High school teachers' knowledge of dental caries

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ABSTRACT

The objective of this study was to evaluate the knowledge of dental caries among high school teachers. This was a transversal descriptive study with a quantitative approach among high school teachers from public and private schools in the city of Vitória/ES, Brazil. The study used a validated self-administered questionnaire adapted for the target population with questions about the knowledge of caries. The descriptive data were presented in absolute and relative frequencies and the association test was carried out with Fisher's Exact test ($p < 0.05$). A total of 38 teachers participated in the study, 25 (65.8%) from public schools. Most teachers did not receive information about caries (60.5%) during their academic training and their knowledge was acquired during visits to their private dentists (50.0%). Most of them knew how to define caries as a disease (71.1%), however, there was uncertainty about whether the lesion (39.5%) was the main consequence of its development and the mandatory requirement of restoration (55.3%) for its treatment. The caries theme is addressed in the classroom by 60.5% teachers, mainly in the second year (60.9%) and in private schools ($p = 0.0285$). Most of the teachers would like that caries become part of the curricular structure of secondary education (92.1%) as they believe in the relevance of this topic (97.4%). As a conclusion, most teachers knew the definition of caries as a disease, however, there was relative ignorance of its consequences and ways of treatment.

Descriptors: Dental Caries. Health Education. Primary and Secondary Education.

1 INTRODUCTION

The perception individuals have of certain disease might change according to their source of information and personal experience. Information obtained from family members, through different communication means such as the television, the radio or the internet, or that received from professionals in the private or public health systems, along with what they have learnt throughout their school life are examples

of sources of information that might contribute to their understanding of several aspects related to health and the prevention of illnesses. Education and motivation are able to arise interest in health maintenance by developing people's awareness of the real causes of their problems[1].

Since hygiene is essential for good oral health. It is relevant to provide the population with suitable guidance regarding their behavior in relation to their oral health and its relation with dental caries[2]. Thus, teamwork involving health and education professionals, acting as collaborators in information-prevention programs is essential[3].

The school environment is a favorable space where oral health concepts should be taught within a wide and continuous approach, since it gathers children and adolescents from an age range that is suitable for the adoption of educational and preventive measures[4]. Ideally, such awareness, as well as the knowledge of other illnesses that are of public health concern, should be available to individuals throughout their school life. However, the literature presents few reports on the knowledge acquired by students in elementary and high school about dental caries and their implications in hygiene and oral self-care[5-10].

Teachers in elementary school play a fundamental role as knowledge multipliers and might become agents that motivate and promote health while teaching and contextualizing self-care, including oral health[10]. Following this path, an interdisciplinary action, joining the undergraduate courses of Dentistry and Education might become a fundamental tool in the transformation of school children teaching-learning[11].

Therefore, it seems highly relevant to evaluate teachers' knowledge regarding caries as an illness to understand the teaching-learning process of students who receive this kind of information. The objective of this study was to evaluate high school teachers' knowledge of dental caries.

2 METHODOLOGY

This is an exploratory transversal study with a quantitative approach and was carried out using a validated structured questionnaire[9], applied to high school teachers in the area of biological sciences of public and private schools in the municipality of Vitória/ES.

This study is part of the Brazilian Education System "dental caries" theme insertion Project and was approved by the Research Ethics Committee of the Federal University of Espírito Santo (CEP-CCS-Ufes) under the technical opinion nº 1.616.366 (CAAE: 56210416.8.0000.5060).

The target population of this study included high school teachers in the biological sciences area from 12 public schools (n=36) and from 11 private schools (n=44), totalling 80 teachers in the municipality of Vitória/ES.

All questionnaires were handed in to the school principal, distributed and then collected by the coordinator of each school year. The participants answered the questionnaire by themselves and the researcher collected the questionnaires after they had been answered.

