Teaching and use of silver diamine fluoride in Pediatric Dentistry: a questionnaire-based cross-sectional analysis of undergraduate Brazilian dental schools

Tatiana Tambara Fröhlich*; Taiane Costa Leite; Rachel de Oliveria Rocha*****

* Postgraduate student, Dental Science Graduate Program, Federal University of Santa Maria
** Private practice, Santa Maria, Brazil
*** Associate Professor, Department of Stomatology, Federal University of Santa Maria

Received: 11/18/2021. Accepted: 01/28/2022.

ABSTRACT

This study investigated the teaching and use of silver diamine fluoride (SDF) in Pediatric Dentistry in undergraduate Brazilian dental schools through a questionnaire-based cross-sectional analysis. Two-hundred and thirty-five questionnaires were e-mailed to directors of Pediatric Dentistry of undergraduate Brazilian dental schools. The details of the teaching and use of SDF in clinical practice were asked. Obtained data were analyzed descriptively and using the chi-square test. A total of 149 complete questionnaires were returned (63.4%). Most of schools taught SDF in lectures (73.8%, p <0.001). The majority use SDF in clinical practice (64.4%, p <0.001), but its use is not frequent (11.4%, p<0.001). All dental schools reported that SDF is applied in primary teeth, and few reported its use for permanent teeth (36.4%, p = 0.01). SDF has been used mainly for cavitated caries in primary teeth of children aged 0 to 3 years (93.7%, p<0.001), with restricted use in posterior teeth (42.7%, p <0.001). Although SDF is teaching and used in clinical practice in Pediatric Dentistry in most Brazilian undergraduate schools, its use is not frequent. Furthermore, SDF is not considered an option for caries lesions in some dental schools.

Descriptors: Dental Caries. Cariostatic Agents. Pediatric Dentistry. Education, Dental. Survey and Questionnaires.

1 INTRODUCTION

Silver diamine fluoride (SDF) has been considered one of the most effective treatments for arresting carious lesions in primary teeth[1]. Its use was proposed in Japan[2] in the 70s and later began to be used in Brazil[3] and other countries. However, it recently came back to prominence mainly after its introduction in the American market in 2014[4], becoming, since then, the focus of numerous scientific investigations. Furthermore, in early 2020, with the global pandemic of COVID-19, the SDF has emerged as a minimally invasive measure with minimal aerosol generation carious lesions treatment[5,6].

Silver diamine fluoride has antibacterial properties, acts on the dental structure's remineralization, and has an inhibitory effect on the organic matrix's degradation[7]. The most

common adverse effect related to its use is to make treated carious lesions black[8], forming a layer of silver phosphate on the surface[9]. This clinical observation that SDF causes the compromised tooth structure to darken can significantly impede its use due to aesthetic concerns, especially when anterior teeth are involved[10]. Therefore, the inclusion of SDF as a teaching topic and its use in undergraduate dental schools may be affected.

A recently published study investigated the teaching of silver diamine fluoride in dental schools in the United States. It is present in the curriculum of almost 70% of them but is used in clinical practice in less than 50%[11]. Another investigation carried out in residency programs in Pediatric Dentistry, also in American institutions, found that for more than one-half of the respondents, the concern with parental acceptance in the face of the color change associated with arresting of the carious lesion is considered a barrier to its use[12]. The use of SDF was less commonly taught in undergraduate pediatric dentistry in dental schools in the United Kingdom[13]. To the best of our knowledge, there are no investigations on the use of silver diamine fluoride in Brazilian dental schools. Therefore, this study aimed to evaluate the current teaching and use of SDF in Pediatric Dentistry in undergraduate Brazilian dental schools. The hypothesis tested was that SDF is not taught and not used in most pediatric dentistry disciplines.

