.2%)*	*0.002*[a]
Specialization course	163 (68.2%)	51 (62.2%)	112 (71.3%)	0.150[a]	88 (67.2%)	75 (69.4%)	0.708[a]	119 (66.5%)	44 (73.3%)	0.324[a]	33 (56.9%)	130 (71.8%)*	*0.034*[a]
Tutoring program	211 (89.4%)	69 (87.3%)	142 (90.4%)	0.465[a]	109 (85.2%)	102 (94.4%)*	*0.021*[a]	154 (87.5%)	57 (95.0%)	0.103[a]	45 (81.8%)	166 (91.7%)*	*0.037*[a]
Extension program	216 (91.5%)	71 (89.9%)	145 (92.4%)	0.518[a]	114 (89.1%)	102 (94.4%)	0.139[a]	160 (90.9%)	56 (93.3%)	0.560[a]	49 (89.1%)	167 (92.3%)	0.459[a]
Research program	211 (89.4%)	67 (84.8%)	144 (91.7%)	0.104[a]	109 (85.2%)	102 (94.4%)*	*0.021*[a]	155 (88.1%)	56 (93.3%)	0.252[a]	44 (80.0%)	167 (92.3%)*	*0.010*[a]
Online disciplines	82 (34.6%)	33 (41.3%)	49 (31.2%)	0.124[a]	40 (31.0%)	42 (38.9%)	0.204[a]	64 (36.2%)	18 (30.0%)	0.386[a]	20 (35.7%)	62 (34.3%)	0.841[a]
Scientific events	148 (62.4%)	44 (55.0%)	104 (66.2%)	0.091[a]	83 (64.3%)	65 (60.2%)	0.511[a]	114 (64.4%)	34 (56.7%)	0.285[a]	34 (60.7%)	114 (63.0%)	0.759[a]
Dental scientific events	198 (82.8%)	64 (78.0%)	134 (85.4%)	0.155[a]	107 (81.7%)	91 (84.3%)	0.599[a]	146 (81.6%)	52 (86.7%)	0.364[a]	44 (75.9%)	154 (85.1%)	0.105[a]
Quantitative variables													
Life span of the course in the HEI (years)	29,7±26,0	30.3±27.6	29.4±25.2	0.802[b]	32.5±27.6	26.2±23.4	0.057[b]	28.8±25.8	32.6±26.5	0.289[b]	33.0±31.3	28.6±23.9	0.754[b]
Number of students per class authorized by MEC	139,8±151,3	150.7±227.7	134.1±87.8	0.504[b]	126.7±181.2	155.8±102.2	*<0.001*[b]	143.5±168.9	128.8±77.5	0.965[b]	138.3±260.6	140.3±92.2	*0.010*[b]
Total of credit hours	4373,9±399,5	4398.0±411.4	4362.1±394.3	0.637[b]	4426.2±415.8	4312.6±371.9	0.059[b]	4377.4±415.3	4363.7±352.1	0.737[b]	4478.6±435.2	4343.9±384.6	0.075[b]
Total of mandatory credit hours	59,7±30,8	65.7±51.1	57.0±14.3	0.147[b]	62.3±40.4	56.8±13.6	0.46[b]	60.61±34.6	56.9±14.6	0.352[b]	71.1±62.8	56.9±13.7	0.148[b]

*p<0.05, a Fisher's exact test or Pearson's chi-square (n, %); b Mann-Whitney test (Mean±SD).

Table 3. Correlation between the total of credit hours allocated to disciplines related to clinical medicine and the distribution of students per class in the 241 HEIs evaluated in Brazil.

Correlation	Total credits (in hours)			
	Stomatology	Special Care Dentistry	Hospital Dentistry	Subjects
Life span of the course in the HEI (years) until 20.01.01				
R	*0.259**	-0.049	-0.063	*0.157**
p-Value	*0.004*	0.655	0.661	*0.037*
Number of students per class authorized by MEC				
R	-0.094	0.177	*0.447**	-0.064
p-Value	0.298	0.099	*0.001*	0.394
Total credits (in hours)				
R	0.118	-0.047	0.057	0.136
p-Valor	0.199	0.668	0.691	0.074
Class hours of mandatory disciplines				
R	-0.005	-0.151	-0.178	-0.067
p-Value	0.960	0.176	0.232	0.383

**p*<0.05, Spearman correlation.

Table 4. Predictive factors for offering disciplines related to clinical medicine in the 241 HEI evaluated in Brazil.

