



ORIGINAL ARTICLE

Caries arrest using silver diamine fluoride: Knowledge, attitude, and perception of adult patients in Saudi Arabia



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Abstract Objectives: The objective was to evaluate the current knowledge, attitude, and perception of adult patients toward SDF and identify related factors.

Materials and methods: In this cross-sectional study, data were obtained from adult participants of the Kingdom of Saudi Arabia. A simple random sampling method was used. An electronic questionnaire was designed to collect data regarding participants' demographics and their knowledge, attitude, and perception toward the use of SDF.

Results: The majority (86.6%) of the participants were females. Approximately 58% were ≤ 25 years of age. Overall, 77.1% of the participants had college/higher level education, and 34.2% had a monthly income of > 16000 Saudi Riyals (SAR). Approximately 75.8% of them did not suffer from medical conditions, 60.8% had tooth decay, 82.5% brushed their teeth daily, 77.7% flossed regularly, and 63% used fluoridated toothpaste. Dental pain or inflammation was reported by 87.7% of the participants (P -value < 0.001). A higher proportion of adult patients (47.8%) was strongly satisfied with the speed of treatment, 58.9% were strongly satisfied with advantages, and 24.5% were dissatisfied with disadvantages (P -value < 0.001). Disagreement (24.0%) toward SDF material use for anterior teeth was statistically high (P -value < 0.001). Females (64.5%) demonstrated strong satisfaction with the benefits of SDF material (P -

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value = 0.004). Participants of male sex (26.0%), education up to high school (33.0%), and income of > 16000 SAR (31.0%) showed statistically strong disagreement (P -value < 0.05) with use of SDF for anterior teeth.

Conclusion: The present study demonstrates that SDF is acceptable among Saudi adults for the purpose of arresting dental caries. However, pigmentation of anterior teeth is a major concern, especially in male participants with high socioeconomic status.

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1. Introduction

Dental caries is one of the most common chronic diseases worldwide. It has a high impact on overall health, social wellness, and the health care system. The prevalence of dental caries was the highest among all conditions of the Global Burden of Disease 2015 (Kassebaum et al. 2015). The current review shows a high prevalence of caries among various age groups in Saudi Arabia (Al-Ansari et al. 2019; Alhabdan et al. 2018).

Dental caries can be prevented or treated by several methods, such as practicing regular oral hygiene, application of topical fluoride, drinking fluoridated water, and routine dental care (Trieu, Mohamed, and Lynch 2019). However, the widespread method of managing cavitated dental caries includes the removal of disease by drilling the subjected tooth and filling it with a restorative material. This invasive management, which includes local anesthesia, patient cooperation, and time, may be bothersome for some patients, such as children, elderly patients, and those with special needs. Therefore, silver diamine fluoride (SDF) has been developed as a substitutive non-surgical intervention for dental caries (Contreras et al. 2017; Fung et al. 2018; Horst and Heima 2019).

SDF is a clear liquid material that is applied directly to carious teeth. It was first discovered in 1969 by Mizuho Nishino at Osaka University in Japan. She thought of combining the antimicrobial properties of silver and adding the benefits of fluoride. Soon after, SDF was approved as a cariostatic agent from the Central Pharmaceutical Council of the Ministry of Health and Welfare of Japan (Yamaga et al. 1972). It was also approved for use in the United States in 2014 by the Food and Drug Administration (FDA), and it is less invasive than conventional methods of managing dental caries (Mei, Lo, and Chu 2018).

Clinical studies have shown that SDF is appropriate for use with in patients with high caries risk both dentitions, those who do not have dental care access, and those with medical complications (Horst et al. 2016; Contreras et al. 2017; Crystal and Niederman 2019). In adults, SDF has shown effectiveness in root caries prevention and arrest (Hendre et al. 2017), dentin sensitivity (Castillo et al. 2011), and remineralization (Mei, Lo, and Chu 2016). However, the major drawback of SDF is dark staining after treatment, which raises concerns about appearance and self-image satisfaction (Crystal and Niederman 2019). On the other hand, there is growing support that the immediate use of potassium iodide (KI) after SDF application reduces the likelihood of staining of carious enamel and dentine (Patel, Anthonappa, and King 2018). Moreover, the application of SDF and KI solution is effective in arresting active root caries, but KI does not prevent the

black staining of SDF in root caries (Li et al. 2016). In this regard, a randomized controlled trial concluded that SDF solution or SDF/KI solution helps arrest dental caries in elderly individuals in water fluoridated areas; however, long-term use of KI immediately after applying SDF might not be effective in decreasing blackening of carious lesions. On the basis of the currently available evidence, annual application of 38% SDF is recommended (Sharma and Puranik 2015).

