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Prevalence of parents willingness to take up fluoride treatment for their children, the gender differences and common age of acceptance - A retrospective study

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ABSTRACT

Fluoride used as a chemotherapeutic agent for caries prevention has been widely researched and documented. The change in the prevalence of caries and advent of different fluoride formulations along with the desire to maximize the benefits and minimise the side effects has led to evoking guidelines for its use. Fluoride varnish, which is one of the most important materials to prevent early childhood caries, is easy to apply and well-tolerated by children. The study aims in assessing the perception of parents towards professional fluoride treatment, opinions, differences and evaluating the prevalent condition. The study was performed in the outpatient department of Pediatric and Preventive Dentistry. Data required for the study was procured by reviewing patient records and analysed data of 86000 patients between June 2019 to March 2020. The data was sorted in excel and statistically analysed using the IBM SPSS software analysis and the results interpreted in graphs and tabulations. The prevalence of fluoride treatment was found to be 37.7%. The study shows a female predilection (Chi-square test; p-value- 0.252) and age is found to be negatively correlating with fluoride type ($p<0.01$). It is imperative that regular professional fluoride treatment for pediatric patients is followed by parents to prevent and manage tooth decay effectively.

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INTRODUCTION

Dental caries is one of the most chronic conditions especially among children aged 2 to 5yrs, and the presence of untreated caries can affect the child's esthetics, causing them pain and interfere in the child's day to day activities (Halabi, 2015; Ravikumar *et al.*, 2017).

The use of fluoride in various methods such as water fluoridation, toothpaste, sealants, mouth rinses, professional topical agents is considered a measure of great importance for the prevention of dental caries, owing to the anti-cariogenic property of dental caries (Marinho, 2004, 2015; Govindaraju *et al.*,

2017b). Fluoride varnishes have been described as the most convenient form of professional use of topical fluoride in preschool children, based on the premise that they are easy to apply and well-tolerated (Govindaraju *et al.*, 2017a). The application time of varnish varies from 1 to 4 minutes. Varnish acts by hardening on contact with saliva and thereby forming a film that sticks to the dental surface. Thus it can remain on the surface of enamel for several hours (Christabel, 2015; Packiri, 2017; Subramanyam, 2018). Fluoride varnish which is one of the most important materials to prevent early childhood caries is easy to apply and well-tolerated by children (Govindaraju *et al.*, 2017c; Jeevanandan *et al.*, 2019)

A fluoride gel, another formulation of fluoride apart from varnish, is also a professional topical administration method, widely used in school going children and young adults (Panchal *et al.*, 2019; Mishra, 2017). The gel is usually placed on a tray of foam material, which the child or young adult has to keep in their mouth and has to bite into for 4minutes (Jeevanandan and Govindaraju, 2018; V. Panchal., G. Jeevanandan., E. M. G. Subramanian, 2019). Cases have been reported where young people unusually accidentally swallow some of the gel, feeling sickness, vomiting, headache and stomach pain (J Godel., Canadian Paediatric Society and Community Paediatrics Committee, 2002; Govindaraju, 2017). Due to this risk of toxicity, fluoride gel treatment is generally not recommended to children below 6years of age (Ismail and Hasson, 2008; Thakare *et al.*, 2012).

Parental knowledge with respect to the first dental visit of their child, the correct time to start cleaning the child's teeth, a quantity of toothpaste used, cariogenic effects of dietary food, the requisite for fluoride treatment etc., needs to be improved (Clark, 1993; Sköld-Larss *et al.*, 1999).

The aim of this study is to analyse the prevalence rate of parents allowing fluoride treatment for their children, the gender differences and common age of acceptance in the department of pediatric and preventive dentistry, Saveetha Dental College.

MATERIALS AND METHODS

The study was performed as a retrospective study under a university setting in the outpatient department of Pediatric and Preventive Dentistry, Saveetha Dental College. The advantages of this study include available data, the population of various strata of society while the disadvantages account for the study being unicentric, geographical trends not assessed. Ethical approval was obtained from the institutional committee (ethical approval number: SDC/SIHEC/DIASDATA/0619-0320). Data required for the study was procured by reviewing patient records and analysed data of 86000 patients between June 2019 to March 2020. The total sample size of the study is 5000. To eliminate bias, simple random sampling was done to narrow down the sample size to 4339. Verification of the data was done with the presence of additional reviewers procedure notes and photographs of application of fluoride. Stratification and randomisation were done to minimise sampling error. Data that were incomplete were excluded. Internal validity - yes, external validity - no. The obtained data were tabulated in excel systematically. Data were then entered in the SPSS analysis software and descriptive analysis and correlation statistics performed. The obtained results were tabulated and graphically represented.

