

Evaluation Of Commonly Treated Teeth With Silver Diamine Fluoride Among Children

Research Article

N.Naveenaa¹, Vignesh Ravindran^{2*}¹Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha University, Chennai- 77, India.²Senior Lecturer, Department of Pediatric and Preventive Dentistry, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences [SIMATS], Saveetha University, Chennai- 77, India.

Abstract

Introduction: Dental caries is a bacterial disease of calcified tissues of teeth and is characterised by demineralisation of inorganic and destruction of organic substances of tooth. Various approaches are done in managing and prevention of dental caries. In recent times, the oral hygiene and dental caries prevention are done by increasing the fluoride content in the form of dentifrices, mouth rinses. Silver diamine fluoride is suggested by many clinicians in the management of early childhood caries due to its enormous activities. As it is non-invasive, easily performed, and provides a satisfactory result with no systemic toxicity. The use of silver diamine fluoride has gained wide acceptance due to its easy application and its reach to all groups of population.

Aim: To evaluate commonly treated teeth with silver diamine fluoride among children.

Materials and Methods: The data were collected from 5,00,000 patient's case sheets from June 2019 – February 2021. A total of 58 samples were taken based on internal and external validation. The collected data were subjected to statistical analysis using SPSS software, IBM version 23. And the collected data were tabulated and both descriptive and inferential tests were done using chi-square.

Result: Out of 58 samples, 60.34% were females undergoing silver diamine fluoride treatment and the participants with age group 1-5 were treated more with silver diamine fluoride when compared to other age groups. Female children were predominantly treated with silver diamine fluoride in primary dentition compared to other groups which was not statistically significant (p-value=0.34).

Conclusion: Within the limits of the present study, female children were most commonly treated with silver diamine fluoride. Children with primary dentition were treated predominantly with silver diamine fluoride.

Keywords: Dental Caries; Silver Diamine Fluoride; Dentition; Innovative Material.

Introduction

Dental caries is a bacterial disease of calcified tissues of teeth and is characterized by demineralization of inorganic and destruction of organic substance of tooth. The caries incidence has been drastically increased with an increased consumption of sugar [1]. There are certain risk factors which include cariogenic bacteria, high sugar content, reduced salivary flow, low fluoride exposure, poverty and poor oral hygiene [2]. There are various approaches done to prevent and for the management of caries. In recent times, the oral hygiene and caries prevention are done by increasing the fluoride content in the forms of dentifrices, mouth rinses

[3]. Many clinicians have suggested silver diamine fluoride [4] as a preventive measure for the management of early childhood caries which is an easier procedure and can be carried out at a low cost. It is a colorless solution which contains ammonia, silver, fluoride ions where the fluoride ions help in demineralization of the hard tissue and the silver ions [5] have antibacterial effects. This is highly preferred as it is non-invasive, easily performed and gives a satisfactory result in management of dental caries in young children and also in children with special needs. But still some clinicians are concerned to use silver diamine fluoride as it can cause dental fluorosis in children, but only a smaller quantity is taken and placed over the carious lesion, so the systemic toxicity could be negligible [6].

***Corresponding Author:**

Vignesh Ravindran,

Senior Lecturer, Department of Pediatric and Preventive Dentistry, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences [SIMATS], Saveetha University, Chennai- 77, India.

Tel: +91-9789934476

E-mail: vigneshr.sdc@saveetha.com

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There are certain studies done which show that the silver diamine fluoride is 38% effective in inhibiting the demineralization of dentin and it protects collagen from getting destroyed [7, 8]. It is also proven that silver diamine fluoride has antibacterial properties and prevents the growth of caries causing bacteria [5]. A clinical trial was done in Santiago de Cuba in school children where they received 38% of silver diamine fluoride solution continuously for every 6 months over a period of 36 months on the carious lesion in primary teeth and all the permanent molars. It was found that the newer carious lesion surfaces were very less and about 77% of the active cases treated gave a positive result and the efficiency of prevention in primary teeth was 80% and 65% in permanent first molar [4]. It is also proven that silver diamine fluoride was used in high numbers in arresting, treating and also in prevention of caries [9]. The main challenge faced was, there are not many previous studies and the sample size is found to be smaller. Correlating with that, there were no generalized results and no external validity.

This research is mainly done to determine the prevention of caries using silver diamine fluoride and the tooth which is commonly treated. As there are not many previous studies, this might help in better evaluation of caries prevention and management. And also to promote the application of silver diamine fluoride into common practice as it is less invasive and positively helps in arresting and preventing caries. Our team has extensive knowledge and research experience that has translated into high quality publications [10-22, 23-29] The aim of the study is to evaluate the commonly treated teeth with silver diamine fluoride among children.

Materials and Methods

The study was done under a university setting. The Ethical approval was obtained from the Institutional ethical committee. About 2,00,000 case sheets were obtained from June 2019 to March 2020. Informed consent was obtained from the parents or guardian regarding usage of the clinical data for research purposes.

Inclusion criteria were patients between the age group of 2-17 years, who underwent topical application of silver diamine fluoride for management of dental caries. Exclusion criteria includes patients above 18 years of age, and those patients who were not treated using silver diamine fluoride.

Digital entry of clinical examination, intraoral photographs of the oral cavity and the treatment procedure were assessed. The data collected (digital entry and intraoral photographs) was verified by an external additional reviewer. The sampling bias was minimised by a simple random sampling method. If any error in data entry or patient details or clinical data were noticed, that case sheet was excluded from the study.