There is a lack of studies in Saudi Arabia about the knowledge, attitude, and perception of adults toward SDF as a prevention or restorative solution. Formulating baseline data on relatively new dental material would offer an opportunity to improve the prevalence of this disease in the region. A recent study showed a positive attitude of Saudi dentists toward SDF by accepting it as a good alternative treatment for individuals with behavioral problems or medical care (Alajlan et al. 2020a). Unfortunately, there are no data about the acceptance of this method by patients. Therefore, the aim of this study was to assess the current knowledge, attitudes, and perceptions of adult patients in Saudi Arabia toward SDF and the factors related to SDF.

2. Materials and methods

The present research study was approved by the Institutional Review Board of College of Medicine, King Saud University, Saudi Arabia (IRB Project No. E- 20-4943). In this cross-sectional study, data were obtained from adult participants living in the Kingdom of Saudi Arabia using simple random sampling. The objective of the research study was to evaluate the current knowledge, attitude, and perception of adult patients toward SDF and identify related factors.

A purposeful electronic questionnaire was designed and used for collection of the required data. The questionnaire was composed of 22 multiple choice questions and was distributed to adult participants. Five questions were related to participants' demographic information (sex, age, nationality, educational level, and monthly income), eight questions were designed to ask the participants about their medical condition and past dental history, three questions were tailored to investigate participants' perception about SDF (advantages and disadvantages), three questions to investigate their attitude regarding SDF, and two final questions were asked to assess the factors that influence participants' choice to use SDF.

Data were analyzed using Statistical Package for Social Sciences (SPSS) version 26.0 (IBM Inc., Chicago, USA). Descriptive statistics (frequencies and percentages) were used to describe the categorical variables. Pearson's chi-square test was used to compare the distribution of responses of

categorical outcome variables (perceptions and attitudes) in relation to the categorical study variables (sex, educational level, and monthly income level). A P -value < 0.05 was considered statistically significant.

3. Results

Out of 462 adult patients, the majority (86.6%) were females, and approximately 58% were ≤ 25 years of age. Overall, 77.1% of the participants had college/higher level education, and 34.2% had a monthly income of > 16000 Saudi Riyals (SAR) (Table 1).

The distribution and comparison of adult patients' responses to eight questions of dental treatment history showed a statistically significant distribution across the three categories of responses (I don't know, yes, and no). Approximately 75.8% of them did not suffer from medical conditions, 60.8% of them had tooth decay, 82.5% were confirmed to brush their teeth daily, 77.7% of them were not flossing regularly, and 63% of them were using fluoridated toothpaste.

Table 1 Distribution of Characteristics of Adult Patients (n = 462).

| Characteristics | No. (%) |
|-------------------------------|------------|
| Age groups (in years) | |
| < 20 | 102 (22.1) |
| 21–25 | 166 (35.9) |
| 26–30 | 35 (7.6) |
| 31–35 | 22 (4.8) |
| 36–40 | 28 (6.1) |
| 41–45 | 24 (5.2) |
| 46–50 | 32 (6.9) |
| > 51 | 53 (11.5) |
| Sex | |
| Female | 400 (86.6) |
| Male | 62 (13.4) |
| Educational level | |
| Elementary | 1 (0.2) |
| Middle school | 5 (1.1) |
| High school | 100 (21.6) |
| College/higher | 356 (77.1) |
| Monthly income (Saudi Riyals) | |
| > 16,000 | 158 (34.2) |
| 10,000–16,000 | 88 (19.0) |
| 7000–10,000 | 93 (20.1) |
| < 7,000 | 123 (26.6) |

Approximately 96.5% reported that they had been to a dentist before, and 87.7% of them were cooperative with the dentist. Suffering from dental pain or inflammation was reported by 87.7% of adult patients (Table 2).

