

Aesthetic perception, acceptance and satisfaction in the treatment of carious lesions with silver diamine fluoride: Scoping review

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ABSTRACT

Background: With a frequency of 69%-79%, dental caries is one of the most prevalent diseases in the world. Untreated cavities are linked to pain, discomfort with eating, drinking, sleeping, and smiling, which has an impact on a child's overall health and development. To stop active carious lesions, one such technique involves applying SDF as a cheap, antibacterial, and remineralizing agent.

Objective: How is the aesthetic perception, acceptance, and/or satisfaction of patients, parents, and professionals towards the treatment of carious lesions with SDF.

Methods: The method used in this study uses the literature study method. The data was carried out by searching the PubMed, ScienceDirect, Google Scholar and Google databases.

Results: Parents concur that SDF is a significant breakthrough in the management of ECC that has the potential to alter the conventional approach to treating caries. They appreciate the non-invasive, painless, and efficient therapy for carious lesions because it delays further degradation and, in the end, spares them from having to undergo surgery under general anesthesia.

Conclusion: Due to its simplicity of usage, the use of SDF has recently attracted attention. It is a promising tactic that can be extensively applied in a variety of populations, including those who refuse restorative treatment.

Keywords: perspective, parents, SDF, caries, silver diamine fluoride

INTRODUCTION

With a 69% prevalence rate, dental caries is one of the most prevalent diseases in the world.¹ Untreated cavities are linked to pain, trouble sleeping, eating, and drinking, as well as a refusal to smile, which can harm a child's overall health and development.^{2,3} Conventional restorative techniques, which are the foundation of basic caries therapy, necessitate support systems and patient involvement.⁴ For some patients with special needs or elderly topics, children, and those who are difficult to handle, as well as in locations lacking proper working circumstances, like rural or indigenous communities, restorative treatment is occasionally not practicable in outpatient settings.⁵

In contrast to another study that found that only 26.9% of parents would select SDF to repair anterior teeth, a previous clinical trial revealed that 100% of parents of children treated with SDF thought that these modifications had no detrimental effect on the child's appearance.^{5,6} Additionally, 55% of dental hygienists in alternative practice concur that many patients or their parents won't obtain SDF treatment for dental caries since the lesions have persistent black stains.⁷

Based on the background above, the problem formulation of this scoping review is how is the aesthetic perception, acceptance, and/or satisfaction of patients, parents, and professionals regarding the treatment of caries lesions with SDF.

METHOD

The article search strategy in this review uses research keywords and includes the AND combination in the database search. The keywords are aesthetic perception and parental satisfaction and carious lesions with silver diamine fluoride. The article selection process uses 3 databases namely Science Direct, PubMed, and Google Scholar. In the first stage, articles will be filtered based on the 2020-2022 range, abstracts, and free full text using filters from the database. The second stage, namely articles that enter the first stage of the article selection process will be reviewed based on the inclusion and exclusion criteria in the article. Extraction of article data by entering several variables, such as article title, author, journal name, volume, number, year,

research method, research objectives, conclusions and results which will be summarized in tabular form. List and definition of research variables whose data are taken from each article reviewed.

RESULTS

The results of a search for evidence source articles using 3 databases namely Google Scholar, PubMed and Science Direct obtained 5 articles. The process of searching for articles and selecting articles consists of several stages. The first stage is to conduct an initial search on the online PubMed and Science Direct databases and Google Scholar using the final keywords and queries that have been determined. The search process obtained 887 articles from PubMed, 53,853 from Science Direct and 1,010 articles from Google Scholar. The total number of articles from the three databases was 55,750 articles and duplication screening was carried out to obtain 12 duplicate articles, the selection process used Mendeley software. The results of the duplication filter left 55,738 articles.