2 METHODS

Study Design

This research refers to a questionnaire-based cross-sectional study conducted from September 2019 to April 2020. The project started after review and approval by the Institution's Research Ethics Committee (CAAE 08116619.2.0000.5346) and was designed and conducted according to guidelines of the STROBE statement (Strengthening the reporting of observational studies in epidemiology)[14].

Population

The survey targeted 265 undergraduate dental schools in Brazil, all of them registered with the Federal Council of Dentistry and the Ministry of Education and Culture (MEC). Therefore, a convenience sample was used.

Data Collection

The names and electronic addresses of the heads or other staff members of Pediatric Dentistry were obtained from school websites. A questionnaire about the current use and teaching of silver diamine fluoride was developed based on the previous study[15]. An introductory letter, a Free and Informed Consent Form, and a link to the online platform (Google Forms) were sent to a faculty member in charge of each institution's pediatric dentistry teaching.

The questionnaire consisted of 11 questions designed to evaluate the details of the theoretical teaching and clinical use of SDF in undergraduate pediatric dentistry. The first question asked if the silver diamine fluoride is a theoretical topic of lectures and if it is used in the clinical practice of pediatric dentistry. When the answer was positive, other specific questions about the use of SDF were presented: frequency and how long it has been used, product concentration, if used in primary teeth and age range, if used in permanent teeth, if used in anterior and/or posterior teeth and for non-cavitated or cavitated lesions, according to the International Caries Detection and Assessment System (ICDAS) considering each type of teeth (primary or permanent).

The questionnaires were sent out again up to five times, with seven-day intervals among submissions in case of no response. After this

period, a new attempt was made for another teacher from the same institution. If more than one questionnaire returned from the same institution, the first questionnaire received was considered.

Data Analysis

The data obtained were summarized using descriptive statistics (percentages) and the chi-square test to compare the proportions obtained. The results were analyzed using the Minitab Express statistical program (Minitab, Inc, State College, PA, USA).

3 RESULTS

A flow diagram illustrates the sending and receiving of questionnaires (figure 1). A total of 265 institutions were considered as potential participants. Of these, 20 were excluded from the study for not having started the discipline of Pediatric Dentistry. Also, 10 institutions could not be considered due to the impossibility of contact. Questionnaires were sent to 235 dental schools. A total of 149 dental schools returned the completed questionnaires (overall response rate of 63.4%).

