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International Journal of Oral Health Dentistry

Journal homepage: www.ijohd.org

Original Research Article

Evaluation of self-perceived knowledge and attitudes towards the use of silver diamine fluoride in pediatric dentists

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Abstract

Background: Educational institutions and public health entities play a crucial role in promoting awareness of the clinical and social benefits of SDF in pediatric dentists. Increasing the dissemination of evidence-based information can help improve parental acceptance and encourage its use as a minimally invasive, cost-effective option for managing dental caries. By integrating SDF education into dental training programs and community outreach initiatives, professionals can foster better oral health practices from an early age, ultimately contributing to the reduction of untreated caries and improving children's overall well-being.
Aim: To assess the self-perceived knowledge and attitudes of pediatric dentists in Peru regarding the use of silver diamine fluoride (SDF).
Materials and methods: A validated self-reported questionnaire was administered to 278 pediatric dentists in Peru. Covariates regarding pediatric dentists' general characteristics, frequency of SDF use, education about SDF, information sources for SDF, and possible barriers to SDF use were collected.
Results: The majority (77.28%) of the respondents agreed that SDF is a good non-invasive treatment alternative for restorations in children with behavioral problems such as severe dental anxiety, and 70.87% mentioned it as a useful alternative for patients who cannot obtain conventional dental care or be managed by pharmacological behavioral intervention treatments. As for possible barriers to the use of SDF: 12.59% of the respondents point out the inability to restore form and function, as well as the lack of scientific knowledge, and 7.91% consider that parental acceptance also hinders its application.
Conclusion: Pediatric dentists exhibit a positive attitude toward the use of silver diamine fluoride; however, reinforcing their knowledge is essential to encourage its broader application, particularly in the current context.

Keywords: Silver diamine fluoride; Pediatric dentistry; Dental caries; Knowledge; Attitude.

Received: 28-03-2025; **Accepted:** 31-05-2025; **Available Online**: 2025

1. Introduction

Dental caries is a dynamic, multifactorial, non-communicable, biofilm-mediated and diet-modulated disease that produces a net loss of dental hard tissues.[1] According to the World Health Organization (WHO), early childhood caries has been a worldwide problem with a prevalence between 60% and 90%.[2] In Peru, the General Directorate of Epidemiology reports that 76.2% of schoolchildren aged 3 to 5 years have the disease.[3]

Dental caries is one of the chronic diseases influenced by biological, behavioral, psychosocial and environmental factors. This process, together with the net loss of tooth structure, results in the development of carious lesions.[4,5] The consequences of early childhood caries often include pain and infections that, in some cases, require hospitalization, in addition to causing the loss of school days and a decrease in learning ability.[6] Likewise, the increased level of anxiety before dental treatment can lead to refusal of treatment, which, in certain situations, makes it necessary to perform the procedures under intravenous sedation or general anesthesia.[7] Therefore, it is essential to prioritize prevention and improve oral health-related quality of life through minimally invasive approaches.

Minimal intervention dentistry is a philosophy that aims to preserve as much tooth structure as possible and presents

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https://doi.org/10.18231/j.ijohd.v.11.i.2.9

affordable options for controlling caries in disadvantaged communities.[8] Many of these techniques are especially useful for treating patients who are uncooperative, anxious or when sophisticated dental equipment is limited in availability.[8,9]

One of the techniques employed is the application of Silver Diamine Fluoride (SDF), a colorless liquid available in different concentrations. The 38% formulation is the one that has shown the highest efficacy backed by scientific evidence, especially when used twice a year. This concentration contains 24.4% and 28.8% silver (253,870 ppm), 5.0% and 5.9% fluoride (44,800 ppm), 8% ammonia and 62% water. It possesses significant antibacterial activity, ability to inhibit demineralization and prevent collagen degradation, making it a suitable option for the treatment of caries lesions.[10,11] In 1960, Japan was the first country to approve SDF, developed by Drs. Nishino and Yamaga, as a treatment to halt dental caries. By 1969, it was used to arrest lesions in primary teeth. In 2014, the FDA cleared SDF (as Advantage Arrest 38%) for U.S use, thought off-label for caries. In 2020, the American Dental Association (ADA) endorsed for caries management,[10] while the American Academy of Pediatric Dentistry (AAPD) recommended it as part of a comprehensive program for the management of this disease.[12]