The instrument used was previously validated by Santos-Daroz *et al.*[9] with Dentistry students and for this reason, it was adapted regarding the characteristics of the target public of this study. The questionnaire enabled the characterization of the sample (school, school year, sex, age, teachers' education, among others) and approached issues related to the knowledge of the dental caries illness (such as definition, consequences and prevention methods) and the source of the knowledge acquired (graduation, home, school, their dentist, among others).

The data was inputted in the program Excel 2016® (Microsoft Corporation, Redmond, Washington, USA) and a descriptive analysis with absolute (n) and relative (%) frequency was carried out. The Fisher exact test was employed in the association analysis ($p<0,05$).

3 RESULTS

Two private and one public schools did not accept to take part in the research. Thus, 69 questionnaires were handed out. The return rate was 55%, totalling a sample with 38 teachers (25 from public schools and 13 from private schools).

In this study, female teachers outnumbered their male colleagues (55.3%), the participants were aged between 30 and 39 years (52.6%), married (47.4%), with family income between 5 and 6 minimum wages (34.2%). Their education background showed that most concluded elementary school in the public system (6th to 9th year) (57.9%), while high school (1st to 3rd year) was mostly concluded in the private system (57.9 %), going back to the public system for undergraduate studies in the Biological Sciences Course (89.5%), and 81.6% of the participants concluded graduate studies (Table 1). Most of the teachers (36.8%) teach in all years of high school (table 2).

Regarding their knowledge of caries, only 39.5% reported having received information about the health-illness process in the undergraduate course, however, 50.0%, 42.1% and 28.9% believe that most of their knowledge was obtained from their dentists, from home and school, respectively. All the teachers in the study stated that after having acquired knowledge of caries as an illness, they could apply it in their daily practice, with better results in their oral health (table 3). Caries was characterized as an illness by 71.1% of the participants, who saw its consequences as a lesion (39.5%) and as a dental loss (31.6%). Over a half of the teachers, 55.3% thought that all caries should be restored /filled (table 4).

Regarding prevention methods, all interviewees affirmed knowing regular home brushing, followed by the use of dental floss (97.4%) and regular visits to the dentist (94.7%), while diet and mouthwash with fluoride were reported by 84.2% and 73.7% of the respondents, respectively. When asked about the caries prevention methods that they employ, the results obtained were: tooth brushing at home (97.4%); using dental floss (97.4%); using mouthwash with fluoride (55.3%); and paying attention to their diet (50.0%). Most teachers (76.3%) answered that they visited their dentists regularly, and once a year (47.4%) (table 4).

In the classroom, 60.5% approaches the topic caries, most of them in the 2nd year of high school (60.9%) (table 5), but the topic was less popular in public schools ($p=0.0285$). Almost all the teachers (97.4%) considered the theme caries relevant and would like (92.1%) to have it included in the curricular structure of high school, since 100% of them believed that with the inclusion of this content in the classroom, the incidence of caries among students would be reduced. However, 60.5% believed that the content caries and its prevention methods should be adopted in elementary and high school as a subject (table 5).

4 DISCUSSION

In this study, most teachers thought the content caries was relevant and would like to see it and its prevention methods included in the curricular structure of high school. Although most of the teachers were seen to be aware of caries as an illness and its prevention methods, just over a half of them addresses these issues with their students, probably because this is not a mandatory topic in the curricular structure to be covered by the schools or due to the lack of this subject in teaching courses.

