

# Knowledge and Attitude of Dentists toward Silver Diamine Fluoride in Saudi Arabia

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## ABSTRACT

**Introduction:** Dental caries is managed by two approaches: prevention which focuses on inhibiting the caries progression, and the traditional approach which is treating caries by drilling and filling. Logically, the first approach is more effective. One of the recently marketed preventive methods for preventing and inhibiting the progression of dental caries is silver diamine fluoride (SDF), which is proven to be minimally invasive and cost-effective, SDF has proven to have a significant success rate in caries prevention, especially in the early childhood caries.

**Objective:** The study aims to evaluate general practitioners' SDF clinical experience, knowledge, professional behavior, and attitudes.

**Materials and methods:** The study was a cross-sectional study and we utilized a random sampling of Saudi general dental practitioners from different places in the Hail region, KSA. The study was conducted using papered interview and an online questionnaire followed by educating the dentists about SDF.

**Results:** Dentists were asked about SDF, 62.7% answered that they heard about SDF topical application, but the dentists who answered all questions correctly are only 14.89% with no statistically significant difference among gender, age, or sector.

**Conclusion:** This study had several limitations. It only included the dental GPA in the Hail region, Saudi Arabia. As is the case with all surveys, only a limited number of questions could be asked. Thus, the information to be obtained is also limited. Future research should therefore include other questions to clarify other aspects which we could not explore in this research.

**Keywords:** Arrested caries, Caries, Pediatric dentist, Prevention, Primary dentition, Silver diamine fluoride.

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## INTRODUCTION

Dental caries is considered one of the most prevalent chronic dental diseases.<sup>1</sup> It affects all social classes in society. However, caries risk is considered a variable within communities, and there are low-risk and high-risk communities.<sup>2</sup> Many factors that control the level of caries risk, including diet, socioeconomic status, demographic factors, and level of educations.<sup>3</sup> Dental caries is managed by two approaches: prevention which focuses on inhibiting caries progression, and the traditional approach which is treating caries by drilling and filling. Logically, the first approach is more effective. One of the recently marketed preventive methods for preventing and inhibiting the progression of dental caries is silver diamine fluoride (SDF), which is proven to be, minimally invasive and cost-effective.<sup>4-6</sup> Silver diamine fluoride has proven to have a significant success rate in caries prevention, especially in early childhood caries.<sup>7-9</sup> It gives an alternative choice for the management of dental caries, especially if caries is at its early stages, without pulpal signs and symptoms. Also, it could save time and effort for the dental team and families. It is also considered to be a harmless approach for uncooperative patients. Thus, it could prevent any psychological and emotional impacts, that might happen as an outcome of more aggressive treatment options. On the contrary, SDF has its own disadvantages. One of these is staining. It stains the enamel and dentin with a dark stain, which might cause some esthetic concerns.<sup>10</sup> The application of SDF once yearly has been proven to be slightly less effective than twice yearly.<sup>11</sup> When applied twice yearly, the 38% SDF solution has a success rate of 84.8% for stopping the progression of dental caries.<sup>10</sup> Furthermore, the 38% SDF was shown to be more effective than the 12% SDF.<sup>6,12</sup> The study aimed to evaluate SDF clinical experience, knowledge, professional

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behavior, and attitudes of dental general practitioners (GPs), in the Hail region, Saudi Arabia.

## MATERIALS AND METHODS

The study was a cross-sectional study and we utilized a random sampling of Saudi general dental practitioners from different places in the Hail region, KSA. The team carried three dentists, the data were conducted using a papered interview, and an online questionnaire

followed by educating the dentists about SDF (advantages, disadvantages, indications, and contraindications). The period for conducting and assessing was from 28-4-2019 to 25-5-2019. Each general dentist was asked to sign a written ethical consent during the questionnaire's interview. The informed ethical consent form was designed and approved by the Ethical Committee of the University of Hail, KSA. The study aimed to evaluate GPs' SDF clinical experience, knowledge, professional behavior, and attitudes, in the Hail region, Saudi Arabia. The survey was distributed among 150 Saudi general dental practitioners, consisted the demographic data such as age, gender, clinical experience, sector, and BDS university followed by informed consent to authorize us to publish the data. The questions included were 11, with a multiple-choice style. The first question was that if they have heard about SDF or not, if they did, they should continue answering the remaining questions. The 2nd, 3rd, and 9th questions were about the advantages and disadvantages of SDF, 4th and 5th questions were related to the main indications and contraindications of SDF, the 6th question was regarding the type of patients that SDF treatment is not suitable for them, the 7th and 8th questions were to examine the GPs knowledge for the most effective way to use SDF regarding the frequency and intervals, the 10th question was about the informed consent and the last question was about GPs anticipation for any future implementation of SDF replacing the traditional methods.