Despite its high success rate, the use of SDF in clinical dental practice remains controversial due to certain disadvantages. One of the main concerns is the dark staining that appears on demineralized tissue after application, caused by the precipitation of silver by-products, which may affect parental acceptance.[13-15] A study in the UK reported that parents expressed concerns during interviews about SDF staining the oral mucosa, skin, and the black staining of arrested lesions, as well as fears of their children being bullied or judged by others.[16] Additionally, a systematic review found that parental acceptance was significantly influenced by factors such as tooth location, child cooperation, and the nature of the operative procedure.[17] Furthermore, data from Vietnam suggest that parental acceptance rates could improve if dental providers actively promote SDF as a treatment option by educating parents based on scientific evidence.[18] The lack of knowledge about SDF also poses a barrier to its clinical implementation. A study in Brazil found that the primary reason pediatric dentists did not use SDF was insufficient scientific knowledge (58.3%).[19]

Therefore, the objective of the present study was to evaluate the self-perceived knowledge and attitudes towards the use of silver diamine fluoride in pediatric dentists in Peru. Knowledge is a conscious, intentional and individual act to learn object's qualities and is firstly referred to who knows but also to the object thing what is known.[20] Conversely, an attitude is the mental disposition of a person to develop certain behaviors.[21]

2. Materials and Methods

2.1. Study design

The present study was observational, analytical and cross-sectional. This study was conducted in accordance with the Declaration of Helsinki and was approved by the Ethics-SubCommittee of the Faculty of Health Sciences.

2.2. Population and sample

The final sample size was 278 participants, and the unit of analysis was each pediatric dentist or pediatric dentistry resident who agreed to participate in the study, provided informed consent, and was currently working. The sampling method was nonprobabilistic by convenience.

2.3. Measuring instrument

The knowledge and attitude questions were obtained from research.[22] This same instrument was previously used in Saudi Arabia and Japan.[23,24] The survey comprised of 40 questions categorized into 6 sections. The knowledge and attitude sections have been evaluated using a Likert scale: 1=strongly disagree, 2=disagree, 3= neither agree nor disagree, 4=agree and 5=strongly agree, except for the first dimension of self-perceived knowledge in which it is presented: 1= not at all, 2= very little, 3= a little, 4= quite a lot and 5= a lot. Each question is evaluated independently and then a mean of central tendency and dispersion is obtained for each dimension.

To conduct an internal validity assessment of the questionnaire, the translated survey was sent to a committee of experts composed of five professionals. An AIKEN's V statistic of 0.93 was obtained, indicating excellent content validity. Comments and suggestions for the linguistic adaptation of the questions were also considered. The pilot test of the questionnaire approved by expert judgment was carried out on 22 participants. This revealed high reliability of the instrument. The survey was sent via email and social networking sites (Instagram and Facebook) using the Google Forms® platform**.** Data were collected using Microsoft Excel® 2019 for analysis.

2.4. Data analysis

For the univariate analysis, descriptive measures were used, such as absolute and relative frequency were used for qualitative variables. In addition, for the quantitative variables for self-perceived knowledge and attitudes toward SDF use, the median was used as a measure of central tendency and the interquartile range as a measure of dispersion.

For the bivariate analysis, self-perceived knowledge was compared with the attitudes of pediatric dentists in relation to the frequency, education, information and possible barriers to the use of silver diamine fluoride. The Kruskal-Wallis test was used for this purpose.

A confidence level of 95% was used and the statistical significance value (p) will be less than 0.05 to determine statistical significance and the results will be analyzed using the statistical program Stata® version 17.

3. Results

The aim of the present study was to evaluate self-perceived knowledge and attitudes according to frequency, education, information and possible barriers to the use of silver diamine fluoride in pediatric dentists in Peru. There are statistically significant differences in certain items.