Table 1. Sample characterization

Variables	n	%
Sex		
Male	17	44.7
Female	21	55.3
Age range		
From 24 to 29 anos	7	18.4
From 30 to 39 anos	20	52.6
From 40 to 49 anos	5	13.2
From 50 to 59 anos	4	10.5
From 60 to 66 anos	2	5.3
Marital status		
Single	17	44.7
Married	18	47.4
Divorced	3	7.9
Family income		
From 1 to 2 minimum wages	1	2.6
From 3 to 4 minimum wages	10	26.3
From 5 to 6 minimum wages	13	34.2
From 7 to 8 minimum wages	5	13.2
Over 8 minimum wages	7	18.4
Not answered	2	5.3
Completed elementary school (6^{th} to 9^{th} year) in		
Public school	22	57.9
Private school	13	34.2
Public and private schools	3	7.9
Completed high school (1^{st} to 3^{rd} year) in		
Public school	13	34.2
Private school	22	57.9
Public and private schools	3	7.9
Completed higher education in		
Public institution	22	57.9
Private institution	14	36.8
Public and Private institutions	2	5.3
University education		
Biological Sciences	34	89.5
Biological Sciences and Medicine	1	2.6
Biological Sciences and Education	1	2.6
Environmental Management	1	2.6
Veterinary Medicine	1	2.6
Completed graduate studies		
No	7	18.4
Yes	31	81.6
Total	**38**	**100.0**

Table 2. Absolute and Relative distribution of high school classes that the teachers work with

Variable	n	%
High school classes taught		
1st year	3	7.9
2nd year	3	7.9
3rd year	8	21.0
All classes	14	36.8
1st and 2nd years	3	7.9
1st and 3rd years	4	10.5
2nd and 3rd years	3	7.9
Total	**38**	**100.0**

Table 3. Absolute and Relative Distribution regarding time of knowledge of caries

Variables	n	%
In higher education, did you receive any information about the health-illness process related to caries:		
No	23	60.5
Yes	15	39.5
Do you believe that most of your knowledge of caries came from *:		
Home	16	42.1
School	11	28.9
Private Dentist	19	50.0
Public Service	2	5.3
Means of communication	3	7.9
Undergraduate studies	2	5.3
Others (Research and personal search)	2	5.3
When you acquired this knowledge, could you apply it in your daily practice?		
No	-	-
Yes	38	100.0
When you acquired this knowledge, do you believe that this information resulted in some improvement of your oral health?		
No	-	-
Yes	38	100.0
Total	**38**	**100.0**

* More than one option could be chosen.

Table 4. Absolute and Relative Distribution regarding teachers' knowledge of caries

Variables	n	%
What is dental caries?		
A bug that eats the tooth	-	-
An illness	27	71.1
Consequence of an illness	9	23.7
Lack of brushing the teeth	2	5.3
All caries should be restored/filled?		
Yes	21	55.3
No	17	44.7
What's the consequence of caries development?		
A cavity in the tooth	2	5.3
A lesion	15	39.5
Tooth wear	9	23.7
Tooth loss	12	31.6
Choose the caries prevention method(s) listed below that you know *:		
Regular brushing at home	38	100.0
Use of dental floss	37	97.4
Regular visits to the dentist	36	94.7
Watching your diet	32	84.2
Use of fluoride mouthwash	28	73.7
Others (Mouthwash with 10V oxygenated water)	1	2.6
Choose from the list the methods of prevention that you use*:		
Regular brushing at home	37	97.4
Use of dental floss	37	97.4
Regular visits to the dentist	21	55.3
Watching your diet	19	50.0
Others (Mouthwash with 10V oxygenated water)	1	2.6
Do you see your dentist regularly?		
No	9	23.7
Yes	29	76.3
Choose from the list below the situation in which you visit your dentist:		
When you have a toothache	6	15.8
Once a year	18	47.4
Twice a year	8	21.1
To treat caries	-	-
For cleaning and prevention measures	3	7.9
Emergency	3	7.9
Total	**38**	**100.0**

* More than one option could be chosen.