	p-Value	Adjusted β	CI95%	
Class hours of mandatory disciplines				
Region	0.228	-10.35	-27.25	6.56
Classification of the HEI	0.545	-17.98	-76.61	40.66
ENADE grade	0.054	-24.49	-49.38	0.39
MEC grade	**0.008*	*37.66*	*10.19*	*65.12*
Optative discipline	0.998	-0.07	-68.87	68.73
Master´s degree	0.614	14.05	-40.98	69.07
Doutorate degree	0.524	17.97	-37.73	73.67
Specialization course	**0.002*	*-65.62*	*-106.29*	*-24.95*
Tutoring program	0.929	-4.99	-115.56	105.58
Extension program	0.215	73.87	-43.46	191.20
Research program	0.101	-88.25	-193.89	17.40
Online disciplines	0.754	6.27	-33.30	45.83
Scientific events	0.300	-19.16	-55.66	17.34
Dental scientific events	0.592	-14.54	-68.18	39.11
Life span of the course in the HEI (years)	**0.040*	*0.91*	*0.04*	*1.77*
Number of students per class authorized by MEC	0.533	-0.07	-0.27	0.14
Total of credit hours	0.192	0.03	-0.02	0.08
Total of mandatory credit hours	0.506	-0.48	-1.91	0.95

p*<0.05, multiple linear regression model; CI95% = confidence interval; 95% of the adjusted **β; RV = Reference value

The disciplines of Stomatology, Special Care Dentistry and Hospital Dentistry are areas that contemplate the knowledge of Dentistry students in Brazil considering systemic diseases, and consequently the medical clinic[4-6].

Regarding the importance of these disciplines related to medical clinic, it was verified, in the present study, a considerably high number of HEIs that offer at least one of these disciplines (75.1%). However, when analyzed individually, it becomes evident that less than half of the HEIs offer Special Care Dentistry (44.8%) and Hospital Dentistry (24.9%) courses.

The Stomatology course teaches students to correctly identify, diagnose and treat oral lesions and diseases, in addition to explain about systemic diseases and their possible oral manifestations, and oral repercussions of antineoplastic treatments, how to identify and treat/control them, aiming to improve the quality of life of patients[17]. The discipline of stomatology was more frequently found among the mandatory/optative disciplines of the HEI included in our research. In a survey carried out in 2019, in the Southeast region of the country, it was observed that 82.95% of the institutions offered this discipline, which was mandatory in 93.18% of them[18]. In the National Curriculum Guidelines that govern the Dentistry course in Brazil, we observed that dentists must be able to perform prevention, diagnosis and treatment of oral lesions, which could explain the expressive number of HEI that offer the discipline of stomatology.

Private institutions had a lower frequency of the Stomatology discipline, which may suggest that some institutions prioritize other disciplines in their curriculum. According to MEC Resolution 02 of July 18, 2007, the minimum credit hours of Dentistry courses in Brazil is 4000 hours[19]. In this way, the courses that strictly follow these credit hours must choose carefully which contents they will address in their curricular matrices, because certainly, contents will be left out. It was noticed, with the present study, that stomatology is not a prioritized content in these situations.

However, the presence of a stomatology discipline was directly associated with *strictu sensu* graduate programs at master's (p=0.006) and doctoral (p=0.005) levels, which shows the importance of investing in this discipline.

In the discipline of Special Care Dentistry (SCD), the main objective is to teach about the systemic, infectious and neurological diseases that can affect patients. Through this knowledge, the student becomes able to choose the ideal dental therapy for each patient, according to their needs and health problems[20]. Despite the importance of this discipline, it was only after Resolution No. 3 of the Ministry of Education, of June 21, 2021, that content on dental care for patients with special needs became mandatory in undergraduate Dentistry courses. However, dentistry schools have up to two years, after the date of publication of the resolution, to apply the determined requirements[20].

The SCD discipline is still very neglected within Dentistry courses, even though it has been a specialty recognized by the CFO for several years. In our research, less than half (44.8%) of the HEI offered this discipline, but 81.3% of these were said to be mandatory. In the study by Conceição et al., carried out in 2021, which evaluated 143 institutions with the Dentistry course in their curriculum, it was observed that 67.8% of the institutions offered the SCD discipline, with 54.5% being mandatory[22].

Hospital Dentistry (HD) was legitimized in Brazil in 2004 and focuses on the treatment of patients with systemic diseases admitted to hospital units or who require dental interventions at hospital level[23]. This discipline highlights the importance of the dentist's participation in hospital units, in addition to showing the general population the positive contribution of integrated care[24].

The HD is guided by resolutions of the Federal Council of Dentistry, CFO – 162/2015 and CFO – 163/2015, which discuss about the performance of the dental surgeon in the hospital environment on the form of qualification[25]. In addition, the resolution nº7 of ANVISA (National Health Surveillance Agency), published in 2010, lists the assistance services that must be guaranteed in the Intensive Care Units, including dental assistance (art.18, item VI)[26].