RESULTS AND DISCUSSION

The total number of pediatric patients in this study was 4,339. Among them, the number of individuals subjected to fluoride is 1638 with varnish administered for 338 individuals and fluoride gel administered to 1300 individuals. 2,701 individuals were found to have not been subjected to fluoride treatment in this study. The prevalence rate was obtained to be 37.7% [Figure 1]. The rates of fluoride gel administrations versus fluoride varnish, as observed in this study showed fluoride gel having a greater prevalence rate compared to fluoride varnish [Figure 4]. The mean age of acceptance to fluoride gel treatment observed to be around 11yrs. The mean age of acceptance for fluoride varnish in this study was observed to be between 5yrs. Children who were females had a higher prevalence of fluoride treatments. (Chi-square test; p-value- 0.252 - statistically not significant) [Figure 3]. The gender distribution of the study shows a female predilection for the administration of both fluoride gel and fluoride varnish (Chi-square test; p-value- 0.252). Higher incidence of use of fluoride gel was noticed in Undergraduates clinics while Postgraduates preferred to use fluoride varnish. (Chi-square test; p-value- 0.000, statistically significant). [Figure 4]. The preference to treatment from undergraduates vs postgraduates in this study was reported that parents prefer treatment from undergraduates rather than postgraduates for fluoride gel while only postgraduates are allowed to handle fluoride varnish treatment for pediatric patients (Chi-square test; p-value- 0.000). Mean age of children who underwent fluoridevarnish treatment was 5years of age, while fluoride gel treatment was 11years of age. [Figure 2]. SPSS statistics performed, Pearson correla-

tion analysis done and the result interpreted, which shows age negatively correlates with fluoride type ($p<0.01$).

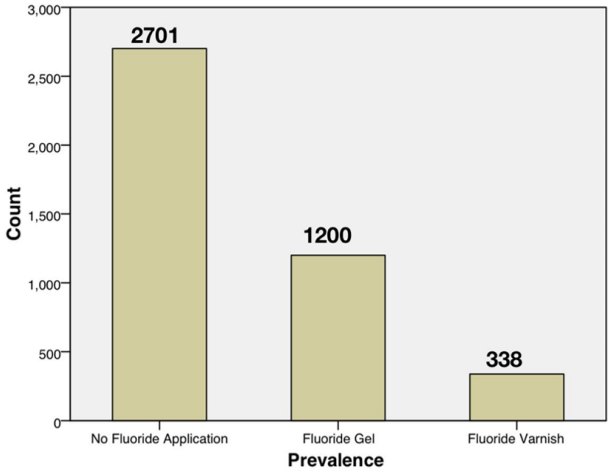

Figure 1: The prevalence of fluoride treatment among the participants in the present study. Prevalence of fluoride treatments was 37.7%

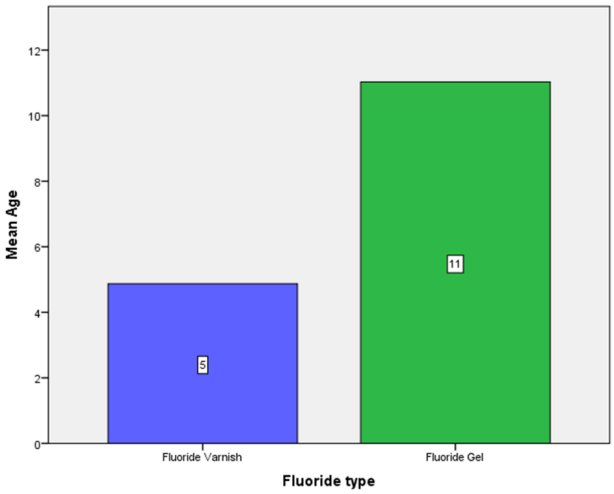

Figure 2: The mean age of the children involved in different fluoride treatments.

Topical application of fluoride gels has been used widely as a measure for the intervention of caries in dental clinics and school-based programs for over three decades (Dorri, 2016). Dental preventive therapy should start early in a child's life. The need for early intervention is to reduce or eliminate oral diseases and the lack of awareness among children about oral health, mandate the involvement of parents in the prevention process (Alkhtib and Morawala, 2018; Mamat, 2018). Studies have reported that low parental knowledge and a poor attitude towards oral health are associated with an experience of high caries in young children (Blinkhorn, 1989; Watson, 1999; Gussy *et al.*, 2008). It is a requirement that only if parents have

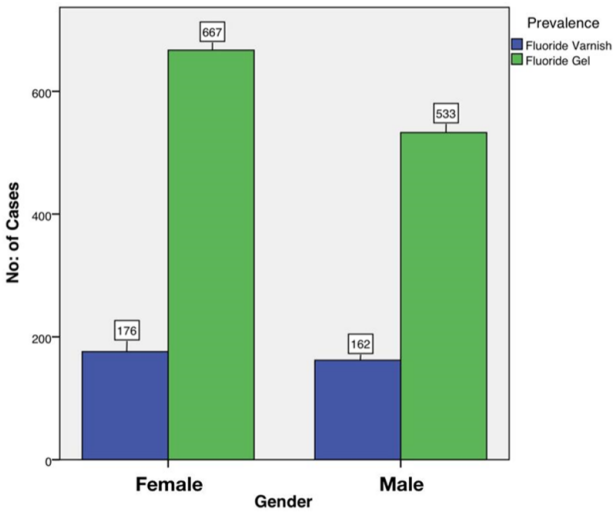

Figure 3: The distribution of children involved in fluoride treatments based on gender.