Table 5. Absolute and Relative Distribution regarding addressing the theme caries in the classroom

Variables	n	%
The topic caries is approached in the classroom:		
No	15	39.5
Yes	23	60.5
If "YES", in which year?		
1st year	8	34.8
2nd year	14	60.9
3rd year	10	43.5
Do you believe that by including this content in the classroom the incidence of caries would:		
Decrease	38	100.0
Increase	-	-
Remain the same	-	-
Do you believe in the relevance that the topic caries be included in the curricular structure of high school:		
No	1	2.6
Yes	37	97.4
Would you like to see the topic caries as part of the curricular structure of high school:		
No	2	5.3
Yes	35	92.1
Not answered	1	2.6
In which year, do you believe caries and its prevention methods should be approached in schools as a subject taught?		
From 1st to 4th year	7	18.4
From 5th to 8th year	5	13.2
In high school (1st, 2nd and 3rd year)	-	-
In elementary and high school	23	60.5
I don't think this theme is important in the classroom	1	2.6
From 1st to 4th year / 5th to 8th year	2	5.3
Total	**38**	**100.0**

Despite these teachers' education being mainly in Biological Sciences (89.5%), most of them (60.5%) reported not having received any information about the health-illness process related to dental caries in their academic training. This is worrying, since dental caries is the most prevalent oral illness in the world and can be prevented[12,13].

Just over a half (60.5%) of the teachers stated to approach the theme caries in the classroom, similarly to the report presented by Costa *et al.*[14], who verified that 59% teachers in elementary school reported introducing the theme oral health to their students. In addition, this study also evidenced that public school teachers do not address the theme in their

classrooms as much as teachers in private schools do. Since caries presents uneven distribution with higher incidence among individuals of lower social classes[15], this data reinforces the need to include this theme in the Brazilian education system. The Health Ministry[16] recognizes that, in addition to its inherent teaching function, the school has a social and political function aiming at the transformation of the society. Thus, the importance of teaching contents related to health in the school environment is highlighted. However, systematically, themes like dental caries are not included in the curriculum guidelines.

The teachers in this study presented basic knowledge of dental caries, a similar result to that found by Aragão *et al.*[17] in municipal day care institutions in the municipality of João Pessoa/PB. Even so, the teachers in this study stated that most of their knowledge was obtained from information given by their dentists in the office, as also found in studies with university students[9] and professors[18]. In this aspect, it seems relevant to highlight the dentists' importance in oral health education during their clinical practice[18]. Other sources of information reported were home, family environment and school environment, similarly to the data obtained from samples of dentistry students – 17.4% of the participants reported that most of their knowledge of caries came from school[9]. This data shows the importance of teachers' qualification in this theme, so that they are able to deliver health education throughout the individuals' education, favoring the change or implementation of attitudes, habits and care with one's own oral health, since this challenge does not need to be exclusively faced by the dentist[9].

Although most of the teachers could conceptualize caries as an illness, there were some doubts about the consequences of its development, since 39.5% introduced it as a lesion and 31.6% answered that it results in dental loss. The same was observed when most of them (55.3%) stated the need of always restoring caries. Lack of information about the need or not for a restoring treatment shows the importance of making teachers aware that in its initial stage, caries appears as a white spot that can be remineralized, enabling its elimination without the need for restoration[19]. Even in more advanced stages, with the formation of a cavity, depending on its extension and possibility of cleaning through daily brushing, plaque removal and use of fluorides, the illness process can be stopped without the need for restoring intervention[20]. Therefore, the results led to the conclusion that a better informed teacher can more effectively contribute to the teaching-learning process about health in schools[21].

Knowledge of this theme could also be observed when teachers were asked about caries prevention methods. Most of them reported to know and use toothbrush and dental floss, while 84.2% reported to know the importance of watching their diet and 73.7% reported knowing about the use of mouthwash with fluoride, however, these methods are used by only 50.0% and 55.3% of the respondents, respectively. Both diet and the use of fluoride play a fundamental role in the caries lesion development, since a diet that is rich in sucrose favors the establishment and proliferation of cariogenic microorganisms, making the biofilm thicker and, consequently, increasing dental demineralization periods[1]. In the absence of fluoride, the enamel becomes more susceptible to demineralization, enabling the start of a carious process and the appearance of white spot initial lesions[22].