The comparison of the adult patients' responses for perceptions and attitudes, measured on a five-point scale, toward the use of SDF to arrest dental caries demonstrated statistically significant findings. Out of the three items of perception, a higher proportion of adult patients (47.8%) were strongly satisfied with the speed of treatment. Regarding the advantages and disadvantages of SDF material, 58.9% were strongly satisfied and 24.5% were dissatisfied (P -value < 0.001). For the attitude part, many participants showed statistically significant (P -value < 0.001) disagreement toward SDF material use for anterior teeth (24.0%) and agreement for posterior teeth (37.2%) and temporary treatment (38.7%) (Table 3).

The comparison of sex with adult patients' responses for perceptions toward the use of SDF to arrest dental caries revealed a statistically significant sex difference (P -value = 0.004) for benefits of SDF material, with a higher number of females than males expressing strong satisfaction (64.5% versus 58%). In addition, the attitude of male sex was statistically (P -value = 0.015) and strongly nonaffirmative for use of SDF material to treat anterior teeth in contrast to their female counterparts (26.0% versus 9.7%) (Table 4).

For comparison of adult patients' responses for perceptions toward use of SDF with respect to their education, participants with education up to high school showed statistically higher dissatisfaction (P -value = 0.015) for disadvantages of SDF material in comparison of participants with education up to college (31.1% versus 22.5%). The former group also showed statistically significant dissatisfaction (P -value = 0.005) for the use of SDF material for anterior teeth when compared with the college-level education cohort (33.0% versus 21.3%) (Table 5).

We did not find any significant difference when we compared perceptions of SDF use with respect to monthly income levels. Participants with income of > 16000 SAR (31.0%), in contrast to other groups of income [< 7000 (22.0%), 7000–10000 (20.4%), and 10000–16000 (17.0%)], showed statistically strong disagreement (P -value = 0.025) with the use of SDF for anterior teeth (Table 6).

4. Discussion

Few studies have discussed SDF material in Saudi Arabia. None of them measured the knowledge, attitude, and

Table 2 Distribution and Comparison of Adult Patient Responses toward their Dental Treatment History.

| Adult's Dental Treatment History | Reponses - No. (%) | | | X ² -value | P-value |
|----------------------------------------------------------|--------------------|------------|------------|-----------------------|----------|
| | I don't know | Yes | No | | |
| Do you suffer from any medical condition? | 14 (3.0) | 98 (21.2) | 350 (75.8) | 397.09 | < 0.0001 |
| Do you have any teeth decay? | 40 (8.7) | 281 (60.8) | 141 (30.5) | 190.22 | < 0.0001 |
| Do you brush your teeth daily? | – | 381 (82.5) | 81 (17.5) | 194.80 | < 0.0001 |
| Do you use floss regularly? | 7 (1.5) | 96 (20.8) | 359 (77.7) | 435.05 | < 0.0001 |
| Do you use fluoridated tooth paste? | 124 (26.8) | 291 (63.0) | 47 (10.2) | 202.06 | < 0.0001 |
| Have you ever been to a dentist before? | 1 (0.2) | 446 (96.5) | 15 (3.2) | 831.13 | < 0.0001 |
| Were you cooperative with the dentist? | 13 (2.8) | 405 (87.7) | 44 (9.5) | 616.77 | < 0.0001 |
| Have you ever suffered from dental pain or inflammation? | 5 (1.1) | 362 (87.7) | 95 (20.6) | 447.70 | < 0.0001 |

Table 3 Distribution of Adult Patients' Perceptions and Attitudes Toward Use of Silver Diamine Fluoride to Arrest Dental Caries.

