

Cariology education for undergraduate Brazilian dental students

Ensino da cariologia para estudantes de graduação em odontologia no Brasil

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ABSTRACT

This study sought to provide an overview of current cariology education for undergraduate Brazilian dental students. Data collection was via a Portuguese version of a 12-item questionnaire (Schulte et al., 2011) that was sent to all Brazilian dental schools (n = 219). The response rate was 57.0% (n = 125). Of the schools that returned the questionnaire, 84.8% supported the development of a Brazilian cariology curriculum. The units responsible for teaching cariology were predominantly operative dentistry (49.6%), pediatric dentistry (49.6%), dental public health (44.8%), and cariology (32%). Theoretical teaching of cariology (74.4%) and pre-clinical exercises (63.2%) were cited to occur mainly during the second year of the course, while clinical activities were placed in the third (71.2%) and fourth (64.8%) years. Among respondents, 76.8% of the schools included dental erosion and 86.4% included defects of dental hard tissues, such as abrasion, in teaching cariology. This survey was able to determine the panorama of cariology education in Brazil and to detect some differences among Brazilian geographic areas. The promotion of a workshop to discuss the topics that should be taught to undergraduate dental students and the development of a Brazilian core curriculum in cariology would be likely to reduce the differences in teaching cariology in Brazil.

Indexing terms: Curriculum. Dental caries. Teaching.

RESUMO

Este estudo teve como objetivo apresentar um panorama do ensino de cariologia nos cursos de graduação em Odontologia no Brasil. A coleta de dados foi realizada por meio de uma versão em Português Brasileiro de um questionário de 12 itens (Schulte et al., 2011) que foi enviado a todas as faculdades de Odontologia brasileiras (n = 219). A taxa de resposta foi de 57,0% (n = 125). Dentre as faculdades que responderam o questionário, 84,8% apoiam o desenvolvimento de um currículo brasileiro de cariologia. As disciplinas responsáveis por lecionar os conteúdos de cariologia são principalmente dentística (49,6%), odontopediatria (49,6%), saúde bucal coletiva (44,8%), e cariologia (32%). O ensino teórico de cariologia (74,4%) e os exercícios de pré-clínica (63,2%) são abordados principalmente durante o segundo ano do curso, enquanto as atividades clínicas ocorrem, em geral, no terceiro (71,2%) e quarto (64,8%) anos. Dentre os respondentes, 76,8% das faculdades incluem erosão dentária e 86,4% incluem defeitos dos tecidos dentários duros, como abrasão, no ensino da cariologia. Essa pesquisa foi capaz de determinar o panorama do ensino da cariologia no Brasil e detectar algumas diferenças de currículo entre as regiões do país. A promoção de um workshop para discutir os assuntos que devem ser ministrados aos estudantes de graduação em Odontologia e para desenvolver um currículo brasileiro de cariologia seria válida para reduzir as diferenças no ensino de cariologia no Brasil.

Termos de indexação: Currículo. Cárie dentária. Ensino.

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INTRODUCTION

Dental caries has shown a marked decrease in both incidence and prevalence in the Brazilian population [1]. An epidemiological survey performed in 2010 showed that Brazil now presents low caries prevalence in a sample of 12 year old subjects according to the World Health Organization (WHO) classification [2]. The disease, however, has a polarized profile in the country since the prevalence is still high among deprived groups [1].

For many years, the dentist profile has been described as traditional and mainly focused on technical aspects of oral health care. However, there is still the need for professionals engaged in oral health promotion to be able to diagnose dental caries and to consider the interaction among biological, environmental, and socioeconomic aspects [3].

Oral health teaching has been fragmented, and because of this, the adequate synthesis of the knowledge is not observed [4]. This model reflects on the biological dentist formation that does not consider social determinants to establish clinical management. This panorama supports the elaboration of a curriculum that provides knowledge integration, early diagnosis, and treatment in a translational perspective.