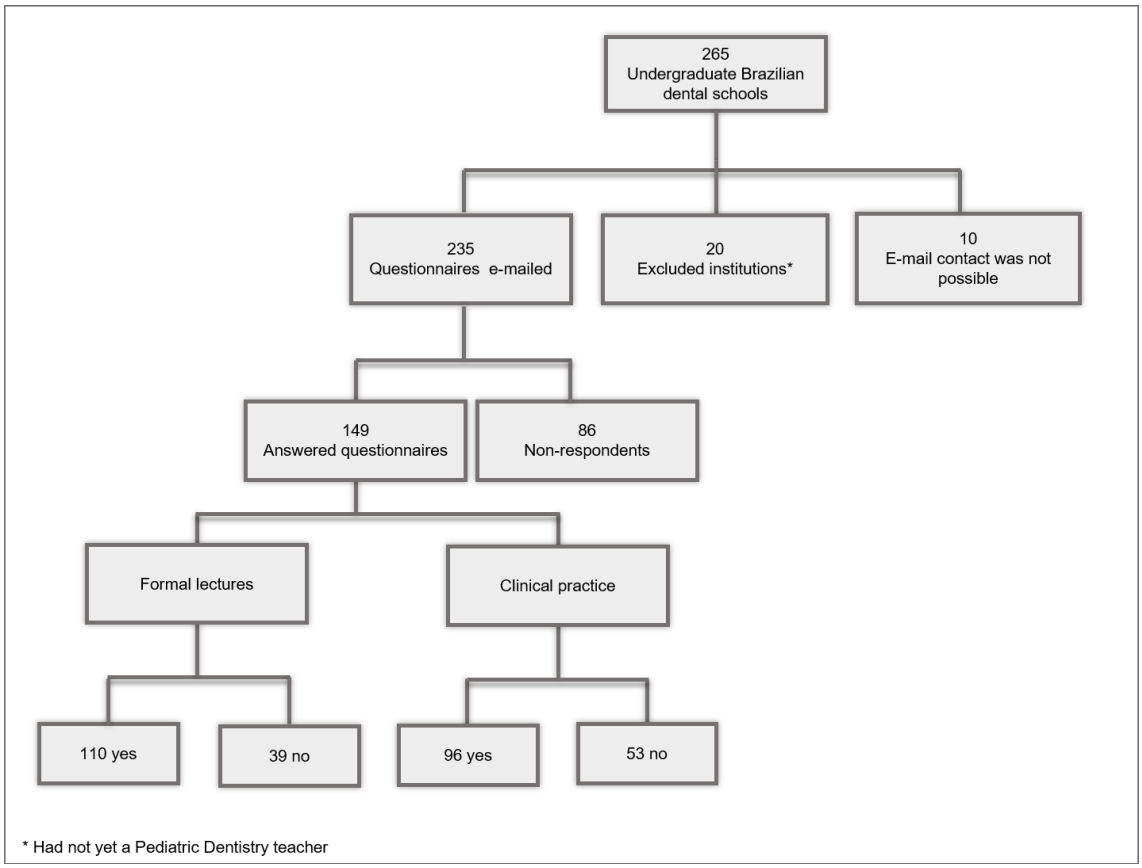

Figure 1. Flowchart for the application of questionnaires in the Pediatric Dentistry disciplines of undergraduate dentistry courses in Brazil

The number of questionnaires answered by Brazilian geographic macro-regions and public or private dental schools is described in table 1. The majority (78%) of the schools are private educational institutions, and 60.8% of these private schools returned the completed questionnaire. Fifty-one public educational institutions were consulted, and 72.5% participated in the study. All Brazilian geographic macro-regions were represented in

the present study. However, Southeast and Central-West macro-regions showed higher representation (84.4% and 72.2%, respectively).

Table 1. Type and geographic region of undergraduate courses participating in the research

	Sent e-mails N	Answered Questionnaires N (%)
Type of the Institution		
Public	51	37 (72.5)
Private	184	112 (60.8)
Country Region		
North	21	11(52.3)
Northeast	62	33 (53.2)
Central-West	18	13(72.2)
Southeast	89	54 (60.6)
South	45	38 (84.4)
Total	235	149 (100)

In most of the responding schools, silver diamine fluoride is included as a topic in formal lectures (73.8%, p<0.001) and is used in the clinical practice of pediatric dentistry (64.4%, p<0.001). The general obtained data are described in table 2.

Regarding the frequency of use, most schools reported using the SDF rarely (29.5%) or sometimes (27.5%), and in 11.4% of schools, SDF is used frequently (p<0.001). It has been in use for less than 5 years (46.8%), although 37.5% using it for more than 10 years in the discipline's clinical practice. SDF in a concentration of 30% (52%, p=0.01) is used in most schools, despite the concentrations of 38% and 10% or 12%. It is essential to consider that some respondents chose more than one option.

The SDF is used in all institutions to treat carious lesions in primary teeth, but only 36.4% of schools reported its use in permanent teeth (p=0.01). For primary teeth, it is used for both anterior and posterior teeth (53.1% of responses), although in some institutions, the use is restricted to posterior teeth (42.7% of responses, p<0.001). The SDF is mostly used in children aged 0 to 3 years (93.7%, p<0.001), but the application in children aged 5 to 10 years was also reported by most schools (63.5%). Regarding the type of lesion, non-cavitated enamel lesions (ICDAS 1 and 2) have been treated with SDF (33%), even if less frequently than cavitated lesions, both in enamel (ICDAS 3, 63.5%) and dentin (ICDAS 5 and 6, 63.5%). For permanent teeth, it is used almost exclusively in posterior teeth (88.5%, p< 0.001) in enamel cavitated lesions (ICDAS 3, 57.1%), non-cavitated lesions (ICDAS 1 and 2, 42.8%), and even in dentin cavitated lesions (ICDAS 5 and 6, 40%). Table 3 presents the specific data about primary and permanent teeth use.

