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Awareness Towards Fluoride Application Therapy Among Outpatients Reporting a Private Dental College in Chennai

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ABSTRACT

Introduction: Dental caries is an infectious disease affecting mostly children but can be presented at early stages. Fluoride is considered as an effective method in lowering dental caries via enhancing remineralisation and inhibiting demineralisation. An awareness survey was conducted with an aim to determine the awareness of outpatients towards fluoride application therapy.

Materials and Method: A questionnaire of 10 questions was prepared and distributed among a convenience sample of 120 outpatients via an online survey platform. The data was collected and analysed. The data was analysed using SPSS and chi square test was used to analyse the association between variables.

Results: Approximately 55% participants were between the age group of 26-50 years and 64% were males. Around 55% participants were aware about fluoride application therapy. 54% of the participants believed that dental caries can be prevented by fluoride application. Approximately 53% of the participants had a positive attitude regarding fluoride gel application therapy. Males were more aware about the various sources of fluoride (p=0.50). Participants in the age group of 26-50 years old were found to be more aware about the benefits of fluoride application therapy (p=0.005).

Conclusion: The results of this study demonstrated that nearly half of the participants were aware about fluoride gel application therapy, but some gaps were observed, suggesting more awareness could be spread among the patients.

Key words: Fluoride, remineralization, demineralization, caries, innovative analysis

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INTRODUCTION

Dental caries is defined as damage to the tooth caused by plaque and bacteria. The carbohydrate component of the food in the mouth is fermented by bacteria, producing acids leading to demineralisation of tooth enamel [1]. This process is usually exacerbated by the lack of adequate dental hygiene. The American Dental Association (ADA) and the National Institute of Health and Care Excellence (NICD) Place emphasis on the prevention and early detection of dental caries as the most important elements in any healthcare program [2]. With the current level of evidence, fluoride is well documented as an effective preventive method against dental care for people at risk of developing Dental caries via enhancing re-mineralisation and innovating demineralization [3].

Most scientific evidence indicates that topical fluoride therapy applied by a dentist can effectively reduce the incidence of dental caries. Topical application of fluoride by a dentist four times a year has been reported to result in 86% reduction in the number of dental caries [4,5].

When fluoride, a universally used chemotherapeutic agent, is used topically in the mouth, its anti-caries action is *via* three mechanisms: inhibiting demineralization, enhancing remineralization and inhibiting plaque bacteria [6,7].

Topical fluoride in solution inhibits demineralization by adsorbing negative fluoride ions to the surfaces of crystals in teeth and acts as a physical barrier against acids. In addition, if fluoride is available during the remineralization process, the newly forming crystal will incorporate fluoride instead of hydroxyl. By

incorporating the more electro-negative fluoride ion at the hydroxyl position, a more perfect crystal is created with a highly acid resistant surface called fluorapatite [8]. The second way fluoride helps control caries is by speeding up or "enhancing" remineralization, a natural process that occurs if acid is neutralized by salivary buffers and if there are adequate levels of calcium and phosphate present in solution in the saliva to allow crystal growth. The negative fluoride diffuses subsurface and helps attract positively charged calcium ions, which then attract phosphate ions to the area needing remineralization [8].

The third way fluoride works is by its antibacterial effects. Fluoride diffuses into the bacterial cell wall as a neutral HF molecule then dissociates in the cytoplasm releasing HF and F^-. The F^- inhibits key enzymes that stops glycolysis and also acidifies the cytoplasm by not allowing H^+ to be removed [8].

The principal topical preparations of fluoride are 1 ppm fluoride in fluoridated drinking water, 225 ppm fluoride in Over-The-Counter (OTC) daily rinses, 900 ppm fluoride in a weekly prescription rinse, 1000 ppm-1500 ppm fluoride, available in OTC toothpastes, and 5000 ppm fluoride, available in prescription gels and toothpastes [9].