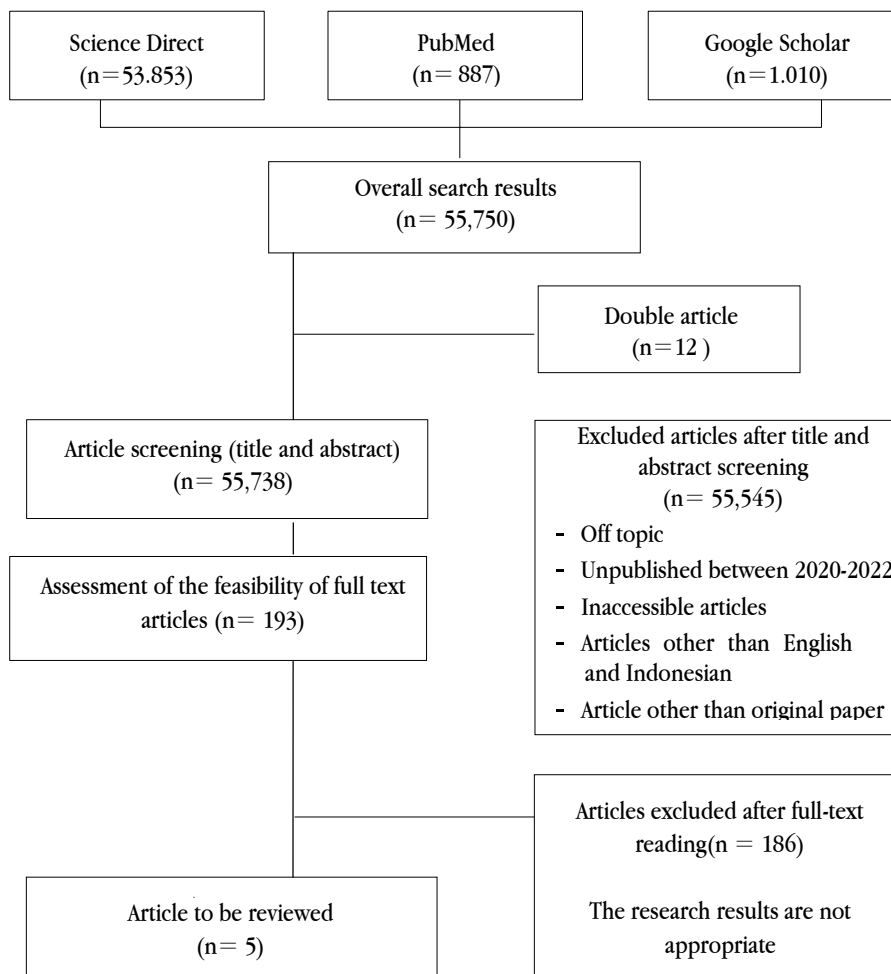


Figure 1. Results of selection of evidence sources

In the second stage, articles were filtered based on titles and abstracts that match the inclusion and exclusion criteria. From this screening, 55,545 articles were excluded, because there were many studies on nurses outside Indonesia, namely as many as 9,795 articles and based on the year below 2020, there were 45,750 articles. The results of screening titles and abstracts that match the inclusion and exclusion criteria left 193 articles. The third stage, re-screening by reading the full-text. After filtering the full-full text, 186 irrelevant articles were obtained and the explanations were not in-depth according to the Scoping review topic. The results of the full-text screening left 5 relevant articles to be used as sources of evidence.