Table 2. Results regarding general data about the use of silver diamine fluoride presented in the survey

Questions	N (%)*
How often is the SDF are use?	
Frequently	11 (11.4)#
Sometimes	41 (27.5)
Rarely	44 (29.5)
How long SDF has it been used by the institution?	
Less than 5 years	45 (46.8)
From 5 to 10 years	15 (15.6) #
More than 10 years	36 (37.5)
What product concentration is used?	
10 or 12%	33 (34)
30%	50 (52) #
38%	27 (28)
Do not know	5 (5.2)
Is it used on primary teeth?	
Yes	96 (100)#
No	0
Is it used on permanent teeth?	
Yes	35 (36.4)
No	61 (63.5) $

* Numbers (percentage) marked with superscript symbols show statistically significant differences from the others.
# p<0.001 $ p=0.01

4 DISCUSSION

SDF has been used in Brazil since the 1980s; however, recently, it has aroused greater interest and perhaps greater use, as it is a non-invasive technique for caries treatment[1,16] and due to its current availability in the American market[4]. Besides that, the SARS-CoV2 pandemic impact on dentistry requires evidence-based protocols on children's dental care, including those with no or minimum aerosol generation, as the use of SDF[5,6]. This is the first study to investigate the teaching and use of SDF in Brazilian undergraduate dental schools. The overall response rate (63.4%) may be considered satisfactory because of the significant number of dental schools in Brazil; in this study, 235 institutions were contacted, and 149 answered the survey. Also, the obtained response rate is even higher than that related in other Brazilian surveys based on questionnaires[17-19].

Table 3. Results regarding specific data about the use of silver diamine fluoride in primary and permanent teeth presented in the survey

Questions	N (%)*
Primary teeth**	
What age group is it used?	
0 to 3 years	90 (93.7)[#]
5 to 10 years	61 (63.5)
Over 10 years	14 (14.5)
Which teeth are treated with SDF?	
Anterior	4 (4.1)[#]
Posterior	41 (42.7)
Both	51 (53.1)
Which lesions are treated with SDF?	
Enamel lesions, without cavity (ICDAS 1 and 2)	31 (33)[#]
Enamel cavitated lesions (ICDAS 3)	61 (63.5)
Dentin cavitated lesions (ICDAS 5 or 6)	61 (65.5)
Permanent teeth***	
What types of teeth are treated with SDF?	
Anterior	0
Posterior	31 (88.5)[#]
Both	4 (11.4)
What type of lesions are treated with SDF?	
Enamel lesions, without cavity (ICDAS 1 and 2)	15 (42.8)
Enamel cavitated lesions (ICDAS 3)	20 (57.1)
Dentin cavitated lesions (ICDAS 5 or 6)	14 (40)

* Numbers (percentage) marked with symbols show statistically significant differences from the others.
** N= 96 ***N=35 [#]p<0.001

This study demonstrates that SDF is a topic of theoretical lectures and is used in the clinical practice of the Pediatric Dentistry of most Brazilian dental schools, then the null hypothesis could be rejected. These findings contrast with the data obtained in American dental schools[11] and from a study carried out in dental schools in the United Kingdom[13]. In the United Kingdom, only one institution reported teaching the technique of silver diamine fluoride. Despite being part of the majority curriculum in American institutions, it is used in clinical

practice in less than 50%. Although SDF has been available for more than four decades in some countries like Brazil, only in 2014 the SDF receive FDA (Food and Drug Administration) approval for commercialization in the American market[4]. In the United Kingdom, currently, the use of SDF would be on an off-license basis[13]. These may explain the differences observed in SDF use in Brazilian, American, and European institutions. Besides, the great concern with unfavorable aesthetics resulting from SDF use may also explain its non-use.