Table 1 details a total of 278 respondents who accessed and answered the survey correctly, 60.79% (169) were male and 23.74% (66) were from the provinces. With regarding work experience as a dentist, 28.42% (79) had 5 to 7 years of experience. Regarding employment status, 43.53% (121) had a hospital as their main center. Also, in relation to information on the FDP, 26.98% (75) of the respondents obtained this information from dentistry journals, while 33.09% (92) obtained it through publications in scientific articles. In addition, 14.75% (41) of the respondents point to inadequate training as one of the possible barriers to SDF use as a limiting factor.

Table 2 shows the evaluation of the self-perceived knowledge about SDF among pediatric dentists. Most of the respondents know enough about the use of SDF to treat dental caries in pediatric patients and the advantages of the material compared to other conventional treatments. Also, the indices of self-perceived knowledge of cavitated lesions (A) and self-perceived knowledge of non-cavitated lesions (B) obtained a median of 3, which could be interpreted as little according to the Likert scale.

Table 3 shows the evaluation of SDF attitudes among pediatric dentists. The majority of respondents agree that SDF is a good treatment alternative in patients with severe dental anxiety and for patients who would have to undergo dental treatment under general anesthesia. Also, the median of the considerations about treatment outside the esthetic zone (E) is 3, as is the median of the considerations about treatment in the esthetic zone (F).

Table 4 corresponds to the comparison of the frequency, education, information and possible barriers according to self-perceived knowledge with the attitudes towards the use of the SDF according to the respondents. Statistically significant differences were observed in relation to the frequency of SDF use with the indices of general self-perceived SDF knowledge (A) (0.04; $p<0.05$) and the indices of knowledge of cavitated lesions (B) ($p<0.05$). Likewise, SDF information presented statistically significant difference with self-perceived knowledge of non-cavitated lesions(C) (0.03) and patient-related indications for the SDF use index (D) (0.03).

Table 1: General characteristics of the respondents (n=278)

Variable	n	(%)
Sex		
Male	169	(60.79)
Female	109	(39.21)
Work experience as a dentist		
Less than 2 years	14	(5.04)
3-4 years	69	(24.82)
5-7 years	79	(28.42)
8-10 years	69	(24.82)
Greater than 10 years	47	(16.91)
Employment status		
Freelance practice	57	(20.50)
Group practice	85	(30.57)
Hospital dentistry	121	(43.53)
Corporate dentistry	15	(5.40)
Frequency of SDF use		
Sometimes	75	(26.98)
Never	38	(13.67)
Many times	165	(59.35)
Education about SDF		
Undergraduate studies	52	(18.71)
Postgraduate studies	149	(53.60)
Internship	48	(17.27)
Master's degree	26	(9.35)
Doctorate	3	(1.08)

Table 1 Continued…		
Information sources for SDF		
Courses	35	(12.59)
Dentistry journals	75	(26.98)
Publications	92	(33.09)
Dentistry organizations	76	(27.34)
Possible barriers to SDF use		
Parent's acceptance	19	(6.83)
Patient's	22	(7.91)
Scientific knowledge	35	(12.59)
Inadequate training	41	(14.75)
Reimbrusement	39	(14.03)
Product supply	35	(12.59)
Cost	26	(9.35)
Does not restore from or function	35	(12.59)
Dental stains	17	(6.12)
More than one	9	(3.24)
n: Absolute frequency		
%: Relative		

Table 2: Evaluation of self-perceived knowledge of SDF stacked pediatric dentists (n=278)

		Self-perceived knowledge	
	Item	**Median**	
		(IQR)	
	How much do you know about... a		
	SDF use in dentistry?	3(4-3)	
	SDF use in the treatment of dental hypersensitivity?	3(3-2)	
	SDF use in the treatment of caries in pediatric patients?	3(3-3)	
	The advantages of SDF over conventional treatments?	3(3-3)	
	The potential problems associated with SDF use?	3(3-2)	
A	Index of self-perceived general knowledge of SDF use	Median= 3, IQR= (3-2)	
	To what extent do you agree or disagree with the following statements? b	**Median**	
		(IQR)	
	SDF can be used to arrest cavitated lesions in enamel	3(4-3)	
	SDF can be used to arrest cavitated lesions in	3(3-2)	
	SDF can be used to arrest cavitated root caries	3(3-2)	
	Infected soft dentin should be removed before applying SDF	3(3-2)	
	SDF is a good treatment alternative to preventive cavities when all lesions cannot be in one appointment	3(3-2)	
B	Index of self-perceived knowledge of cavited lesions	Median= 3, IQR= (3-3)	
	SDF can be used applied to arrest noncavitated lesions in enamel	3(3-3)	
	SDF can be used to preventive noncavitated root	3(3-2)	
C	Index of self-perceived knowledge of noncavitated lesions	Median=3, IQR= (3-2)	
a. Response options were 1= none, 2= very little, 3= little, 4= enough, and 5= a lot. B. Reponse options were 1= strongly disagree, 2= disagree, 3= i neither agree nor disagree, 4= agree, and 5= strongly agree.			