Regular visits to the dentist, known by 94.7% of the teachers, is only accomplished by 76.3% of them, and on an annual basis for 47.4% of the respondents. Periodic return to the dentist is recommended for enabling the preservation

and maintenance of the oral health, so that the carious initial lesions can be diagnosed, resulting in minimally invasive and preventive dental intervention [23]. It seems relevant to highlight that in this study all teachers have a university degree, 81.6% of them completed a graduate course, showing a high schooling level. The participants' income varied mostly between 5 and 6 minimum wages. This information is relevant, since there is association between better oral health practices and the financial situation of the teachers[24].

Despite a decrease in the prevalence of caries in Brazilian children and adolescents in the last few decades, this illness is still a public health issue[2]. In the last few years, dentistry has achieved great advances regarding technical-scientific knowledge and prevention of oral diseases, however, they still affect great part of the population[13]. Although the benefits of changing life habits are known by the professionals, they are not always known by the population as a whole[11]. The dentistry service is still limited without total coverage by Oral Health Teams, and the number of professionals has not been enough to accelerate the process of reversion of the welfarist model to a model of attention to health, inter-sectorial actions involving the education system might be important to reduce the impact of caries in the Brazilian population.

For this reason, it seems relevant to emphasize that an integrating action between education and dentistry, by introducing the content oral health in the curriculum of the pre, elementary and high school would enable the education of children and adolescents with a differentiated profile, able to apply the knowledge acquired more deeply within the context of each age range and carry out the promotion of their own oral health. Turning all schools into promoters of oral health is a target to be achieved, since a well-informed, qualified and motivated teacher will be able to act as an oral health multiplier agent.

One of the limitations of this study was the sample loss, mainly due to the fact that the study could not be developed in some schools and the low number of questionnaires returned, which might have excluded individuals that presented lower or higher level of information or knowledge of the theme. Likewise, the results obtained in a specific municipality cannot be extrapolated for the population as a whole. However, the study puts forward unpublished and relevant data for the discussion of the insertion of the theme caries in the Brazilian education system.

5 CONCLUSION

Most of the participants did not receive information regarding the health-illness process during their undergraduate course, but rather from their private dentist, from home and school. All stated to have improved their own oral health from the application of the knowledge acquired and most of them could define caries as an illness, however, a relative unawareness of its consequences and treatments was observed.

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RESUMO

Conhecimento sobre cárie dentária entre docentes do ensino médio

O objetivo do estudo foi avaliar o conhecimento

sobre cárie dentária entre docentes do ensino médio. Trata-se de um estudo exploratório transversal com abordagem quantitativa entre docentes do ensino médio de escolas públicas e privadas do município de Vitória/ES. O estudo utilizou um questionário autoaplicado validado, adaptado para população-alvo, com perguntas que versavam sobre o conhecimento da cárie. Os dados descritivos foram apresentados em frequências absolutas e relativas e houve o teste de associação utilizando o teste Exato de Fisher ($p<0,05$). Um total de 38 professores participaram do estudo, sendo 25 (65,8%) de escolas públicas. A maioria dos professores não recebeu informações sobre cárie (60,5%) durante sua formação acadêmica e seus conhecimentos foram adquiridos nas visitas ao cirurgião-dentista particular (50,0%). A maior parte soube definir cárie como doença (71,1%), no entanto, com incertezas (39,5%) se a lesão era a principal consequência do seu desenvolvimento e obrigatoriedade de restauração (55,3%) para o seu tratamento. O tema cárie é abordado em sala de aula por 60,5% dos docentes, principalmente no segundo ano (60,9%) e nas escolas particulares ($p=0,0285$). Dos professores, a maior parte gostaria que o tema cárie fizesse parte da estrutura curricular do ensino médio (92,1%) por acreditaram na relevância do assunto (97,4%). A maioria dos docentes soube definir a cárie como uma doença, no entanto, houve relativo desconhecimento de suas consequências e formas de tratamento.

Descritores: Cárie Dentária. Educação em Saúde. Ensino Fundamental e Médio.

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