Fluoride in toothpastes, water supplies, and professionally applied are well known modes of preventing dental caries. A coherent study has shown that fluoride in varnishes, toothpaste or gels can reduce dental caries by 26% in children and adolescents [10].

Despite the use of preventive procedures, the percentage of people involved in these services are less. One of the barriers to this utilisation of preventive dental care is lack of public awareness. Knowledge about professional preventive dental care is very important to improve the collective consciousness to improve the oral health of the population. Our team has extensive knowledge and research experience that has translated into high quality publications[11-30]. Hence the aim of this study is to determine the awareness of outpatients towards fluoride application therapy.

MATERIALS AND METHODS

Study setting

A cross sectional survey was conducted in Saveetha Dental College and Hospitals.

Study population

The survey was conducted among the outpatients reporting to Saveetha Dental College and Hospitals. A total of 120 participants enrolled for this study. The sampling bias was minimized by including all available data with no sorting process.

Study approval

Ethical clearance was obtained from the institutional review board

Study instrument

Survey was done using an interviewer administered questionnaire. The questionnaire was assessed by experts in the field for validity and reliability.

A questionnaire based online survey was conducted among 120 dental outpatients. The survey was created on Google Forms platform. A total of 10 questions were asked related to fluoride application therapy.

Statistical analysis

The collected data was tabulated and analysed with Statistical Package for Social Sciences for Windows, version 20.0 and results were obtained. Categorical variables were expressed in frequency and percentage. Chi square test was used to test association between categorical variables. Chi square tests were carried out using age, gender as independent variables and responses as dependent variables. P value<0.05 was considered statistically significant**.**

RESULTS

In this study, more than half of the participants (54.7%) were between the ages of 26-50 years. Majority of the participants (64.2%) were male.

Approximately 55% of the participants were aware about fluoride application therapy and out of the total participants 59% of them have undergone fluoride application therapy once. Out of the total participants 48% of them were aware about the various sources of fluoride and approximately 62% of the participants were aware about the benefits of fluoride application. 54% of the participants believed that fluoride application helps in prevention of dental caries and 55% were aware that fluoride gel application is indicated for patients who underwent gum surgeries. Fluoride application therapy is usually indicated for children, and around 46% of the participants believed that fluoride application is indicated in children after tooth eruption. Approximately 53% of the participants had a positive attitude regarding fluoride gel application therapy.

The age group of 26-50 years old were found to be more aware and knowledgeable about the sources of fluoride (Figure1), benefits of fluoride application therapy and this was found to be statistically significant (The Chi square test, p=0.005) (Figure2).

Males were more aware about the various sources of fluoride when compared to female respondents and this difference was not statistically significant (Figure 3). Male study participants were more aware about the benefits of fluoride application therapy when compared with female study participants. However, this was not statistically significant (Figure 4).

DISCUSSION

Dental caries is defined as damage to the tooth caused by plaque and bacteria. The carbohydrate component of the

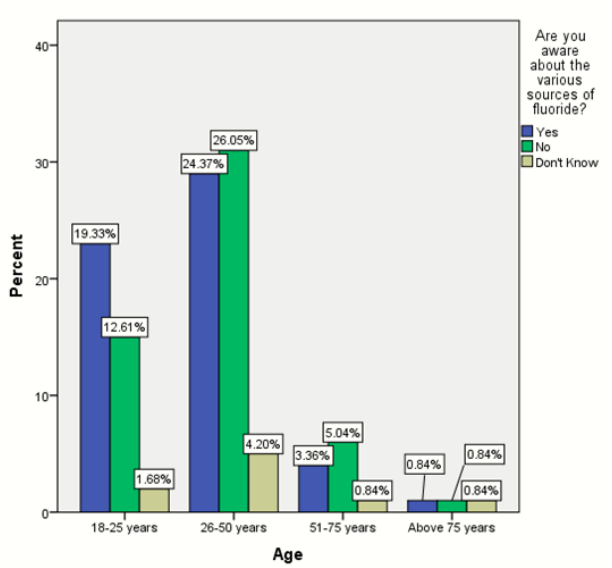

FIGURE 1: This graph represents the awareness about the various sources of fluoride among different age groups. X-axis denotes the different age groups and Y-axis denotes the responses of the question "are you aware about the various sources of fluoride. "Blue colour denotes 'Yes', green colour denotes 'No', and brown colour denotes 'Don't Know'. The age group of 26-50 years old were found to be more aware and knowledgeable about the sources of fluoride. The Chi square test was found to be statistically not significant (p=0.50).