The HD discipline was the least found in our study, present only in 24.9% of the HEI, and being mandatory in 68.3% of these. In a survey carried out in 2019 in the Northeast region, it was observed that 18.6% of the institutions offered the HD discipline, of which 81.25% were mandatory and found mainly in private HEIs (62.5%)[27]. In the research carried out in the Southeast region, it was observed that 31.9% of the HEI offered this discipline, which was mandatory in 80.4%[27].

Despite being the least found in this research, the HD subject was directly associated with MEC grades 4 and 5, with 5 being the maximum grade in this assessment. It should be noted, therefore, that investment in HD disciplines in Dentistry

schools is important not only for students' knowledge, but also for updating course contents and for enhancing courses in external evaluations, proving to be an innovation of the curriculum.

The presence of disciplines related to medical clinic was directly associated with *stricto sensu* graduate programs at master's and doctoral level, lato sensu specialization, tutoring programs and research programs. These results suggest that HEIs that invest in disciplines related to medical clinic, invest in other academic areas, prioritizing the tripod research, teaching and extension, in addition to having a robust and strong graduate program.

The lack of theoretical knowledge, during graduation, related to patients with medical conditions, causes dentists to feel insecure in the care of these patients. In a survey carried out on the evaluation of special needs patients dental care during graduation, it was shown that most of the students who participated in the survey recognized that the absence of a discipline of Special care dentistry lead to insecurity during future dental care[29].

The results of the present study corroborate the findings in the literature, where it is observed that the disciplines of HD and SCD are not included in many dental schools, and the unpreparedness felt by dentists in caring for systemically compromised patients can be elucidated through the inclusion these disciplines as mandatory in the curricula of dentistry courses[24,29].

This study highlights the need to make Hospital Dentistry and Dentistry for Patients with Special Needs mandatory in all institutions to ensure greater safety and preparedness in managing complex cases. Integrating these fields into the curriculum, along with strengthening programs in scientific initiation and postgraduate studies, would support a more interdisciplinary education, essential for meeting the growing demands of a population with multiple comorbidities.

Dental education in Brazil faces several barriers to implementing curricular changes, primarily reflected in institutional resistance and structural limitations. One of the main obstacles is the difficulty in integrating traditional technical training with interdisciplinary approaches and clinical medicine content, both essential to preparing professionals to manage the increasing complexity of contemporary patients, especially those with systemic comorbidiies.[30]

It is worth noting that, in accordance with the new National Curriculum Guidelines effective since 2021, the teaching-learning process has been adapting and undergoing transformations, with a trend toward replacing disciplines to address these themes in order to enhance the quality of training for future professionals.

A limitation of this study is that the analyzed data represent a specific period during the COVID-19 pandemic (May 2020) and prior to the implementation of the new National Curriculum Guidelines (DCNs) in January 2021.

These new guidelines promote a more integrated and interdisciplinary approach to dental education, which may have influenced how courses are structured in higher education institutions. It is important to highlight that, although the study identified the presence of specific disciplines such as stomatology, hospital dentistry, and care for patients with special needs, many programs may not explicitly name these disciplines. Instead, their content might be included in broader subjects, such as clinical propaedeutics or integrated dentistry, which encompass outpatient care for individuals with special needs and dental care in hospital settings—areas that gained more prominence after the analyzed period.

As emphasized by Barbosa et al. (2020), the role of dental professionals in ICU teams is considered essential in multidisciplinary care, especially in addressing respiratory infections related to COVID-19. This underscores that, during the study period, prior to the implementation of the new DCNs, most dental schools were not adequately preparing dental surgeons with the necessary technical and scientific skills.

The 2021 DCNs introduced significant changes to dental education, emphasizing the need for more integrated and patient-centered training. This new curricular approach aims to prepare students to handle the complexities of healthcare. It is suggested that the absence of explicitly named disciplines does not necessarily indicate a lack of relevant content but rather the possibility that these topics are being integrated into other courses. This shift could directly impact the training of future dentists, requiring a reassessment of teaching and evaluation methodologies in dental programs.

It is also worth noting that, despite the new DCNs being introduced in 2021, their impact may not yet be fully observable in scientific analyses. Future studies will be crucial to evaluate how these changes are reflected in dental education once sufficient time has passed since their implementation. Thus, while we acknowledge the significant contributions of the

2021 DCNs, our findings reflect the reality of dental education in Brazil during a period when these changes had not yet been implemented.

CONCLUSION

The study showed that considering the disciplines of stomatology, HD and SCD, stomatology is the discipline that is most present in the HEIs, and HD and SCD are found in less than half of these institutions. These results corroborate the literature, which brings the unpreparedness of the dental surgeon as the main consequence.

Thus, nowadays, with the aging of the population and the increase in life expectancy, where many patients have systemic impairments, it will be necessary to increase dental education related to medical clinic.

It is essential for future research to explore how these guidelines are being implemented in higher education institutions. Additional studies could investigate the effectiveness of the proposed integrated approach and its impact on preparing students to care for patients with systemic conditions.

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