In Europe, a number of dental disciplines have published guidelines specifying the items in their disciplines to be included in the agenda of dental teaching [5-9]. Surprisingly, up to 2010, nothing about cariology education had been written. To overcome this, the European Organization for Caries Research (ORCA) and the Association for Dental Education in Europe (ADEE) conducted a survey on cariology education in European dental colleges to obtain data that should serve as basis for the elaboration of a European core curriculum in cariology [10]. Following this, in 2010, the first consensus workshop for the development of a cariology core curriculum was held in Berlin. During this event, the participants discussed and agreed on the most relevant items regarding teaching cariology [11].

In Latin America, efforts have been made to investigate the state of teaching cariology and the availability of a cariology curriculum. A survey was conducted between 2009 and 2011 among Spanish-speaking Latin American dental schools from 16 countries, which included questions about curriculum, diagnosis, treatment, and perceptions, all with regard to cariology [12]. After this project, regional workshops to discuss

aspects of teaching cariology were organized in Colombia using the document of the "European Cariology Core Curriculum" as basis for the discussions. The outcome of these workshops was used to create the Colombian cariology curriculum. The final document was agreed upon with the aid of a structured consensus process in which 23 Colombian dental schools took part [13].

Recently, in Brazil, some initiatives to assess how cariology has been taught were undertaken. Methods involving analysis of curriculum courses [14] and the conceptualization of dental caries by students [15] were used to initially evaluate the insertion of cariology content. However, data on teaching cariology in different geographic areas in the country are still missing. Therefore, the aim of this survey was to provide an overview of current cariology education for undergraduate Brazilian dental students similar to the survey performed by ORCA and ADEE in Europe.

METHODS

After approval by the Ethics Committee of the Federal University of Rio Grande do Sul (Presentation Certificate of Appreciation for Ethics number 42725715.7.0000.5347), a 12-item Brazilian Portuguese language questionnaire was developed based on the translation of the instrument used by ORCA and ADEE to perform the investigation [10]. The translation to Brazilian Portuguese was realized according to the method "translate-translate back" in three steps:

1. Translation of the European document, which was published in the English language into the Brazilian Portuguese language by two translators;
2. The Portuguese version of the document was assessed by a third translator who translated the Brazilian version back into English; and
3. The first two translators compared the original European version in English with the English language version provided by the third translator and adjusted when necessary.

After this, the questionnaire was sent to 73 dental schools for a preliminary survey [3]. By this preliminary investigation, some difficulties in filling out the questionnaire were detected and small changes were made to favor the understanding of the questions. The revised version of the questionnaire and the online informed consent were developed using the virtual tool "Google Forms." The questionnaire and the informed

consent were available online and a web link was sent by email to the coordinators of all 219 Brazilian dental schools (total of registered schools up to 2014), as well as to the 73 that answered the preliminary survey using an account created specifically for this purpose. Data were analyzed descriptively and frequencies of answers are presented.

RESULTS

A total of 125 dental schools responded the questionnaire (response rate of 57.0%). Of these schools, 74.4% were private schools and 27.2% were public. The national response rate was 57.0% (125 dental schools). Analyzing all five Brazilian geographic regions individually, the responses rates were 66.6% (south), 55.5% (southeast), 68.4% (midwest), 60.0% (northeast), and 31.8% (north). Concerning public (free) and private institutions, a higher response rate (66.6%) was observed for public schools than for private schools (55.3%). Of the 125 schools that returned the questionnaire, 84.8% supported the development of a Brazilian cariology curriculum (table 1).

Table 1. Response rate and supporting of a Brazilian Cariology curriculum.