**RESULTS**

Our study was a cross-sectional study conducted using a pretested questionnaire in 180 dental practitioners. The response rate was 83.33%. In the questionnaire, we mainly assessed the knowledge about the SDF topical application. When we measured that how

many dentists answered the correct options for all the knowledge-based questions, we observed that 14 (14.89%) dentists answered all the questions as correct. When the relationship of various sociodemographic details of dentists was measured with the knowledge of SDF, it was observed that age and gender did not have any statistically significant association with the knowledge of SDF among dentists ( $p > 0.05$ ) (Table 1). There was no association observed with the sector that dentists working in, and the knowledge of SDF (Table 1).

When we assessed the relationship between various sociodemographic variables of dentists such as age, gender, and sector of practice with dentists who have answered all the knowledge questions as correct, it was found that there was no statistically significant association observed with any of the above variables ( $p > 0.05$ ) (Fig. 1).

The first question asked was "Have you ever heard about silver diamine fluoride?" We observed that 62.7% ( $n = 94$ ) reported that they have heard of SDF (Fig. 2). Those who answered "yes" to the above question were asked to answer the remaining questions related to the SDF topical agent.

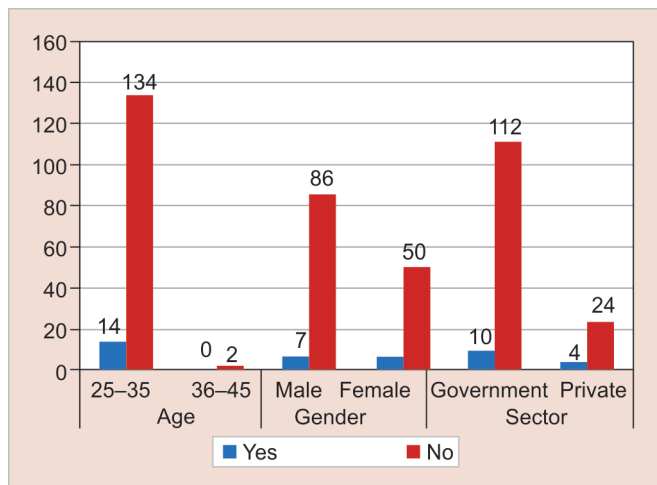
The next question was "Which of the following do you think is an advantage of using silver diamine fluoride?". For this, 55.3% ( $n = 52$ ) answered the correct answer (caries arresting) (Table 2).

When a question was asked about the main disadvantage of using SDF, 47.9% ( $n = 45$ ) answered the correct option (staining to the tooth). 27.7% answered it as "Irritation to pulp" whereas 14.9% of the dentist mentioned it as "low pH" (Table 3).

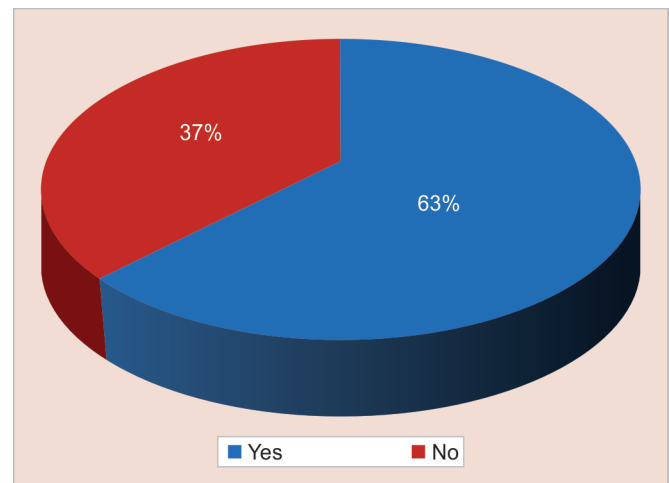
The next question was about the main indication of using SDF (Fig. 3). For this question, 51.1% ( $n = 48$ ) dentists answered the correct option "Cavitation of primary teeth". 27.7% mentioned it as "Cavitation to permanent teeth", 12.8% mentioned it as "Incipient

**Table 1:** Relationship of sociodemographic details with knowledge of SDF

Have you ever heard of SDF?	Age		Gender		Sector	
	25–35	36–45	Male	Female	Government	Private
Yes	93	1	59	35	73	21
No	55	1	34	22	49	7
Total	148	2	93	57	122	28
Chi-square value	0.139		0.627		2.238	
p value	0.709		0.802		0.135	