Table 1 Characteristics of evidence sources

No.	Author (Year)	Title	Method	Result
1	Seifo et al. (2020) ⁸	“It’s really no more difficult than putting on fluoride varnish”: A qualitative exploration of dental professionals’ views of silver diamine fluoride for the management of carious lesions in children	Qualitative study	Prior dental experience varied across all child All of the children who participated had varying prior dental experiences. Five of the 11 kids had numerous primary teeth extracted under general anesthesia (GA). Two people have gotten SDF therapy. Participants who had discolored front teeth showed fear of being pickpocketed by their peers. The gender of the child did not appear to affect parental choices or the kid's preferences about the use of SDF, and younger children seemed to be less concerned about discoloration. Parents find SDF particularly helpful for children who are uneasy or resistant, but they worry about potential bullying at school because SDF application to anterior teeth results in unsatisfactory dental esthetics. Because of the black stain, parents worry that people would perceive them as disregarding their child's oral hygiene. When SDF is applied to posterior teeth that are less noticeable, both parents and kids are more amenable to it. Parents agreed to the use of SDF if GA extraction was avoided.
2	Khammas & Haidar (2020) ⁹	Parental Perceptions of Silver Diamine Fluoride Discoloration in Baghdad/Iraq	Quantitative study	In this study, 79 moms and 23 fathers from various backgrounds took part. More people accepted the discoloration caused by silver diamine fluoride on the back teeth (71.6%) than on the front teeth (43.2%). Demographic information like age, gender, community, and educational attainment showed statistically negligible variations, however strong relationships with certain kid attitudes were discovered.
3	Altner et al. (2022) ¹⁰	Impact of Silver Diamine Fluoride Therapy on the Oral Health-Related Quality of Life of Preschool Children with Behavioral Problems after Three Months: A Pilot Study	Quantitative study	A total of 30 children aged 0-5 years were registered and received SDF treatment. At baseline, the total ECOHIS score was 21.4 (\pm 8.5). Three months after therapy, significant improvement was achieved (16.3 [\pm 5.6], $p < 0.05$). Significantly better scores were observed across the six subdomains, especially in “child functioning” (3.9 [\pm 2.0]) and “child symptoms” (2.0 [\pm 1.3]) ($p < 0.05$).
4	Vollu et al. (2019) ¹¹	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	Randomized Controlled Trial	The use of SDF and the city of practice have no connection. The majority (75.9%) suggested SDF for individuals who weren't adhering. Dentists reported using it exclusively on baby teeth (75.9%), with just 24.1% also using it on adult teeth. Lack of understanding (58.3%) is the biggest hurdle for non-users, but tooth discoloration (90.7%) and parental acceptability (64.8%) are issues among users.
5	Kyoon-Achan et al. (2021)	Parents’ Views on Silver Diamine Fluoride to Manage Early Childhood Caries	Mixed-method study	None of the parents had previously heard of SDF, and they learned about it from the study dentists. Although parents trust dentists' information about SDF, they welcome the additional evidence, especially with regard to product safety and effectiveness. Some parents are not too concerned about the black staining caused by SDF treatment. It is more important that SDF restrains caries development, minimizes pain and sensitivity, and prevents tooth infection. However, some parents expressed concern regarding the unaesthetic black coloring. Interestingly, many parents indicate that their children do not really care about dark spots. The majority of parents said that they would recommend treatment to others.

It was determined that aesthetic perception, acceptance, and satisfaction in the treatment of carious lesions using silver diamine fluoride had a low level of effectiveness and a very effective level of effectiveness based on the overall findings of research completed by previous researchers. Parents' perceptions that SDF is particularly helpful for anxious and uncooperative children as well as the ease with which the process can be performed can both have an impact on this level of efficacy. Before deciding on SDF or not for their child, parents appear to take into account a number of considerations. Their divergent perspectives are linked to certain circumstances. This highlights how critical it is for doctors to comprehend the unique circumstances, past encounters, preferences, and concerns of each kid and their parents. Joint decision making and treatment planning.

Poor esthetics is not a significant factor when SDF is suggested, according to studies on parental satisfaction and other research. Despite the lack of a statistically significant difference, these results imply that acceptance declines with higher educational attainment. Additionally, younger adults (20 and under) are more in favor of SDF treatment than older adults. This result supports the findings of Crystal et al., but it contradicts the findings of Al-Shammari et al., who found that those with lower levels of education strongly opposed utilizing SDF in 100% of cases. The findings of this study suggest that a child's mindset has an impact on whether or not they accept that their front and back teeth are discolored. The unexpected finding was that when children needed help, their acceptability increased, which is consistent with Chhokar et al. and Crystal et al. but the unexpected finding was that when children needed general anesthesia acceptance dropped. The reason may be because the Iraqi population is not familiar with this method of treatment.^{6,7,12}