| Items | Responses - No. (%) | | | | | X ² -value | P-value |
|-----------------------------------------------------------------------------------------------------------------------|---------------------|------------|------------|--------------|-----------------------|-----------------------|----------|
| | Strongly Satisfied | Satisfied | Neutral | Dissatisfied | Strongly Dissatisfied | | |
| Perception | | | | | | | |
| What do you think regarding the speed of treatment of SDF material (1-minute application)? | 221 (47.8) | 141 (30.5) | 79 (17.1) | 16 (3.5) | 5 (1.1) | 352.33 | < 0.0001 |
| What do you think regarding the benefits of SDF material (no anesthesia, no drilling, no pain, less cost)? | 272 (58.9) | 110 (23.8) | 60 (13.0) | 15 (3.2) | 5 (1.1) | 511.31 | < 0.0001 |
| What do you think regarding the disadvantages of SDF material (permanent black stain limited to the decayed surface)? | 51 (11.0) | 80 (17.3) | 110 (23.8) | 113 (24.5) | 108 (23.4) | 30.79 | < 0.0001 |
| Attitude | | | | | | | |
| Items | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree | X ² -value | P-value |
| Will you agree on using the SDF material to treat your anterior teeth? | 69 (14.9) | 85 (18.4) | 87 (18.8) | 111 (24.0) | 110 (23.8) | 13.93 | < 0.0001 |
| Will you agree on using the SDF material to treat your posterior teeth? | 112 (24.2) | 172 (37.2) | 113 (24.5) | 45 (9.7) | 20 (4.3) | 158.37 | < 0.0001 |
| Will you agree on using the SDF material as temporary treatment for your teeth? | 121 (26.2) | 179 (38.7) | 119 (25.8) | 28 (6.1) | 15 (3.2) | 207.39 | < 0.0001 |

Table 4 Comparison of Adult Patients' Perceptions and Attitudes Toward Use of Silver Diamine Fluoride to Arrest Dental Caries in Relation to their Sex.

| Items | Responses | Sex - No. (%) | | X ² -value | P-value |
|-----------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|-----------|-----------------------|---------|
| | | Male | Female | | |
| Perception | | | | | |
| What do you think regarding the speed of treatment of SDF material (1-minute application)? | Strongly Satisfied | 200 (50) | 21 (33.9) | 6.183 | 0.186 |
| | Satisfied | 119 (29.8) | 22 (35.5) | | |
| | Neutral | 64 (16) | 15 (24.2) | | |
| | Dissatisfied | 13 (3.3) | 3 (4.8) | | |
| | Strongly Dissatisfied | 4 (1) | 1 (1.6) | | |
| What do you think regarding the benefits of SDF material (no anesthesia, no drilling, no pain, less cost)? | Strongly Satisfied | 232 (58) | 40 (64.5) | 15.27 | 0.004* |
| | Satisfied | 106 (26.5) | 4 (6.5) | | |
| | Neutral | 46 (11.5) | 14 (22.6) | | |
| | Dissatisfied | 12 (3.0) | 3 (4.8) | | |
| | Strongly Dissatisfied | 4 (1) | 1 (1.6) | | |
| What do you think regarding the disadvantages of SDF material (permanent black stain limited to the decayed surface)? | Strongly Satisfied | 41 (10.3) | 10 (16.1) | 5.47 | 0.242 |
| | Satisfied | 66 (16.5) | 14 (22.6) | | |
| | Neutral | 94 (23.5) | 16 (25.8) | | |
| | Dissatisfied | 103 (25.8) | 10 (16.1) | | |
| | Strongly Dissatisfied | 96 (24.0) | 12 (19.4) | | |
| Attitude | | | | | |
| Will you agree on using the SDF material to treat your anterior teeth? | Strongly Agree | 58 (14.5) | 11 (17.7) | 12.27 | 0.015* |
| | Agree | 66 (16.5) | 19 (30.6) | | |
| | Neutral | 76 (19.0) | 11 (17.7) | | |
| | Disagree | 96 (24.0) | 15 (24.2) | | |
| | Strongly Disagree | 104 (26.0) | 6 (9.7) | | |
| Will you agree on using the SDF material to treat your posterior teeth? | Strongly Agree | 97 (24.3) | 15 (24.2) | 3.33 | 0.504 |
| | Agree | 144 (36.0) | 28 (45.2) | | |
| | Neutral | 99 (24.8) | 14 (22.6) | | |
| | Disagree | 41 (10.3) | 4 (6.5) | | |
| | Strongly Disagree | 19 (4.8) | 1 (1.6) | | |
| Will you agree on using the SDF material as temporary treatment for your teeth? | Strongly Agree | 107 (26.8) | 14 (22.6) | 4.52 | 0.341 |
| | Agree | 148 (37.0) | 31 (50.0) | | |
| | Neutral | 105 (26.3) | 14 (22.6) | | |
| | Disagree | 26 (6.5) | 2 (3.2) | | |
| | Strongly Disagree | 14 (3.5) | 1 (1.6) | | |

* Indicates a statistically significant difference P -value < 0.05.