The data collected were tabulated in MS Excel and was then analysed in SPSS software version 22 (IBM Corp, Texas, LA). The independent variable includes age and dependent variables include gender, caries prevalence among children treated with silver diamine fluoride. Descriptive statistics were used and comparison between groups were done by using Chi square tests.

Results

A total of 58 patients were selected for the study. Among the children treated with silver diamine fluoride 39.66% were males while 60.34% were females. (Figure 1) 67.24% children were between 1-5 years of age, 24.14% were 6-12 years of age and 8.62% were 13-17 years of age. (Figure 2) Female children (44.83%) were predominantly treated with silver diamine fluoride in primary dentition compared to other groups which was not statistically significant (p -value=0.34)(Figure 3).

Discussion

A clinical trial in China was done where silver diamine fluoride was used over the carious lesion of primary anterior teeth for preschool children for a period of 18 months and the mean re-

Figure 1. Bar graph showing the gender distribution of children treated with silver diamine fluoride, violet colour represents male population with 39.66% and orange colour denotes female population with 60.34%.

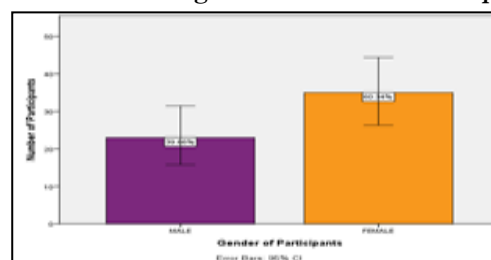


Figure 2. Bar graph showing the age-wise distribution of the children treated with silver diamine fluoride, in which blue colour denotes 1-5 years with 67.24%. Green colour denotes 6-12 years with 24.14%. Red colour denotes 13-17 years with 8.62%.

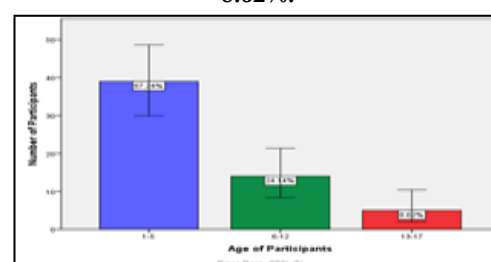
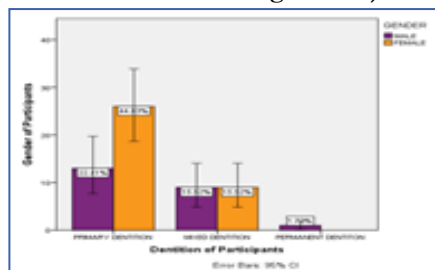


Figure 3. Bar graph depicts the association between gender and the commonly treated dentition with silver diamine fluoride. X axis represents the different dentition belonging to its respective gender and Y axis represents total number of participants. Violet colour denotes the male population and orange colour denotes female population undergoing silver diamine fluoride treatment. Female children (44.83%) were predominantly treated with silver diamine fluoride in primary dentition compared to other groups. This difference was not statistically significant (Pearson's chi-square value = 1.83; p-value=0.34 - not significant).



sults showed that only 0.4% of new caries was seen per child in the population that has received silver diamine fluoride. In addition to that it also helped in arresting caries in children with no increase in risk of tooth becoming non vital for a period of 30 months [30].

A clinical study in Japan which was carried out for a period of 30 months on 220 young children using silver diamine fluoride showed a significant reduction of the severity of the caries up to 52% in those children receiving it when compared to those who aren't receiving them [31]. In another study, there was a marker reduction up to 47% in newer development of caries. A panel was made where the use of 38% of silver diamine fluoride for arresting caries and its prevention in primary teeth was assessed. It proved to be a better way of carrying a caries management program. As it is low cost, less invasive and can even reach all groups of population. So as per the panel silver diamine fluoride application can even reach targeted populations with a low quantity of recommendation [32].

Studies have also shown that silver diamine fluoride shows better properties than glass ionomer cement or fluoride varnish [33] in controlling caries in primary teeth [30, 34] and most importantly it is not always that the caries must be removed before the application of silver diamine fluoride. The application of silver diamine fluoride doesn't require any high end instruments or techniques so its cost effective material to arrest caries and risk of any infection is also less.

Another randomized split mouth study was done to find the effect of silver diamine fluoride on the primary molars over the proximal surface with or without enamel lesions in children belonging to the age group of 5-7 years where the application of silver diamine fluoride was done every 3 months over a period of 18 months. It was observed that 56% lesser lesions were observed in upper teeth and 71% less in lower teeth [35]. Studies were done using 10% SDF to prevent caries in primary and permanent teeth, it was found that it was effective in arresting caries in the primary teeth whereas incapable in arresting caries in permanent teeth [36]. A similar study done in Nepal using 12% SDF proved to be ineffective in arresting primary caries [8]. So from the above various studies it is clear that silver diamine fluoride used in primary dentition is useful in arresting, preventing and managing early childhood caries.

The main advantage could be the maximum internal validity, simi-

lar ethnicity. The possible limitation of this study was mainly minimum external validity, reduced sample size and uni-centric study. In future, the study can be multicentric and with higher sample size to provide better results.

Conclusion

Within the limits of the present study, female children were most commonly treated with silver diamine fluoride. Children with primary dentition were treated predominantly with silver diamine fluoride. Silver diamine fluoride can be used frequently in appropriate quantities and time intervals in prevention of carious lesions. Encouragement of use of newer preventive methodologies like silver diamine fluoride must reach all groups of population in prevention of caries.

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