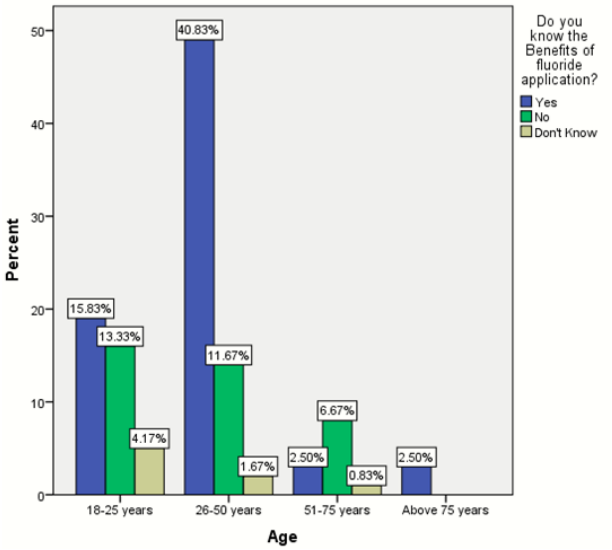

FIGURE 2: This graph represents the Knowledge about the benefits of fluoride application among different age groups. X-axis denotes the different age groups and Y-axis denotes the responses of the question "Do you know the benefits of fluoride application. Blue colour denotes 'Yes', green colour denotes 'No', and brown colour denotes 'Don't Know'. The age group of 26-50 years old were found to be more aware and knowledgeable about the benefits of fluoride application therapy. The Chi square test was found to be statistically significant (p = 0.005).

food in the mouth is fermented by bacteria, producing acids leading to demineralisation of tooth enamel. With the current level of evidence, fluoride is well documented as an effective preventive method against dental care for people at risk of developing Dental caries via enhancing re-mineralisation and inhibiting demineralization [31].

Topical fluoride application in the form of toothpastes, mouth rinses, varnishes, and gels has been shown to

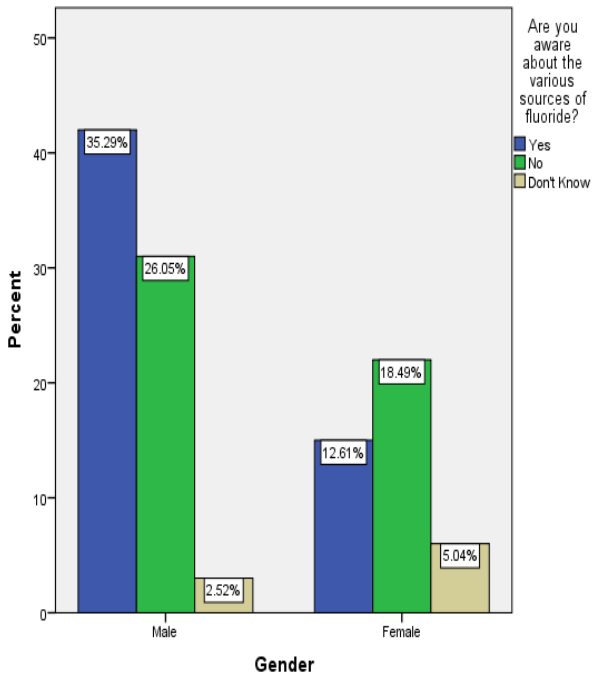

FIGURE 3: This graph represents the awareness about the various sources of fluoride among different age groups. X-axis denotes the different genders and Y-axis denotes the responses of the question "are you aware about the various sources of fluoride". Blue colour denotes 'Yes', green colour denotes 'No', and brown colour denotes 'Don't Know'. Males were more aware about the various sources of fluoride when compared with female study participants. However this difference was not statistically significant (Chi square test p=0.35).