Silver diamine fluoride has been considered the most effective non-invasive treatment for arrest carious lesions in primary teeth[1]. SDF application is advised for cavitated lesions[20,21], especially with dentinal involvement[22]. In all Brazilian institutions that reported using SDF, use it on primary teeth, especially in children aged 0 to 3 years. The use of SDF is being recommended for the management of early childhood caries [21], and it can prevent or delay surgical intervention until 3 years of age, which makes it a potentially attractive therapy in this very young pediatric population[23]. Despite this, most undergraduate dental schools have also considered the application in children aged 5 to 10 years.

The obtained data pointed out that in most Brazilian dental schools, the SDF is an option for treating cavitated lesions in primary teeth, both in enamel (ICDAS 3) and dentin (ICDAS 5 and 6). On the other hand, few schools consider its use to treat incipient caries lesions (ICDAS 1 and 2). Unlike what happens for cavitated lesions, there is still no strong evidence to demonstrate SDF's superiority over other treatments for non-cavitated lesions. The recommendation, so far, has been to prioritize the application of fluoride varnishes or sealants[20].

In contrast to the widespread use of silver diamine fluoride for caries arrest in primary teeth, it is not commonly used in permanent teeth in most Brazilian institutions, probably due to the greater aesthetic demand for permanent teeth. Also, the SDF has its main indication for the treatment of early childhood caries, children with no cooperative behavior, that may be considered traditional restorative treatment barriers[24]. In a non-restorative treatment guideline, the application of SDF is recommended for cavitated lesions in primary and permanent teeth; however, it is considered a conditional recommendation for permanent teeth. Therefore, there is no substantial evidence available to inform its effectiveness on these teeth[20]. However, it is noteworthy that the literature shows that the SDF is an alternative treatment option for incipient caries in occlusal surfaces of permanent first molars[25,26] and initial and moderate caries (ICDAS 1, 2, and 3) in proximal surfaces of permanent teeth[27]. According to the present results, the use in cavitated enamel lesions was similar to non-cavitated and even cavitated lesion in dentin.

The present study also investigated the use of SDF in anterior or posterior teeth. Most of the respondent schools use SDF in anterior and posterior primary teeth; however, in many institutions (42.7%), its use is restricted to posterior teeth. This finding is probably due to the potential for darkening the teeth treated with SDF[8]. A frequent clinical observation following the SDF application, the black staining seems to be more acceptable by parents in posterior teeth than in anterior teeth[10]. It is interesting to note that according to a recently published scoping review, in general, the staining caused by SDF did not interfere in the parental acceptability for the treatment. However, it is one of the professionals' concerns and possible impacts on its use[28]. As expected, the SDF use in permanent dentition is exclusive to posterior teeth in almost all institutions.

Regarding SDF concentrations, products in lower concentrations (10% and 12%) and higher concentrations (30% and 38%) are available in Brazil[1]. Most consulted schools answered using a concentration of 30%. Clinical trials demonstrate that products with the highest concentrations are more effective in arresting caries lesions[29,30], and SDF in a 38% concentration is the most recommended[20]. This is the most used concentration worldwide, but it is used in only a small percentage of Brazilian dental schools. It can be explained by only one product with this concentration (Riva Star, SDI, Victoria, Australia) is more recently available in the Brazilian market. However, clinical studies that evaluated the concentration of 30% guarantee its effectiveness[31-33].