Table 5 Comparison of Adult Patients' Perceptions and Attitudes Toward Use of Silver Diamine Fluoride to Arrest Dental Caries in Relation to their Education.

| Items | Responses | Education - No. (%) | | X ² -value | P-value |
|-----------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------|------------|-----------------------|---------|
| | | School | College | | |
| Perception | | | | | |
| What do you think regarding the speed of treatment of SDF material (1-minute application)? | Strongly Satisfied | 52 (49.1) | 169 (47.5) | 0.91 | 0.922 |
| | Satisfied | 30 (28.3) | 111 (31.2) | | |
| | Neutral | 18 (17.0) | 61 (17.1) | | |
| | Dissatisfied | 5 (4.7) | 11 (3.1) | | |
| | Strongly Dissatisfied | 1 (0.9) | 4 (1.1) | | |
| What do you think regarding the benefits of SDF material (no anesthesia, no drilling, no pain, less cost)? | Strongly Satisfied | 55 (51.9) | 217 (61.0) | 4.69 | 0.320 |
| | Satisfied | 26 (24.5) | 84 (23.6) | | |
| | Neutral | 19 (17.9) | 41 (11.5) | | |
| | Dissatisfied | 5 (4.7) | 10 (2.8) | | |
| | Strongly Dissatisfied | 1 (0.9) | 4 (1.1) | | |
| What do you think regarding the disadvantages of SDF material (permanent black stain limited to the decayed surface)? | Strongly Satisfied | 17 (16.0) | 34 (9.6) | 11.05 | 0.026* |
| | Satisfied | 20 (18.9) | 60 (16.9) | | |
| | Neutral | 17 (16.0) | 93 (26.1) | | |
| | Dissatisfied | 33 (31.1) | 80 (22.5) | | |
| | Strongly Dissatisfied | 19 (17.9) | 89 (25.0) | | |
| Attitude | | | | | |
| Will you agree on using the SDF material to treat your anterior teeth? | Strongly Agree | 23 (21.7) | 46 (12.9) | 14.75 | 0.005* |
| | Agree | 15 (14.2) | 70 (19.7) | | |
| | Neutral | 13 (12.3) | 74 (20.8) | | |
| | Disagree | 35 (33.0) | 76 (21.3) | | |
| | Strongly Disagree | 20 (18.9) | 90 (25.3) | | |
| Will you agree on using the SDF material to treat your posterior teeth? | Strongly Agree | 23 (21.7) | 89 (25.0) | 6.83 | 0.145 |
| | Agree | 49 (46.2) | 123 (34.6) | | |
| | Neutral | 19 (17.9) | 94 (26.4) | | |
| | Disagree | 12 (11.3) | 33 (26.4) | | |
| | Strongly Disagree | 3 (2.8) | 17 (4.8) | | |
| Will you agree on using the SDF material as temporary treatment for your teeth? | Strongly Agree | 27 (25.5) | 94 (26.4) | 2.80 | 0.591 |
| | Agree | 45 (42.5) | 134 (37.6) | | |
| | Neutral | 27 (25.5) | 92 (37.6) | | |
| | Disagree | 6 (5.7) | 22 (6.2) | | |
| | Strongly Disagree | 1 (0.9) | 14 (3.9) | | |

* Indicates a statistically significant difference P -value < 0.05.

acceptance of adults toward SDF. SDF has been recently approved in Saudi Arabia (Alajlan et al. 2020b). However, the impact of SDF on the Saudi adult population is unknown. Accordingly, the knowledge of SDF use is relatively low. This could be due to unfamiliarity and limited dental education about the material.