Table 3: Evaluation of attitudes toward SDF use amino pediatric dentists (n=278)

		Attitude
		Median
	Item	**(IQR)**
	SDF is a good alternative treatment for...	
	restoration in children with behavioral problems	3(4-3)
	patients who are medically	3(3-2)
	patients with severe dental	3(3-3)
	patients who need to undergo dental treatment under general anesthesia	3(3-2)
	patients who cannot receive conventional dental treatment and could not be subject to pharmacological	3(3-2)
	behavioral management techniques	
D	Patient-related indications for SDF	Median= 3, IQR=(3-3)
	SDF is a good treatment alternative for lesions that	
	are not located in the esthetic zone of primary teeth	3(3-2)
	are not located in the esthetic zone of permanent teeth	3(3-2)
E	Treatment considerations outside the esthetic zone	Median=3, IQR= (3-2)
	SDF is a good treatment alternative for lesions that	
	are located in the esthetic zone of primary teeth	3(3-2)
	are located in the esthetic zone of permanent teeth	2(3-2)
F	Treatment considerations in the esthetic zone	Median=3, IQR= (3-2)
Reponse options were 1= strongly disagree, 2= disagree, 3= i neither agree nor disagree, 4= agree, and 5= strongly agree.		

Table 4: Comparison of frequency, education, information and possible barriers according to self-perceived knowledge with attitudes towards FDP use according to respondents (n= 278)

			Self-perceived knowledge of SDF						
Item		**A**			**B**			**C**	
	Mean (SD)	Median (IQR)	**p-value**	Mean (SD)	Median (IQR)	**p-value**	Mean (SD)	Median (IQR)	**p-value**
Frequency of SDF use									
Sometimes	2.89(0.48)	3(3-3)		2.70(0.74)	3(3-2)		2.76(0.75)	3(3-2.5)	
Never	2.78(0.52)	3(3-2)	0.04	2.73(0.79)	3(3-2)	0.00	2.80(0.44)	2.5(3-2.5)	0.42
Many times	2.98(0.66)	3(3-3)		2.89(0.63)	3(3-3)		2.87(0.59)	3(3.5-2.5)	
Education of SDF									
Undergraduate studies	2.82(0.64)	3(3-3)		2.80(0.62)	3(3-3)		2.88(0.68)	3(3.5-2.5)	
Postgraduate studies	2.94(0.56)	3(3-3)		2.81(0.66)	3(3-2)		2.83(0.60)	2.5(3.5-2.5)	
Internaship	3(0.65)	3(3-3)	0.19	2.95(0.71)	3(3-3)	0.30	2.92(0.59)	3(3.5-2.5)	0.37
Master's degree	2.96(0.66)	3(3-3)		2.61(0.89)	3(3-2)		2.61(0.65)	2.5(3-2.5)	
Doctorate	3(0)	(3-3)		2.66(0.57)	3(3-2)		2.5(0.5)	2.5(3-2)	
Information sources for SDF									
Courses	2.91(0.44)	3(3-3)		2.91(0.61)	3(3-3)		2.55(0.87)	2.5(3-2)	
Dentistry journals	3.04(0.62)	3(3-3)		2.92(0.69)	3(3-3)		2.94(0.60)	3(3.5-2.5)	
Publication	2.83(0.59)	3(3-2.5)	0.70	2.71(0.68)	3(3-2)	0.23	2.86(0.55)	2.5(3.5-2.5)	0.03
Dentistry organizations	2.96(0.64)	3(3-3)		2.80(0.73)	3(3-2)		2.81(0.56)	2.75(3.25-2.5)	