	Dental schools	
	Response rate n (%)	Supporting of a national curriculum n (%)
Brazil	125 (57.0)	106 (84.8)
South	26 (66.6)	22 (84.6)
Southeast	52 (55.5)	45 (86.5)
Midwest	13 (68.4)	7 (53.8)
Northeast	27 (60.0)	25 (92.6)
North	7 (31.8)	7 (100)
Public	34 (66.6)	28 (82.3)
Private	93 (55.3)	75 (80.6)

Regarding the units responsible for teaching cariology, 32.0% of the schools had a specific subject named cariology, while other units included operative dentistry (49.6%), pediatric dentistry (49.6%), and dental public health (44.8%) (table 2). The subject content was available in written form in 76.8% of the institutions, and the expressions *cariology* or *dental*

caries were present in the titles of the classes or units in 92.8% of the schools.

Considering the type of education in cariology, the theoretical teaching and the pre-clinical exercises using extracted teeth or phantoms occur predominantly in the second year of the course in dental education. With regard to clinical education, most of the schools placed these activities in the third and fourth years of the course in dental education (table 3).

Table 2. Disciplines responsible for teaching Cariology in Brazil.

Discipline	Brazil n(%)	South n (%)	Southeast n (%)	Midwest n (%)	Northeast n (%)	North n (%)
Cariology	40 (32.0)	7 (5.6)	20 (38.4)	1 (7.7)	10 (37.0)	2 (28.5)
Operative/ Restorative Dentistry	62 (49.6)	9 (34.6)	31 (59.6)	7 (53.8)	12 (44.4)	3 (42.8)
Pediatric Dentistry	62 (49.6)	14 (53.8)	21 (40.3)	8 (61.5)	16 (59.2)	3 (42.8)
Public Health	56 (44.8)	15 (57.7)	22 (42.3)	6 (46.1)	9 (33.3)	4 (57.1)

Table 3. Type of Cariology education during the years of course.

Year	Cariology Education		
	Theoretical n (%)	Pre-clinical n (%)	Clinical n (%)
1 st	58 (46.4)	20 (16.0)	4 (3.2)
2 nd	93 (74.4)	79 (63.2)	49 (39.2)
3 rd	67 (53.6)	42 (33.6)	89 (71.2)
4 th	53 (42.4)	15 (12.0)	81 (64.8)
5 th	16 (12.8)	5 (4.0)	52 (41.6)

Concerning the inclusion of content that is important for differential diagnosis of dental caries in the cariology curriculum, 76.8% of the schools reported including dental erosion and 86.4% included defects of dental hard tissues like abrasion.

Moreover, the questionnaire included a question that presented 29 items related to cariology and dental erosion. The respondents should have selected the items with most importance to the cariology curriculum. Out of these 29 items, 12 showed rates of agreement higher than 90% (table 4).

Table 4. Contents judged important to be included in the Cariology curriculum.

Contents	Respondents agreement n (%)
Etiology of dental caries	123 (98.4)
Role of fluoride in caries prevention	120 (96.0)
Clinical detection of carious lesions	120 (96.0)
Clinical and histological appearance of dental caries lesions	119 (95.2)
Diet	119 (95.2)
Remineralization of dental hard tissues affected by caries	119 (95.2)
Caries risk assessment	117 (93.6)
Caries prevention in patients (monitoring)	117 (93.6)
Biofilm	117 (93.6)
Chemical and mechanical biofilm removal	117 (93.6)
Microbiology	115 (92.0)
Radiological detection of carious lesions	114 (91.2)
Auxiliary for detection of carious lesions	112 (89.6)
Saliva and salivary glands	111 (88.8)
Caries Selective removal	111 (88.8)
Descriptive and analytical epidemiology of dental caries	108 (86.4)
Caries prevention in populations	108 (86.4)
Professional and individual biofilm removal	106 (84.8)
Treatment based on caries activity	98 (78.5)
Atraumatic restorative treatment	92 (73.6)
Etiology of dental erosion	91 (72.8)
Sealing of carious lesion	90 (72.0)
Caries Total removal	88 (70.4)
Role of fluoride in dental erosion prevention	88 (70.4)
Clinical and histological appearance of dental erosion	85 (68.0)
Minimal intervention	85 (68.0)
Anatomy and histology of dental tissues	80 (64.0)
Descriptive and analytical epidemiology of dental erosion	72 (57.6)
Behavioral sciences	64 (51.2)

DISCUSSION

The present study aimed to investigate details of teaching cariology in Brazil. The observed response rate was 57.0%. Similar studies performed in Spanish-speaking countries of Latin America and Europe yielded response rates varying between 60.0% [12] and 72.0% [10].

