

Evaluation of Parental Perception And Acceptance Of Silver Diammine Fluoride Staining; A Questionnaire Based Study.

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ABSTRACT

Aims; Main aim of present study was to evaluate parental acceptance of silver diammine fluoride(SDF) staining on anterior and posterior deciduous tooth. In addition, disparity in acceptance was evaluated according to behaviour of child, and various demographic factors.

Settings and Design; A descriptive cross-sectional study was carried out during the time period of one month, including parents of children with deciduous and mixed dentition aged 12 years and younger, attending OPD.

Methods and Material; Standard sets of high-quality colored photographs of the same teeth before and after treatment were provided for evaluation by parents. Acceptance was noted using a Likert scale.

Statistical analysis used ; The collected data were tabulated and statistically analysed using Windows IBM SPSS 20.0 V. Chi square test was used for nominal data and Wilcoxon signed rank test for mean comparison.

Results; Higher acceptability was reported on posterior teeth with a significant difference between anterior and posterior teeth. However, uncooperative child behaviour during previous appointment made the difference between the acceptance rate in anterior and posterior teeth insignificant. Various demographic factors also affected parental acceptance.

Conclusions; Parent should be informed about the treatment options and its outcome before SDF application and consent should be obtained as recommended by AAPD.

KEY WORDS; Silver diammine fluoride, deciduous tooth, staining, acceptance.

INTRODUCTION

The undesirable sequelae of untreated dental caries is usually loss of tooth structure, pain and periapical infections. Further, missing tooth will affect articulation and esthetics, which can cause psychological impact affecting social life of children.¹

In spite of various control measures implemented, Indian population show a higher prevalence of early childhood caries (ECC) which is reported as 44% among 8- 48 months old, with a skewed distribution among various socioeconomic groups.² In many communities it is considered as a public health challenge.³

Prevention and cure, as in case of any disease, is the basic requirement to control dental caries. An effective caries arresting and preventive material must be one which can deal with both demineralisation of inorganic part and degradation of organic matrix. It should have an antibacterial property as well.⁴ Conventional restorative approaches for ECC is often either unavailable or unaffordable for many child populations irrespective of geographic or sociodemographic factors. Moreover, cooperation from children during dental treatment is another challenge for dentists.⁵ Children at high risk of caries and those with special health care should be provided with maximum benefits using minimal invasive techniques. Non-invasive approaches instead of conventional treatment in arresting or slowing the progression of caries can be easily used in primary and permanent teeth in case of children.⁶ Trending among them is various fluoride preparations.

Silver diamine fluoride (SDF) received considerable attention as it act as cavity sterilizer and dentine desensitizer. It was approved by FDA⁷ as a desensitising agent in 2014. Moreover, it is a safe, efficient and effective⁸, low

-cost method

of caries.⁹

Evidently, when it comes to parental acceptance of any new technique or restorative material including SDF, esthetics is of one of the prime concern¹⁰. Parental acceptance, along with cost, and difficulty in obtaining the product were the most perceived barriers to the use of SDF. Even though, the colour change indicate the effectiveness of treatment, literature reported diminished parental acceptability as the arrested lesion appear darker in colour.⁸ However most parents prefer it over general anesthesia and other invasive procedure.¹¹

Main aim of present study was to evaluate parental discernments of SDF staining. We hypothesized that parents exhibit difference in acceptability to staining caused by SDF based on location of teeth (anterior or posterior). Acceptance of staining according to behaviour of child, and various demographic factors was also evaluated. Knowing parental acceptance

criteria could help in determining treatment plans that meet patients' and parents' requirements and esthetic considerations. Especially in developing countries like India, it is time to make a leap in medical model of dentistry based on adequate investigations, which should go hand in hand with patient perception and this study is one of that kind.

METHODS

This descriptive cross-sectional study was carried out at college OPD during the time duration of one month. Study included parents of children with deciduous and mixed dentition aged 12 years and younger, attending OPD and those who agree to participate in the study. To evaluate parents' acceptance of the aesthetics, the interviewing dentists, provided all participants with standard sets of high-quality colored photographs of the same teeth before and after treatment for comparison. Minimal information about the new medicament was provided as we aimed at evaluating parental acceptance only on the basis of their esthetic perception.

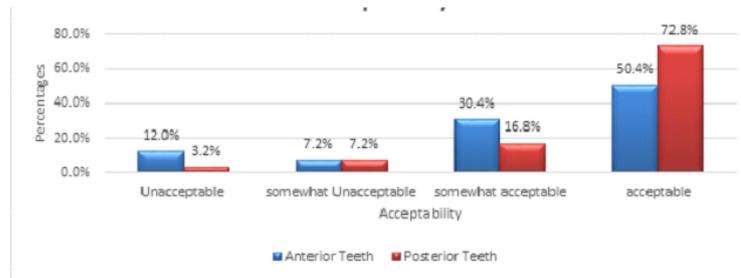
A questionnaire was prepared which included questions regarding demographic data in the first section whereas the second section evaluated the importance they placed treating their child's primary teeth and child's behaviour during previous dental visits. Then in the third part, the participating parent were asked to rate the acceptability after evaluating photographs and rank their acceptance as 1= acceptable, 2= somewhat acceptable, 3= somewhat unacceptable, and 4 = not acceptable. The questions and corresponding options were formulated in both English and Hindi.