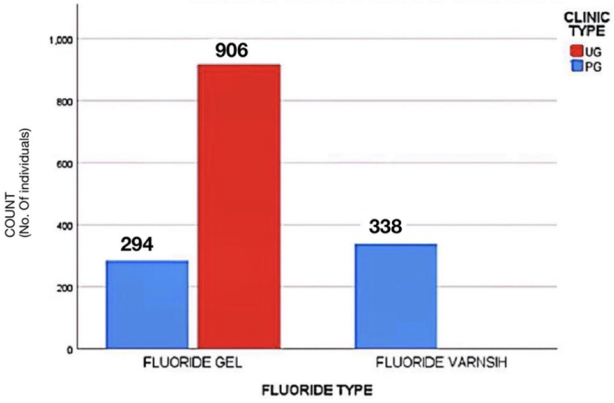

Figure 4: Bar graph comparing the fluoride treatment based on clinic type.

a positive perspective towards dentistry that it will have a good impact on their child's oral health.

From the results, the prevalence of fluoride treatment in this study was observed to be 37.7%. Our study is in concordance with previous literature and reports a low incidence of fluoride treatment in pediatric dentistry (Chi, 2014; Hendaus *et al.*, 2018). These can be attributed to the fact that many parents are not aware of fluoride treatment and refuse; however, on awareness can accept the treatment.

From the data analysed, it was reported that the mean age of this study, for children undergoing topical fluoride treatment, was 11 years and for fluoride varnish, the mean age of acceptance was found to be 5 years. No previous literature was observed to have interpreted similar findings.

The gender distribution of this study reveals a female predilection towards acceptance of fluoride treatment. This can be attributed to the fact that the study is performed unicentric, hence unequal distri-

bution of a population. No previous literature was observed to have interpreted similar findings.

Fluoride gel is clearly greater in prevalence compared to fluoride varnish in our study. It is due to factors such as fluoride gel is prescribed for children above 5yrs up to 17yrs, while fluoride varnish is recommended for preschool going children and hence an unequal distribution of the sample data. Previous studies cite facts in concordance with our findings that gel is widely used compared to fluoride varnishes (Chi and Basson, 2018).

The preference to get treatment from undergraduate or postgraduates by parents as depicted shows that in our study, parents prefer undergraduates treating their children for fluoride gel compared to postgraduates. This can be due to the influence of factors such as ambience of general clinics, the undergraduate clinician's attitude towards the child and parent and their quality of work. Previous literature, however, cite that in general postgraduates are better in handling pediatric cases. Our study results are not in concordance with previous literature which point out postgraduates are expertise in behaviour management of children exclusively (Hamasha and Hatiwsh, 2013; Ibrahim *et al.*, 2017). However under effective training and knowledge on how to handle and manage pediatric patients, undergraduates can also be skilled in treating and managing pediatric patients. Fluoride varnish has been observed to be exclusively treated by only postgraduates.

The statistical analysis performed using the IBM SPSS software analysis to establish or check if there is an existing correlation between the parameters assessed, show that age negatively correlates with fluoride type. Previous studies have also been performed using the analysis software to establish a significant correlation if any (Das, 2013). The statistical analysis of our study shows that age negatively correlates with fluoride type, which is significant ($p<0.01$).

Fluoride treatment is amiable in controlling caries, thereby leading to a reduced risk assessment and is cost-effective (Somasundaram, 2015; Ramakrishnan and Shukri, 2018). It is an easy to administer technique hence advised in clinical practice and is imperative to educate the parent and child regarding the same (Gurunathan and Shanmugaavel, 2016).

The advantages of this study imply that this study was performed with available data and population of variant economic stature. The limitations of the study include that it was performed as a unicentric study, smaller sample size, unequal distribution and geographical trends not assessed. Larger sample size and different ethnicity of the participating patients can yield better results. It is also essential to create awareness of the importance of fluoride with respect to various factors such as control early childhood caries, reduce caries risk in children among parents and the general population.

CONCLUSION

Within the limitations of this study, the prevalence of fluoride application was observed to be 37.7% and the common age group of acceptance for fluoride gel is 11yrs and for fluoride varnish is 5yrs, with the predilection of females.

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Conflicts of Interest

The authors declare that they have no conflict of interest for this study.

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