Table 4 Continued…									
Possible barriers to SDF use									
Parent's acceptance	2.94(0.62)	3(3-3)		3(0.81)	3(4-3)		2.55(0.95)	2.5(3-2)	
Patient's acceptance	3(0.53)	3(3-3)		2.90(0.75)	3(3-2)		2.88(0.95)	2.75(3.5-2.5)	
Scientific knowledge	3.05(0.53)	3(3-3)		2.77(0.77)	3(3-2)		2.88(0.61)	3(3.5-2.5)	
Inadequate	2.87(0.71)	3(3-3)	0.76	2.90(0.66)	3(3-3)	0.11	2.87(0.54)	3(3-2.5)	0.20
Reimbursement	2.89(0.55)	3(3-3)		2.82(0.50)	3(3-3)		2.84(0.56)	2.5(3.5-2.5)	
Product supply	2.77(0.64)	3(3-2)		2.62(0.80)	3(3-2)		2.84(0.52)	3(3-2.5)	
Cost	2.88(0.51)	3(3-3)		2.76(0.58)	3(3-2)		2.84(0.67)	3(3.5-2.5)	
Does not restore form or function	2.97(0.61)	3(3-3)		2.74(0.61)	3(3-2)		2.85(0.55)	3(3.5-2.5)	
Dental stains	3.17(0.63)	3(4-3)		3.05(0.55)	3(3-3)		2.97(0.54)	3(3.5-2.5)	
More than one	2.88(0.60)	3(3-3)		2.77(1.09)	3(3-3)		2.44(1.01)	2.5(3-2.5)	
Note: Item elements used to create indexes A,B and C correspond to **Table 2**. Item elements used to create indexes D, E and F correspond to **Table 3**.									
Kruskal Wallis test									
p<0,05									

Table 5: Comparison of frequency on FDP use, education, information and possible barriers according to self-perceived knowledge and attitudes about FDP according to respondents (n= 278). (Continued)

			Attitude toward SDF						
Item		D			E			F	
	Mean (SD)	Median (IQR)	**p-value**	Mean (SD)	Median (IQR)	**p-value**	Mean (SD)	Median (IQR)	**p-value**
Frequency of SDF use									
Sometimes	2.94(0.53)	3(3-3)		2.8(0.66)	3(3.5-2.5)		2.39(1.02)	2.5(3-2)	
Never	2.94(0.43)	3(3-3)	0.20	2.84(0.57)	3(3.5-2.5)	0.29	2.5(0.91)	2.5(3-2.5)	0.54
Many times	2.91(0.40)	3(3-3)		2.86(0.70)	3(3.5-2.5)		2.44(0.87)	2.5(3-2)	
Education of SDF									
Undergraduate studies	2.98(0.41)	3(3-3)		2.87(0.72)	3(3.5-2.5)		2.45(0.89)	2.5(3.25-1.75)	
Postgraduate studies	2.94(0.43)	3(3-3)		2.83(0.68)	3(3.5-2.5)		2.48(0.90)	2.5(3-2.5)	
Internaship	2.89(0.50)	3(3-2.75)	0.38	2.95(0.62)	3(3.5-2.5)	0.61	2.68(0.80)	2.5(3.5-2.5)	0.44
Master's degree	2.76(0.42)	3(3-3)		2.61(0.57)	2.5(3-2.5)		1.71(0.97)	1.75(2.5-1)	
Doctorate	3(0)	3(3-3)		2.83(0.28)	3(3-2.5)		2.16(0.28)	2(2.5-2)	
Information sources for SDF									
Courses	3.05(0.33)	3(3-3)		2.9(0.63)	3(3.5-2.5)		2.24(1.08)	2.5(3-1.5)	
Dentistry journals	2.99(0.54)	3(3-3)		2.94(0.67)	3(3.5-2.5)		2.61(0.82)	2.5(3-2.5)	
Publications	2.89(0.43)	3(3-3)	0.03	2.82(0.60)	3(3.25-2.5)	0.47	2.41(0.90)	2.5(3-2)	0.82
Dentistry organizations	2.85(0.37)	3(3-3)		2.75(0.75)	2.5(3.5-2.5)		2.39(0.93)	2.5(3-2)	