The collected data were tabulated and statistically analysed using Windows IBM SPSS 20.0 V. Chi square test was used for nominal data and Wilcoxon signed rank test for means comparison. The statistical significance was set at $P < 0.05$.

RESULT

Of the 125 participants completed the survey, 35/125 (28 %) were males whereas 90/125 (72 %) were females, giving a male: females ratio of 1.00:1.28. The great majority of the participants were in the age range of 31–40 years (47.2 %), followed by age range 41 -50 (42.4 %). All the participant had at least one previous dental experience of their child; therefore, they were familiarized with the dental procedures and possible barriers. Most of the children (83 %) belong to age group 1-5 years ,while 30% children were of more than 10 years and rest belong to 5- 10 year age group.

Parental acceptance of SDF treatment was significantly affected by the location of teeth. After evaluating the photographs, most of parents (72.8 %) shown acceptance on posterior teeth whereas for anterior teeth it declined (50.4 %) ($p=0.001$). While 15 % patients found staining in anterior teeth is strongly unacceptable, only 4% reported staining is unacceptable in posterior teeth at any circumstances. Mean acceptability on anterior teeth according to our study is 3.19 and for posterior teeth is 3.59. (Graph 1). For female parents the rate of acceptance is significantly higher than male parents in anterior teeth.



Graph 1 ; Mean acceptability of SDF staining on anterior teeth and posterior teeth.

76 % of the participants consider treating baby tooth as quite important, while 12 % are not at all aware. Patient who were aware about need of treating deciduous tooth shown more acceptance in case of treating baby tooth with SDF than those who consider treating deciduous tooth is not at all important.

Significant difference in mean acceptability was observed among urban and rural population ($P<0.05$). In urban population acceptability in anterior teeth declined to 2.88, while in posterior region it remains almost same as rural population (3.34). According to our study in all the three groups based on income, there was significant difference between the acceptance in anterior and posterior teeth in all the corresponding subdivisions.

In our additional analyses, we added parental age, income, and education to determine their potential modifying effects on parental acceptance ratings. Each covariate interacted with location such that acceptance of staining on the anterior teeth increased toward the level or more , already reported on the posterior teeth , among parents who were less than 30 age group , had higher income, and were more educated. As education and age of parent can have an effect on income, these characteristics tended to be confounded. So one cannot chastely relate the greater acceptance of SDF to the effect of higher income, high education, and younger age.

In the study group 50 % of parents reported that their child had cooperated with restorative treatment in previous appointment, whereas 12% reported that their child had experienced

some level of difficulty (child was upset, cried,) while higher level of discomfort requiring restraining the child physically was reported by 37% parents (kicked, or screamed). More the barrier for invasive dental treatment, higher the acceptance. In addition as the uncooperative behaviour of child increases, the difference between acceptance rate in anterior and posterior teeth also disappeared. (Table 1).

TABLE 1; Mean acceptability rating comparison between Anterior and Posterior teeth in accordance with difficulty in behaviour management during previous appointment

Behavior management	Teeth	MEAN	SD	Difference MEAN±SD	P value
Cooperative	Anterior	2.83	1.13	0.57±0.24	0.000
	Posterior	3.40	0.89		S
Upset & Cried	Anterior	3.59	0.74	0.19±0.13	0.070
	Posterior	3.78	0.61		NS
Kicked, Screamed	Anterior	3.52	0.68	0.29±0.28	0.058
	Posterior	3.81	0.40		NS

Statistical Analysis: Wilcoxon signed rank test. Statistically significant if P<0.0

Effects of education level of parent on acceptance of treatment in accordance with child behaviour was evaluated. It was evident that in less educated parents, acceptance of staining did not vary much with cooperation level of children. (Table 2). On the other hand in case of higher educated parents, acceptance increased with difficulty related to receiving treatment. Interestingly, differences in anterior versus posterior teeth acceptability disappeared when child had to have extended behaviour management techniques.

TABLE 2 ;Mean acceptability rating comparison between Anterior and Posterior teeth in accordance with parental Education.

EDUCATION	Teeth	MEAN	SD	Difference MEAN±SD	P value
High School or less	Anterior	3.17	1.00	0.35±0.18	0.000
	Posterior	3.52	0.82		S

Graduate	Anterior	3.40	1.06	0.40±0.65	0.109
	Posterior	3.80	0.41		S
Post graduate	Anterior	3.21	1.02	0.54±0.34	0.010
	Posterior	3.75	0.68		S

Statistical Analysis: Wilcoxon signed rank test. Statistically significant if P<0.05

Mean acceptance even on anterior teeth (3.76) raised towards the level of posterior teeth in parents who already experienced a long appointment time. (May be because of uncooperative behaviour of the child). As the appointment time becomes longer the significance difference which was seen in other two groups also disappeared (P =0.238). (Table 3).