SDF (AgFH₆N₂) is composed of 24–29% silver and 5–6% fluoride. It has a pH of 10, which makes an alkaline media that inhibits enzyme activation of dentine collagen fibers (Mei, Lo, and Chu 2018). The mixture of silver and fluoride results in a precipitate that blocks dentinal tubules, therefore reducing hypersensitivity (Castillo et al. 2011). Moreover, silver and fluoride in an alkaline solution were found to act synergistically to arrest dental caries. The silver component of SDF can attack the cell membrane and enzymes of bacteria and therefore acts as a bacteriostatic agent. Silver shows antibacterial action by doping itself with hydroxyapatite. Fluoride plays a role in the formation of less soluble fluorohydroxyapatite, and microhardness markedly increases with increased phosphorus and calcium levels (Mei, Lo, and Chu 2018). It also has the ability to inhibit matrix metalloproteinases, therefore inhibiting enzymatic degradation of collagen (Mei et al. 2012).

Caries arrest with SDF offers a minimally invasive and inexpensive alternative to traditional restorative caries treat-

ment. In the present study, most of the participants were strongly satisfied with the speed of SDF treatment and the benefits of SDF material. This comes with the wide international acceptance of the material among studies that involved parents and adults (Huebner et al. 2020; Magno et al. 2019). However, tooth discoloration associated with the use of the material was not satisfactory for most of the participants, strongly disagreeing with its use in the anterior teeth. This was also reported in many previous studies in which parents were sensitive in choosing SDF as a treatment option in anterior teeth, whereas it might have potential in posterior teeth (Crystal et al. 2017; Gordon 2018; Duangthip et al. 2018). The plausible explanation is aesthetics, as anterior teeth are the first to appear while eating, talking, and smiling.

There were no significant differences between male and female samples in most questions dealing with SDF. Females showed strong satisfaction with the benefits of SDF in comparison to males. This might be due to their attribution to their children's care and desire for more convenient restorative solutions. Crystal et al. (2019) also found that mothers' responses were statistically higher than those of fathers (Crystal, Kreider, and Raveis 2019).

Those with high education level and high monthly income level showed statistically significant disagreement with the

Table 6 Comparison of Adult Patients' Perceptions and Attitudes Toward Use of Silver Diamine Fluoride to Arrest Dental Caries in Relation to their Monthly Income.

| Items | Responses | Monthly Income (SAR) - No. (%) | | | | X ² -value | P-value |
|-----------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------------|------------|-------------|------------|-----------------------|---------------|
| | | < 7000 | 7000–10000 | 10000–16000 | > 16000 | | |
| Perception | | | | | | | |
| What do you think regarding the speed of treatment of SDF material (1-minute application)? | Strongly Satisfied | 55 (44.7) | 49 (52.7) | 35 (39.8) | 82 (51.9) | 17.22 | 0.142 |
| | Satisfied | 37 (30.1) | 33 (35.5) | 34 (38.6) | 37 (23.4) | | |
| | Neutral | 25 (20.3) | 7 (7.5) | 15 (17.0) | 32 (20.3) | | |
| | Dissatisfied | 5 (4.1) | 3 (3.2) | 4 (4.5) | 4 (2.5) | | |
| | Strongly Dissatisfied | 1 (0.8) | 1 (1.1) | 0 | 3 (1.9) | | |
| What do you think regarding the benefits of SDF material (no anesthesia, no drilling, no pain, less cost)? | Strongly Satisfied | 67 (54.5) | 59 (63.4) | 42 (47.7) | 104 (65.8) | 20.09 | 0.065 |
| | Satisfied | 28 (22.8) | 21 (22.6) | 33 (37.5) | 28 (17.7) | | |
| | Neutral | 23 (18.7) | 10 (10.8) | 10 (11.4) | 17 (10.8) | | |
| | Dissatisfied | 4 (3.3) | 3 (3.2) | 2 (2.3) | 6 (10.8) | | |
| | Strongly Dissatisfied | 1 (0.8) | 0 | 1 (1.1) | 3 (1.9) | | |
| What do you think regarding the disadvantages of SDF material (permanent black stain limited to the decayed surface)? | Strongly Satisfied | 16 (13.0) | 9 (9.7) | 13 (14.8) | 13 (8.2) | 19.11 | 0.086 |
| | Satisfied | 24 (19.5) | 19 (20.4) | 17 (19.3) | 20 (12.7) | | |
| | Neutral | 30 (24.4) | 18 (19.4) | 19 (21.6) | 43 (27.2) | | |
| | Dissatisfied | 27 (22.0) | 30 (32.3) | 24 (27.3) | 32 (20.3) | | |
| | Strongly Dissatisfied | 26 (21.1) | 17 (18.3) | 15 (17.0) | 50 (31.6) | | |
| Attitude | | | | | | | |
| Will you agree on using the SDF material to treat your anterior teeth? | Strongly Agree | 29 (23.6) | 11 (11.8) | 9 (10.2) | 20 (12.7) | 23.36 | 0.025* |
| | Agree | 22 (17.9) | 17 (18.3) | 22 (25.0) | 24 (15.2) | | |
| | Neutral | 21 (17.1) | 16 (17.2) | 17 (19.3) | 33 (20.9) | | |
| | Disagree | 24 (19.5) | 30 (32.3) | 25 (28.4) | 32 (20.3) | | |
| | Strongly Disagree | 27 (22.0) | 19 (20.4) | 15 (17.0) | 49 (31.0) | | |
| Will you agree on using the SDF material to treat your posterior teeth? | Strongly Agree | 33 (26.8) | 24 (25.8) | 18 (20.5) | 37 (23.4) | 17.83 | 0.121 |
| | Agree | 40 (32.5) | 41 (44.1) | 34 (39.6) | 57 (26.1) | | |
| | Neutral | 34 (27.6) | 18 (19.4) | 24 (27.3) | 37 (23.4) | | |
| | Disagree | 10 (8.1) | 10 (10.8) | 11 (12.5) | 14 (8.9) | | |
| | Strongly Disagree | 6 (4.9) | 0 | 1 (1.1) | 13 (8.2) | | |
| Will you agree on using the SDF material as temporary treatment for your teeth? | Strongly Agree | 39 (31.7) | 22 (23.7) | 22 (25.0) | 38 (24.1) | 17.55 | 0.130 |
| | Agree | 42 (34.1) | 44 (47.3) | 36 (40.9) | 57 (36.1) | | |
| | Neutral | 32 (26.0) | 18 (19.4) | 23 (26.1) | 46 (29.1) | | |
| | Disagree | 5 (4.1) | 9 (9.7) | 6 (6.8) | 8 (5.1) | | |
| | Strongly Disagree | 5 (4.1) | 0 | 1 (1.1) | 9 (5.7) | | |