This study also investigated how long the SDF has been used in pediatric dentistry in Brazilian dental schools. Although SDF has been used in Brazil for a long time, almost half of the respondent schools have reported using the SDF for less than five years. The recent interest by the scientific community may have contributed to it. It is also important to note that, although most Brazilian institutions reported the use of SDF, its use is not frequent. It may be related to the restricted indication for children under 3 years old and in posterior teeth. Besides, there may still be fear of its use due to concern about accepting the color change caused by SDF by parents or guardians, a finding of a previous study carried out in American Pediatric Dentistry Training Programs[12]. Also, it is essential to consider that, at the moment of this research, in some institutions, SDF was not yet considered a treatment option for caries lesions. We can speculate that the SARS-CoV2 pandemic has the potential to highlight techniques that do not generate aerosol[5,6]. SDF is an excellent alternative, and dental schools that have not yet used it should now consider it as a treatment option for caries lesions in Pediatric Dentistry.

Considering that the SDF has been recognized as an effective non-invasive treatment for caries lesions, knowledge about its use in undergraduate education is essential, especially in Pediatric Dentistry. Thus, the present study results show that the SDF has been considered a treatment option, especially for arresting cavitated carious lesions in primary teeth in children from 0 to 3 years old, as most Brazilian dental schools attest. However, despite all available scientific evidence about silver diamine fluoride effectiveness, there are still schools that use it rarely or not at all. Interestingly, in a previous study[12] in American residency programs in Pediatric Dentistry, only 26% of respondents reported using SDF. Still, the publication of this 2015 study's update[15] now shows that 100% reported its utilization in 2020. It can also highlight the importance of this type of survey to guide and accompany teaching in Pediatric Dentistry. This study encourages Brazilian dental schools to reinforce SDF use in clinical practice as it is a well-established and successful technique for arresting carious lesions, especially in primary teeth.

5 CONCLUSIONS

Based on this questionnaire-based cross-sectional analysis, silver diamine fluoride has been taught and used in Pediatric Dentistry of most undergraduate Brazilian dental schools, but its use is not frequent. SDF is used primarily for early childhood caries and cavitated lesions in the posterior primary teeth.

RESUMO

Ensino e uso do diamino fluoreto de prata em Odontopediatria: análise transversal baseada em questionário com cursos de graduação em Odontologia brasileiros

Este estudo investigou o ensino e a utilização do diamino fluoreto de prata (DFP) em

Odontopediatria em cursos de graduação em Odontologia brasileiros por meio de uma análise transversal baseada em questionário. Duzentos e trinta e cinco questionários foram enviados por e-mail a professores responsáveis pela disciplina de Odontopediatria de cursos de Odontologia brasileiros. Os detalhes do ensino e uso de DFP na prática clínica foram solicitados. Os dados obtidos foram analisados descritivamente e por meio do teste do qui-quadrado. Um total de 149 questionários completos foram devolvidos (63,4%). A maioria das escolas ensina sobre o DFP em aulas teóricas (73,8%, p <0,001). A maioria usa o DFP na prática clínica (64,4%, p <0,001), mas seu uso é pouco frequente (11,4%, p <0,001). Todas as escolas de Odontologia relataram que o DFP é aplicado em dentes decíduos, e poucas relataram seu uso em dentes permanentes (36,4%, p = 0,01). O DFP tem sido usado principalmente em lesões de cárie cavitadas em dentes decíduos de crianças de 0 a 3 anos (93,7%, p <0,001), com uso restrito aos dentes posteriores (42,7%, p <0,001). Embora o DFP seja tópico de ensino e utilizado na prática clínica em Odontopediatria na maioria dos cursos de graduação brasileiros, seu uso é pouco frequente. Além disso, o DFP não é considerado uma opção para lesões de cárie em algumas escolas avaliadas.

Descritores: Cariostáticos. Ensino Odontológico. Odontopediatria. Estudantes de Odontologia.