TABLE 3; Mean acceptability rating comparison between Anterior and Posterior teeth in accordance with Appointment time during previous appointment.

Appointment time	Teeth	MEAN	SD	Difference MEAN±SD	P value
Very short	Anterior	1.88	1.26	0.75±0.17	0.005
	Posterior	2.63	1.09		S
Short	Anterior	3.05	0.85	0.57±0.21	0.000
	Posterior	3.62	0.64		S
Very long	Anterior	3.76	0.59	0.10±0.10	0.238
	Posterior	3.86	0.49		NS

Statistical Analysis: Wilcoxon signed rank test. Statistically significant if P<0.05

Age of child had significant influence on the parental acceptance. For children in the age group of 1-5, mean acceptability for anterior and posterior teeth were 3.51 and 3.86 respectively (p=0.000). However for elder children the acceptability reduced (2.33 and 2.93), p value being 0.006. (Graph 2)



Graph 2; Influence of age of child on parental acceptability of SDF staining on anterior and posterior teeth.

DISCUSSION

According to current literatures, topical application of silver diammine fluoride (SDF) solution has comparable results with interim GIC restorations and other fluoride delivery systems¹³ in arresting caries lesion.¹² One of the most significant barriers to the use of SDF is parental reluctance to this procedure due to its staining effect.

Overall sustained health status of any treatment is influenced by attitude and acceptability of patient. As per Lalumandier et al parents specifically have expressed major disquiets concerning the color of their children’s teeth. Parents are more sensitive to esthetic differences like stained anterior teeth than the therapeutic benefits of the same.¹⁴ In addition parents have high expectations regarding esthetic result of any new dental treatment. So it is very crucial to be aware of needs and anticipations of patients, regardless of age, before any treatment. Factors that may affect their level of acceptance could in turn aid clinicians in making treatment plan as per the situation.

The null hypothesis of this study was not supported by the present report, as acceptability was more on posterior teeth with a significant difference between anterior and posterior teeth. As per our observation parents were not willing to compromise aesthetics at the cost of therapeutic benefits, but not in all circumstances. There are certain scenarios that presents a barrier to the delivery of conventional dental treatment which raised the parental acceptance of SDF.

Parental acceptance of SDF was higher among parents of uncooperative children or children who require more advanced behaviour management, which is in accordance with study

conducted by Gordan et al. The same was reported by Clemens¹⁵ et al, and Crystal et al¹⁰. Higher levels of parental acceptance and lower level of difference in acceptance level between anterior and posterior tooth location was evident in high income group and those with more than a college education.¹⁰ Similar trends were evident for parents in the age group of less than 30 years. This is in contrast with study conducted by Crystal et al, where those in lower socioeconomic status (low income and less educated) showed more acceptance towards SDF treatment with no significant difference with cooperation level of child. However among those parents who had more education acceptance increased with difficulty receiving treatment and this is in accordance with that reported by Crystal et al. Knowledge regarding possible side effects of advanced behavior management techniques might be the reason behind this significant difference in acceptance in educated parents.

Various studies report that children cannot concentrate on a single mechanism not more than 30 minutes¹⁶. Though the length of the appointment should be as short as possible in children, it is not always practical, due to need of additional factors like behaviour shaping, difficulty in isolation and restricted mouth opening. Here comes the role of SDF, which is not only a time saver but also quite effective, efficient and safe¹⁰ in arresting and also preventing carious lesion. According to Chu et al even caries removal is not necessary before SDF application.¹⁷ As cooperation potential of child is age depended higher acceptance for SDF treatment was observed in parents of children younger than 5 years. A similar study reported that caregivers were most likely to accept SDF treatment for their children who were either < 6.¹⁹

Acceptability of staining caused by SDF application varied significantly according to location of the teeth and socioeconomic factors except for uncooperative child and an experience of long appointment duration. Nonetheless, 12 % of parents denied the material application on anterior teeth at any circumstance whereas 3.2% show strict unacceptability at posterior teeth. In contrast, Hu et al recently reported that most of the parents were satisfied with the esthetic outcome of SDF.¹⁹ Studies are been conducted to overcome the staining caused by SDF like use of tannic acid, which does not produced any additional effects.²⁰

There were some limitations in our study; study was conducted in a small sample which was available in the department OPD during the time period of one month. None of the parents had exposure to same treatment procedure before which might have affected their decision and preference. And regarding child behavior during previous dental treatment, we only had

the information provided by parents without having that behavior evaluated by a trained examiner. Therefore an extended study with a larger sample is required.

CONCLUSION

The study highlight the importance of following Guidelines and need of obtaining informed consent before SDF application. Parents should be assured that esthetic restorations can be used at a future date with improvement in child cooperation. Till then SDF restrain the caries process and diminish further morbidity. However the acceptance for this outstanding therapeutic medication can be upraised by providing esthetic results, for which there needed further research works regarding the same.

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