Table 5 Continued…									
Possible barriers to SDF use									
Parent's acceptance	2.89(0.59)	3(3-2.5)		2.86(0.81)	2.5(3.5-2)		2.15(1.13)	2.5(3-1.5)	
Patient's acceptance	3.06(0.41)	3(3-3)		2.84(0.74)	2.5(3.5-2.5)		2.75(0.50)	2.5(3.5-2.5)	
Scientific knowledge	2.97(0.43)	3(3-3)		2.81(0.74)	3(3.5-2.5)		2.51(0.95)	2.5(3-2.5)	
Inadequate training	2.92(0.42)	3(3-3)	0.85	2.92(0.53)	3(3.5-2.5)	0.45	2.63(0.59)	2.5(3-2.5)	0.22
Reimbursement	2.87(0.31)	3(3-3)		2.74(0.66)	2.5(3.5-2.5)		2.43(0.85)	2.5(3-2)	
Product supply	2.87(0.45)	3(3-3)		2.88(0.50)	3(3-2.5)		2.41(0.84)	2.5(3-2)	
Cost	2.96(0.50)	3(3-3)		2.69(0.83)	3(3.5-2.5)		2.30(1.24)	2.5(3.5-1.5)	
Does not restore form or function	2.91(0.49)	3(3-3)		2.9(0.73)	3(3.5-2.5)		2.47(0.86)	2.5(3-2)	
Dental stains	2.91(0.40)	3(3-3)		2.91(0.61)	3(3.5-2.5)		2.20(1.19)	2.5(3.5-1.5)	
More than one	3(0.5)	3(3-3)		2.94(0.52)	3(3-2.5)		1.94(1.23)	2.5(3-1)	
Note: Item elements used to create indexes A,B, and C correspond to **Table 2**. Item elements used to create indexes D, E and F correspond to **Table 3**.									
Kruskal Wallis test									
p<0,05									

4. Discussion

The aim of the present study was to compare self-perceived knowledge with attitudes according to frequency, education, information and possible barriers in pediatric dentists in Peru regarding the use of the SDF, finding statistically significant differences in certain items.

Within the study, it was found that 12.59% of respondents had information on SDF through courses, these results are similar to those found in pediatric dentists in the Netherlands by Schroë with 22%.[25] This similarity may stem from various barriers to the incorporation of SDF in postgraduate training programs, including the limited availability of commercial products, minimal advertising, lack of familiarity with the material, and particularly, parental resistance due to esthetic concerns.[24,26] To address this, informed consent is now required before SDF application, ensuring that parents understand its benefits and justifying its inclusion in postgraduate education. Notably, the Horst protocol provides comprehensive guidance with color photographs, helping parents fully grasp both the advantages and potential drawbacks of treatment.[27]

Regarding possible barriers to the use of SDF, the present study found that 14.75% of the respondents reported inadequate training as an obstacle. Similarly, in a study conducted in the USA, it was reported that, although almost all professionals had received information on the SDF, 45.2% had never used it on real patients.[28] This highlights the importance of education in the use of the SDF being both theoretical and practical, which will allow interventions to be carried out safely, efficiently and generate greater confidence among parents.[29]

In terms of self-perceived knowledge in cavitated lesions about the use of SDF (B), half of the respondents expressed agreement with its use in cavitated dentin lesions and in the arrest of cavitated root caries. These results are similar to those reported by Antonioni et al[22] who found that 40% of the participants supported the use of SDF in cavitated dentin lesions and 34% in the arrest of cavitated root caries. There is clinical evidence that SDF facilitates the formation of tertiary dentin and the absorption is higher within the lesion; also, the application of SDF on root surfaces is effective in eliminating bacterial activity and survival.[30]

On the other hand, regarding the considerations on treatment in the esthetic zone (H), 52.16% of the participants expressed agreement that SDF is a good treatment alternative for lesions located in the esthetic zone of the primary teeth. This result contrasts with that obtained by Antonioni,[22] who reported 24% for the same item. It should be noted that parental acceptance of the SDF was higher in primary teeth compared to permanent teeth, as well as in posterior teeth in contrast to anterior teeth in both dentitions. This could be explained by parental knowledge of the natural exfoliation of primary teeth and the lower visibility of stains in posterior teeth.[31]