**Fig. 1:** Relationship of a sociodemographic variable with dentists who answered all of the questions correctly



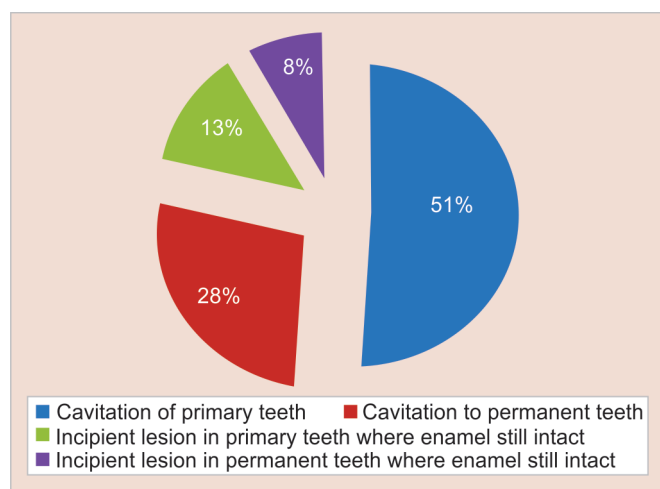
**Fig. 2:** Have you ever heard about silver diamine fluoride?

**Table 2:** Which of the following do you think is an advantage of using silver diamine fluoride? (Q3)

Options	Frequency	Percent
Fluoride releasing	26	27.7
Caries arresting	52	55.3
Esthetically pleasing	12	12.8
Mummification	4	4.3
Total	94	100.0

**Table 3:** Which of the following do you think is a disadvantage of SDF? (Q4)

Options	Frequency	Percent
Staining to the tooth	45	47.9
Irritation to pulp	26	27.7
Low pH	14	14.9
Toxicity	9	9.6
Total	94	100.0



**Fig. 3:** Indications of SDF as answered by the participants

**Table 4:** Which of the following do you think is the main contraindication of SDF?

Options	Frequency	Percent
Symptomatic pulp inflammation	47	50.0
Dentin caries	11	11.7
Enamel caries	7	7.4
Root caries	29	30.9
Total	94	100.0

lesion in primary teeth where enamel still intact”, and the remaining 8.5% answered it as “Incipient lesion in permanent teeth where enamel still intact”.

When a question regarding the contraindication of SDF was asked, 50% ( $n = 47$ ) mentioned the correct answer (“Symptomatic pulp inflammation”). Other dentists answered it as “Dentin caries” (11.7%), “enamel caries” (7.4%), and root caries (30.9%) (Table 4).

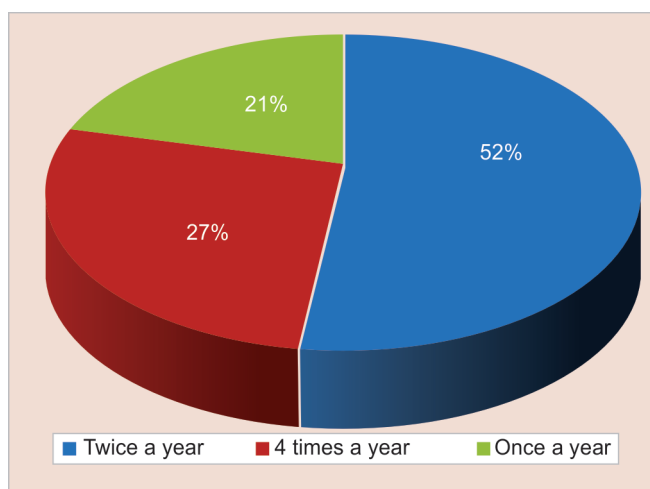
Most of the dentists (66%) answered the correct option “Allergy to SDF component” to the question “Which of the following groups do you think is not a suitable candidate for SDF?” (Table 5).

**Table 5:** Which of the following groups do you think is not a suitable candidate for SDF?

Options	Frequency	Percent
Medically compromised patient	18	19.1
Allergy to SDF component	62	66.0
Autistic patient	10	10.6
<4-year-old patient	4	4.3
Total	94	100.0

**Table 6:** How many applications do you think that SDF needs to be effective?

Options	Frequency	Percent
One	35	37.2
Two	42	44.7
Three	17	18.1
Total	94	100.0



**Fig. 4:** Intervals of application of SDF as answered by participants

44.7% ( $n = 42$ ) said that “two applications” of SDF should be done to give its effect maximum. Whereas 37.2% said it as “one application” would be effective (Table 6).

For the question regarding the interval of application of SDF in a year, 52.1% ( $n = 49$ ) mentioned this as “twice a year”, which is the recommended interval of application. Some (26.6%) mentioned this as “4 times a year” (Fig. 4).