The results of the present study revealed that several units are responsible for teaching cariology. Besides cariology, the most cited units were operative dentistry, pediatric dentistry, and public health. This result corroborates to the outcomes observed in Europe and Spanish-speaking countries of Latin America. The percentage of dental schools in Brazil that provide a specific discipline of cariology seems to be higher than reported in Europe and other countries of Latin America [10,12]. What really matters is that cariology content is being taught to students, not necessarily under a specific named cariology subject. Besides that, it would be of utmost importance that specific disciplines, such as operative/restorative dentistry, also focus on aspects related to caries management and control of the disease and not only on restorative materials and interventional treatments following the actual status of caries process.

With regard to the beginning of cariology education, like in Europe and other Latin American countries, theoretical activities in Brazil usually start in the second year of the course in dental education [10,12]. Pre-clinical exercises usually are scheduled during the second year, while clinical education usually starts in the third or fourth year, similar to the education structure in Europe [10].

With respect to differential diagnosis, in Brazil, 76.8% of the dental schools include dental erosion and 86.4% include defects of dental hard tissues in cariology education. The percentage of schools in Spanish-speaking Latin America that include erosion in cariology education was reported to be 64.8%, lower than that observed in Brazil [12]. In Europe, more dental schools include this content in cariology education: 89.0% include dental erosion and 88.0% include defects of dental hard tissues [12]. Dental caries, erosion, and abrasion are processes that cause loss of dental hard tissue [15,16]. As a consequence, these items should be included in the cariology program in order to permit the student to perform a differential diagnostic. Concerning the content related to dental caries and dental erosion that is judged important for inclusion in a cariology curriculum (table 4), the present survey detected similar results when compared

with investigations performed in other countries [10,12].

The questionnaire also included a question related to supporting the development of a national curriculum of cariology. Regarding this, 84.8% of the respondents said that the dental school where they work would probably support it. This percentage was similar to Europe (89.0%), where the survey about cariology education originated a consensus workshop that contributed to the European core curriculum in cariology [11]. These observations have encouraged the authors of this paper to propose that, in Brazil, a consensus workshop to create a Brazilian version of a cariology core curriculum should take place. The aim of providing such a curriculum is to guide dental schools about important matters related to cariology and therefore contribute to education quality.

To improve this quality, it is important that a national cariology curriculum approaches the prevention and promotion of oral health. In general, most of dentistry curricula is still structured in a technical-scientific emphasis, focused on curative practice, demonstrating a distance from teaching to the socioeconomic reality of the country [17]. This is worrying for a country where is evident a polarization of the prevalence of dental caries in socially vulnerable communities [18], and the opportunity of a workshop should be used to think cariology in a preventive view, being able to modifying this polarized panorama.

CONCLUSION

This survey was able to determine a panorama of the cariology education in Brazil, and the results indicated that the Brazilian scenario is similar to other countries where this initiative also took place. Therefore,

the promotion of a workshop to discuss the content that should be taught to dental students and to develop a Brazilian core curriculum in cariology would be likely to reduce the differences in teaching cariology in Brazil.

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Collaborators

DB GOUVEA, data collection and analysis; critical revising for important intellectual content and agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. S GROISMAN, MJS BÖNECKER, F SAMPAIO, SM PAIVA, L KRIGER, A SCHULTE and JA RODRIGUES contributions to the study design; data collection; critical revising for important intellectual content; agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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