Regarding the comparison of frequency about the use of the SDF, education, information and possible barriers according to self-perceived knowledge and attitudes about

the SDF according to the respondents, in our results statistically significant differences are observed between frequency about the use of the SDF with the index of general self-perceived knowledge about the SDF(A) (p=0.04). This finding is relevant for the understanding of other studies. In the research by Antonioni et al.[22] it was reported that 91% of the specialists had never used the SDF in their practice, despite the fact that 37% knew its purpose. Ezzeldin et al.[32] showed that 75% of the specialists had not used the SDF, although 70% knew its purpose. In addition, only 38% were familiar with its specific use to treat caries.[32] These data reflect a changing trend in recent years in the management of carious lesions, particularly in children. Notably, the FDA approved the use of SDF in 2014 to treat dental hypersensitivity and subsequently in October 2016 as a therapy for caries management.[33] In addition, its use has gained greater prominence worldwide during the COVID-19 pandemic, thanks to its non-aerosol-generating treatment nature and AAPD endorsement.[34]

Finally, statistically significant differences were found between information about SDF and the index of self-perceived knowledge about non-cavitated lesions (C) (p=0.03; p >0.05). The results indicate that 51.8% of the participants agree that SDF can be used to stop non-cavitated root caries. Clinical studies have shown that, in the early stages of root caries, noninvasive treatments such as SDF are effective in preventing its progression.[35] On the other hand, although some patients find the darkening caused by SDF unacceptable, research suggests that the use of an optimal concentration of potassium iodide can reduce this black staining over a period of 7 to 14 days. However, other studies have not found a significant reduction in long-term staining.[36] It is essential to highlight the importance of educational institutions including in their undergraduate and specialty programs not only the management of enamel and dentin caries, but also the approach to root caries, through the teaching of reliable information and the incorporation of these practices in health system policies.

Further clinical trials and long-term follow-up are recommended to obtain more detailed information on optimal SDF concentration, follow-up times, and treatment protocols. Also, further studies on the use of SDF in combination with other minimally invasive procedures, such as the silver-modified atraumatic restorative technique (SMART), which offers the dual benefit of arresting carious lesions and restoring the tooth, especially after the COVID-19 pandemic, would be beneficial.[36]

Globally, in countries such as Argentina, Brazil, Finland, India, Japan, Kenya, South Africa, Switzerland, Thailand, the United Kingdom and the United States, undergraduate dental training includes SDF in their curricula. However, it is important to note that concentrations and guidelines related to SDF vary among countries.[37] In addition, the simplicity of SDF application allows other qualified health professionals, such as hygienists, to apply it in a straightforward manner. Since the procedure is painless, it is especially useful for reducing anxiety in vulnerable patients, such as young children, older adults and people with special needs.[36] In addition, it is essential to develop strategies that minimize the esthetic disadvantages associated with the use of SDF, as these are a barrier to parental acceptance. A promising solution is the application of selenium nanoparticles (SeNPs), which can modify the chemical composition of the SDF to reduce these limitations.[38] The limitations in the present study are related to the method of data collection, since using a self-report questionnaire there is the possibility of a social desirability bias on the part of the respondents, in which they complete the survey in a socially accepted manner and not with their own criteria. However, this was countered by the adequate intraclass correlation coefficient (ICC) obtained from the questionnaire.[39]

5. Conclusion

This study revelead that pediatric dentists hold a positive attitude toward silver diamine fluoride use; however, strengthening their knowledge is key to promoting it wider adoption, especially in today's context.

6. Source of Funding

This research received no external funding.

7. Conflicts of Interest

The authors declare no conflict of interests.

8. Acknowledgment

Not applicable.

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Cite this article: Quiliano RAA, Ríos XAL, Carrillo CAB. Evaluation of self-perceived knowledge and attitudes towards the use of silver diamine fluoride in pediatric dentists. *Int J Oral Health Dent*. 2025;11(2):118–126.