REFERENCES

1. Chibinski AC, Wambier LM, Feltrin J, Loguercio AD, Wambier DS, Reis A. Silver diamine fluoride has efficacy in controlling caries progression in primary teeth: a systematic review and meta-analysis. Caries Res. 2017; 51(5):527-41.
2. Nishino M, Yoshida S, Sobue S, Kato J, Nishida M. Effect of topically applied ammoniacal silver fluoride on dental caries in children. J Osaka Univ Dent Sch. 1969; 9:149-55.
3. Chu CH, Lo EC. Promoting caries arrest in children with silver diamine fluoride: a review. Oral Health Prev Dent. 2008; 6(4):315-21.
4. Horst JA, Ellenikiotis H, Milgrom PL. UCSF Protocol for caries arrest using silver diamine fluoride: rationale, indications and consent. J Calif Dent Assoc. 2016; 44(1):16-28.
5. BaniHani A, Gardener C, Raggio DP, Santamaría RM, Albadri S. Could COVID-19 change the way we manage caries in primary teeth? Current implications on Paediatric Dentistry. Int J Paediatr Dent 2020; 30(5):523-5.
6. Casamassimo PS, Townsend JA, Litch, CS. Pediatric Dentistry during and after COVID-19. Pediatr Dent. 2020; 42(2):87-90.
7. Zhao IS, Gao SS, Hiraishi N, Burrow MF, Duangthip D, Mei ML, et al. Mechanisms of silver diamine fluoride on arresting caries: a literature review. Int Dent J. 2018; 68(2):67-76.
8. Llodra JC, Rodriguez A, Ferrer B, Menardia V, Ramos T, Morato M. Efficacy of silver diamine fluoride for caries reduction in primary teeth and first permanent molars of schoolchildren: 36-month clinical trial. J Dent Res. 2005; 84(8):721-4.
9. Patel J, Anthonappa RP, King NM. Evaluation of the staining potential of silver diamine fluoride: in vitro. Int J Paediatr Dent 2018; 28(5): 1-9.
10. Crystal YO, Janal MN, Hamilton DS, Niederman R. Parental perceptions and acceptance of silver diamine fluoride staining. J Am Dent Assoc. 2017; 148(7):510-8.
11. Ngoc CN, Mehta R, Donovan TE, Ferreira Zandona AG. Teaching silver diamine fluoride in U.S. dental schools' predoctoral curricula. J Dent Educ. 2018; 82(12):1305-9.