When questions regarding staining to teeth by the use of SDF was asked, 31.9% ( $n = 30$ ) dentists answered it as “Staining to teeth is permanent, while to the skin is temporary” which is an incorrect statement. Only 14.9% ( $n = 14$ ) answered the correct statement “Staining to teeth is temporary, while to the skin is permanent”. 29.8% answered it as “Staining to teeth and skin is permanent” (Fig. 5).

Most of the participants (74.5%) agreed that they should take consent from parents before applying SDF, whereas 25.5% said that it is not necessary (Table 7).

Seventy-two percent of dentists believe that SDF will be their favorite fluoride application option in the future rather than the traditional ones (Fig. 6).

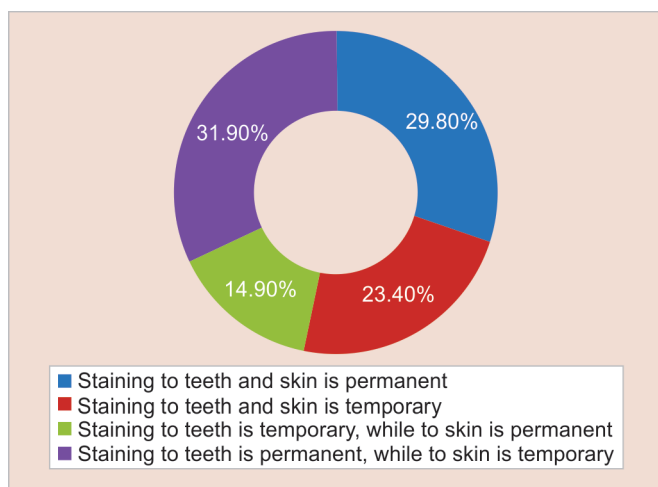


Fig. 5: Disadvantages of SDF as reported by the participants

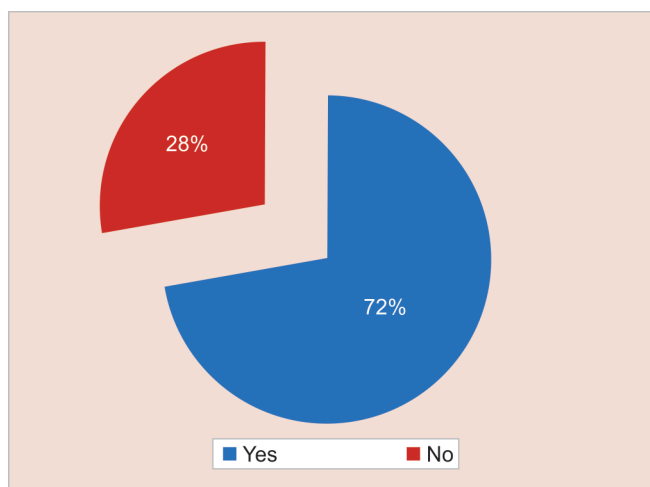


Fig. 6: Do you think SDF will be your favorite in the future rather than the traditional method?

Table 7: Do you think that it is important to take a consent form from the parents for the application of SDF?

		Frequency	Percent
Options	Yes	70	74.5
	No	24	25.5
Total		94	100.0

## DISCUSSION

The surveys were delivered using a papered interview and an online questionnaire, thus the response rate was high (83.33%), followed by educating the dentists about SDF (advantages, disadvantages, indications, and contraindications). Regarding SDF education, 62.7% answered that they heard about SDF topical application, but the dentists who answered all questions correctly are only 14.89% with no statically significant difference among gender, age, or sector. This finding is not surprising because SDF had not been cleared by the FDA until 2014, and in this country, Saudi Arabia, where we are doing our survey, SDF is not cleared yet till this year (2019) by Saudi Food and Drug Authority (SFDA).

We have noticed that when the participants were asked about the main advantage, disadvantages, indications, and contraindications of SDF, that there was a similarity in the correct answers' low percentages. This only indicates that there is a lack of knowledge even among the dentists who said that they have heard about SDF. The clinical application of SDF is advised to be applied two times in 1 year for a better outcome, although that would increase the likelihood of discoloration. The discoloration is the main concern and disadvantage of this material, while teeth discoloration is permanent, discolored skin is temporary but that does not mean that dentists should not be careful and take the required precaution while applying SDF. This information was the least to be known among the dentists, only 31.9%. Consent from the parents is a must, for medicolegal purposes, and out of the 94 dentists, 70 agreed on this. When we discussed the correct answers with the participants, 72% of them showed us that they are very interested in this material, and they are planning to use it in the future. This study had several limitations. It only included the dental GPs in the Hail region, Saudi Arabia. As is the case with all

surveys, only a limited number of questions could be asked. Thus, the information to be obtained is also limited. Future research should therefore include other questions to clarify other aspects which we could not explore in this research.

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