* Indicates a statistically significant difference P value < 0.05.

pigmentation side effects of SDF, especially in anterior teeth. This underscores the great importance of aesthetics and appearance in one's permanent teeth, especially among people of high social class and status. Other studies also showed the preference of using SDF on primary posterior teeth rather than primary anterior teeth in a survey conducted after parental education about the material (Sabbagh et al. 2020). On the other hand, in another study conducted by Alshammari et al. (2019) in Saudi Arabia, there was no significant difference between parents' preference of anterior or posterior teeth staining and use of SDF in their children with carious teeth (Alshammari et al. 2019).

The major limitation of this study is the cross-sectional study design; therefore, we were not able to measure causality between variables. To the best of our knowledge, this is the first study from Saudi Arabia to determine the perception and attitude of adult patients regarding SDF use for arresting dental caries. It provides valuable insights into the factors that could influence the acceptance of SDF in this population and suggests planning awareness and education measures accordingly. Further studies are needed to assess the effectiveness of SDF on root caries, dentine hypersensitivity in posterior teeth, and its acceptance as a treatment option for adults, especially elderly populations.

5. Conclusion

In summary, the present study concludes that SDF is acceptable among Saudi adults for the purpose of arresting dental caries. However, pigmentation of anterior teeth is a major concern, especially in male participants with high socioeconomic status. Knowledge and appropriate counseling from dentists is of utmost importance to allow prospective patients to weigh the risks and benefits of the use of SDF for dental caries arrest.

CRedit authorship contribution statement

Al Hanouf Al Habdan: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Writing - review & editing, Visualization, Supervision. **Amal Al Awdah:** Conceptualization, Writing - review & editing, Visualization, Supervision. **Ghaida Aldosari:** Conceptualization, Methodology, Software, Investigation, Writing - original draft. **Shaikha Almogbel:** Conceptualization, Methodology, Software, Investigation, Writing - original draft. **Rahaf Alawaji:** Conceptualization, Methodology, Software, Investigation, Writing - original draft.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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