12. Crystal YO, Janal MN, Yim S, Nelson T. Teaching and utilization of silver diamine fluoride and Hall-style crowns in US pediatric dentistry residency programs. J Am Dent Assoc. 2020; 151(10):755-63.
13. Grindrod M, Barry S, Albadri S, Nazzal H. How is paediatric dentistry taught? A survey to evaluate undergraduate dental teaching in dental schools in the United Kingdom. Eur J Dent Educ. 2020; 24:715-23.
14. von Elm E, Altman DG, Egger M, Pocock S, Gøtzsche PC, Vandenbroucke JP. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. J Clin Epidemiol 2008; 61(4):344-9.
15. Nelson T, Scott JM, Crystal YO, Berg JH, Milgrom P. Silver diamine fluoride in pediatric dentistry training programs: survey of graduate program directors. Pediatr Dent. 2016; 38(3):212-7.
16. Schmoeckel J, Gorseta K, Splieth CH, Juric H. How to intervene in the caries process: early childhood caries - a systematic review. Caries Res. 2020;54(2):102-12.
17. Bergoli AD, Primosch RE, de Araujo FB, Ardenghi TM, Casagrande L. Pulp therapy in primary teeth--profile of teaching in Brazilian dental schools. J Clin Pediatr Dent. 2010; 35(2):191-5.
18. Paranhos MC, Pires CW, Lenzi TL, Casagrande L, Rocha RO. Graduate and undergraduate teaching of primary tooth pulpectomy: a comparison among Brazilian dental schools. Pesqui Bras Odontopediatria Clin Integr. 2019; 19(1):1-10.
19. Mendes LT, de Oliveira KP, Casagrande L, Lenzi TL. Repair of defective resin composite restorations in primary teeth: current trends Brazilian undergraduate in Dental programs. Rev ABENO. 2020; 20(1):68-79.
20. Slayton RL, Urquhart O, Araujo MWB, et al. Evidence-based clinical practice guideline on nonrestorative treatments for carious lesions: a report from the American Dental Association. J Am Dent Assoc. 2018; 149(10):837-49.
21. Corrêa-Faria P, Viana KA, Raggio DP, Hosey MT, Costa LR. Recommended procedures for the management of early childhood caries lesions - a scoping review by the Children Experiencing Dental Anxiety: Collaboration on Research and Education (CEDACORE). BMC Oral Health. 2020; 20(1):75.
22. Tedesco TK, Gimenez T, Floriano I, Montagner AF, Camargo LB, Calvo AFB, et al. Scientific evidence for the management of dentin caries lesions in pediatric dentistry: A systematic review and network meta-analysis. PLoS One. 2018; 13(11):e0206296.
23. Wright JT, White A. Silver diamine fluoride: changing the caries management paradigm and potential societal impact. N C Med J. 2017;78(6):394-7.
24. American Academy ff Pediatric Dentistry, Policy on the Use of Silver Diamine Fluoride for Pediatric Dental Patients. Pediatr Dent. 2017; 39(6):51-3.
25. Braga MM, Mendes FM, De Benedetto MS, Imparato JC. Effect of silver diammine fluoride on incipient caries lesions in erupting permanent first molars: a pilot study. J Dent Child (Chic) 2009; 76(1):28-33.
26. Liu BY, Lo EC, Chu CH, Lin HC. Randomized trial on fluorides and sealants for fissure caries prevention. J Dent Res. 2012; 91(8):753-8.
27. Mattos-Silveira J, Floriano I, Ferreira FR, Viganó ME, Mendes FM, Braga MM.

Children's discomfort may vary among different treatments for initial approximal caries lesions: preliminary findings of a randomized controlled clinical trial. Int J Paediatr Dent. 2015; 25(4):300-4.
28. Magno MB, Silva LPD, Ferreira DM, Barja-Fidalgo F, Fonseca-Gonçalves A. Aesthetic perception, acceptability and satisfaction in the treatment of caries lesions with silver diamine fluoride: a scoping review. Int J Paediatr Dent. 2019; 29(3):257-66.
29. Fung MHT, Duangthip D, Wong MCM, Lo ECM, Chu CH. Arresting dentine caries with different concentration and periodicity of silver diamine fluoride. JDR Clin Trans Res. 2016; 1(2):143-52.
30. Fung MHT, Duangthip D, Wong MCM, Lo ECM, Chu CH. Randomized clinical trial of 12% and 38% silver diamine fluoride treatment. J Dent Res. 2018; 97(2):171-8.
31. Vollú AL, Rodrigues GF, Rougemount Teixeira RV, Cruz LR, Massa GS, Moreira JPL, et al. Efficacy of 30% silver diamine fluoride compared to atraumatic restorative treatment on dentine caries arrestment in primary molars of preschool children: a 12-months parallel randomized controlled clinical trial. J Dent. 2019; 88:103165.
32. Duangthip D, Wong MCM, Chu CH, Lo ECM. Caries arrest by topical fluorides in preschool children: 30-month results. J Dent. 2018; 70:74-9.
33. Dos Santos VE Jr, de Vasconcelos FM, Ribeiro AG, Rosenblatt A. Paradigm shift in the effective treatment of caries in schoolchildren at risk. Int Dent J. 2012; 62(1):47-51.

Correspondence to:
Rachel de Oliveira Rocha
e-mail: rachelrocha@smail.ufsm.br
Curso de Odontologia
Departamento de Estomatologia
Universidade Federal de Santa Maria
Av. Roraima nº 1000, Prédio 26F
Cidade Universitária - Bairro Camobi
97105-900 Santa Maria/RS Brazil