What stood out in our findings was that the overall average increase in the child impact score was greater than the family impact score, which stayed nearly the same. Surprisingly the strongest increase was seen in the "feel guilty" item. It may be more robust for carious lesions treated with SDF than for other dental treatments without aesthetic limitations, because these teeth are more likely to alert caregivers of failed oral hygiene, which are also seen in public. Prior to treatment with SDF, caregivers were thoroughly instructed about side effects and efficacy of therapy; therefore, parents, unhappy with the aesthetic consequences, choose to refuse treatment or opt for solutions involving sedation or alternatives. This means that those who participate clearly place more importance on the function of their child's teeth than those who do not choose SDF.¹⁰

Here, the most widely cited clinical indication for the use of SDF is 'behavioral problems'. . Similarly, non-adherent patients were appropriate candidates for treatment with SDF, according to a survey of pediatric dentistry residency program directors. Additionally, the majority of respondents in both studies disagreed that SDF should be used to permanent teeth rather than primary teeth. This can be explained by the tooth-darkening effects of SDF, which are more tolerable on temporary teeth, as well as the fact that SDF appears to work better on baby teeth than on adult teeth.

Interestingly, more than a third of respondents in our survey reported using SDF just for posterior teeth, while 5.6% reported using it for anterior teeth solely, despite the fact that lesions on posterior teeth have a lower risk of retention than lesions on front teeth. This might be because parents are more likely to accept the use of SDF on posterior teeth than on anterior teeth, and because dentists still have a predisposition towards using SDF on anterior teeth due to aesthetic reasons.

The most effective methods, parents' perceptions and acceptability, their professional expertise, and clinical efficacy are all still being investigated in numerous studies. We believe that surveys like ours are crucial for assessing the prevalence of SDF in any population given the high interest in and growing use of these products worldwide.¹¹

Given the severity of their children's caries, dentists discussed SDF as a potentially effective treatment option and offered them the opportunity to participate in studies where their children could receive treatment. Parents, however, are aware that they may refuse treatment or participation at any time during the study. Many choose to continue with the treatment/study and report their trust in dentists. We should also note that giving free, prior and informed consent did not prevent parents from commenting on or reacting negatively to the medication once they saw it in their children, as can be seen in the results. This result is very important, because there is no control group. In summary, parents agree that SDF represents an important innovation in

the management of ECC with the potential to change traditional ways of treating caries with the potential to change traditional ways of treating caries. They welcomed the treatment which was non-invasive, painless, and effective in treating carious lesions, thereby preventing further decay and ultimately avoiding surgery under general anaesthesia. More and more parents and dentists need up-to-date information about SDF treatments, product safety, side effects and any progress to improve the aesthetic quality of the treated teeth. Black staining of caries and any side effects should be clearly explained and informed consent obtained before any treatment.¹³

DISCUSSION

Parents of kids who have previously needed general anesthesia (GA) stress the advantages of SDF in preventing or postponing GA. They claimed that, despite the color change, if SDF had been a choice for them earlier, they would have selected it because, in line with the results of other studies, GA was particularly painful for kids and their parents. According to a qualitative study assessing parents' perceptions of their child's dental GA, some parents found it difficult to accept its use, even while others thought it was preferable to standard care. However, all parents expressed some level of dread, anxiety, or worry about their kid receiving dental treatment under GA.¹⁴

In a similar vein, parents worry that people will condemn them if their child has black teeth because they might assume that they are ignoring their child's dental hygiene and since black teeth are linked to drug abuse. Some parents stated that they would rather have their child's tooth pulled than have it stained with SDF and turn it black. The therapy of SDF is only one aspect of this issue. According to Maguire *et al.*, parents shared the same worry that a crown in their child's mouth would indicate that they had neglected their parental duties. Parents claim that by raising awareness about SDF as a treatment and realizing that healthy teeth do not necessarily equal white teeth, this barrier can be removed.¹⁵

Some studies reveal that dark discoloration due to SDF does not affect parental satisfaction and other studies report that poor esthetics is not an important factor when SDF is indicated. Even though there is no statistically significant difference, these findings show that as the level of education increases, acceptability decreases.⁷ A study shows that SDF color changes affect the perception of parents. However, older people tolerate dark discoloration of the back teeth better than the front teeth. These results agree with previous studies.⁹

General anesthesia and sedation have been more popular in the last ten years for the dental care of young patients who are frequently found to have many tooth cavities. In addition, there has been a discernible change in the treatment of non-DGA-compliant children toward the use of caries-inhibiting liquid SDF as a result of the hazards involved with general anesthesia in young children. We predicted that SDF would have a favorable overall effect on patients' OHRQoL. Our hypothesis is confirmed by the overall findings. After receiving SDF dental treatment, they had a significant overall improvement in OHRQoL.¹⁰

SDF use among dentists who responded to the survey was correlated with place of employment, experience, and specialization. The primary obstacle to utilizing SDF, according to the authors, is ignorance. They noted that dentists working in universities had more than twice the potential to employ SDF compared to those working in private practices. This can indicate a gap between clinical practice and research. Those who work at academic institutions typically have quicker and easier access to fresh scientific evidence, giving them knowledge and safety while employing novel or underutilized tools or methods. Similarly, physicians are more intelligent and confident when using these approaches the more clinical experience they have.

The most widely cited clinical indication for the use of SDF is 'behavioral problems'. Because SDF darkens teeth, it is more acceptable when used on temporary teeth and there is evidence that it works better on baby teeth than on adult teeth. Interestingly, more than a third of respondents in our survey reported using SDF just for posterior teeth, while 5.6% reported using it for anterior teeth solely, despite the fact that lesions on posterior teeth have a lower risk of retention than lesions on front teeth. This may be due to the fact that parents now tolerate the use of SDF on posterior teeth more than they did in the past, as well as the fact that dentists still have a prejudice against its use on anterior teeth due to aesthetic concerns. The SDF remains the

target of many studies still seeking to explore the best protocols, parents' perceptions and acceptability, their professional knowledge and their clinical efficacy.

In general, dentists were the initial source of information for parents about SDF as a therapeutic option. They appreciated the treatment's non-invasiveness, particularly the fact that it is painless when administered, can lessen dentin sensitivity or the discomfort brought on by exposed dentine as a result of carious cavity lesions, and can stop the progression of caries. Despite their worries about the black stains that followed treatment, the parents said they would still suggest it to others.¹³

In summary, parents concur that SDF is a significant innovation in the management of ECC and has the potential to alter conventional approaches to treating caries. They hailed the non-invasive, painless procedure that effectively treated carious lesions, stopped further degradation, and finally eliminated the need for surgery under general anesthesia. The need for current information regarding SDF treatments, product safety, side effects, and any advancements to improve the aesthetic quality of the treated teeth is growing among parents and dentists.¹³

CONCLUSION

Conventional restorative techniques, which are the foundation of basic caries therapy, necessitate support systems and patient cooperation. SDF is a potential tactic that can be utilized widely in many groups, including those for whom restorative treatment is not appropriate, and has recently attracted interest because to its simplicity of usage. While another study found that just 26.9% of parents would select SDF to repair their child's anterior teeth, parents of children treated with SDF stated that these modifications had no detrimental effects on the child's appearance. While some research claim that poor esthetics is not a significant issue when SDF is advised, some studies show that dark discoloration brought on by SDF does not impair parental satisfaction. "Behavioral difficulties" is the clinical indication for the usage of SDF that is most frequently reported. Since SDF darkens teeth, it is more acceptable to use it on temporary teeth and there is evidence that primary teeth respond better to SDF than permanent teeth. In conclusion, parents concur that SDF is a significant advancement in the management of ECC with the potential to challenge conventional methods of caries treatment.

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