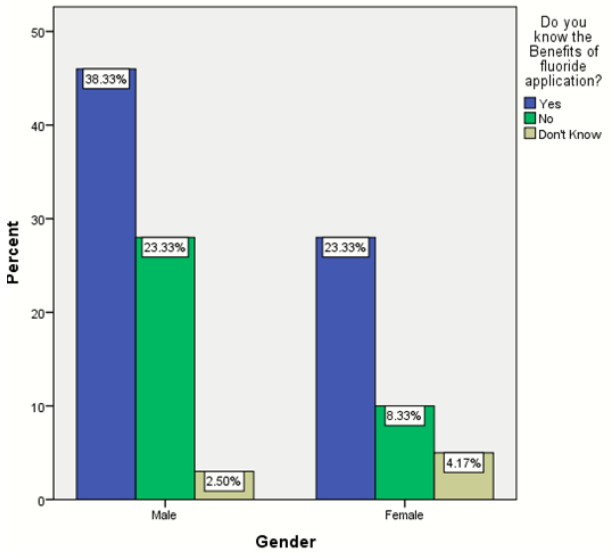

FIGURE 4: This graph represents the Knowledge about the benefits of fluoride application among different age groups. X-axis denotes the different genders and Y-axis denotes the responses of the question "Do you know the benefits of fluoride application". Blue colour denotes 'Yes', green colour denotes 'No', and brown colour denotes 'Don't Know'. Males were more aware about the benefits of fluoride application therapy. The Chi square test was found to be statistically not significant (p=0.120)

prevent dental caries [32].

Even though fluoride is generally present in our everyday life, we consume it in small amounts. In general, it can be found in meat, fish, and cereals. In higher concentrations, it can also be found in canned anchovies,

canned fruits, ground chicken meat products (with a higher percentage of ground bones), chocolate milk and some baby dietary supplements. In certain countries, preventive methods also include fluoridated milk and salt. Fluoridated salt has been widely used in Germany, France and Switzerland since 1955. Nowadays, 30 to 80% of marketed salt is fluoridated. Salt usually contains 250 ppm of fluoride, whereas milk contains 2.5 ppm or up to 5 ppm of fluoride. In the current study, younger individuals had more knowledge and awareness about the various sources of fluoride. [33, 34].

46 (38.3%) males and 28 (23.3%) females are aware about the role of topical fluoride in preventing dental caries and the other benefits of fluoride therapy. This shows that the awareness is more among the population who regularly visit the dentists. A similar survey was conducted by S. Nagarajan (July 2009, Malaysia) where 183(91.5%) of the respondents were aware of these fluorides and their anticariogenic effect. This shows that awareness was high in developed countries for quite some time, while in our country awareness regarding these topical fluorides has just started to grow [35].

Despite the use of preventive procedures, percentage of people involving in these services are less. One of the barriers to this utilisation of preventive dental care is lack of public awareness. Knowledge about professional preventive dental care is very important to improve the collective consciousness to improve the oral health of the population. Media also plays an important role in dental awareness and hence awareness on the application of topical fluorides to prevent caries, can be in the form of presentations in movie halls in rural areas and also through television network. Since more number of people nowadays are using mobile phones, SMS messages regarding topical fluoride therapy can be sent to bulk customers with the approval of TRAI and DCI.

There were certain limitations to this study, such as limited sample size and geographical limitation. Further studies with larger sample sizes and across a large platform might help increasing the awareness among the general public for fluoride application therapy. The role of public health dentistry professionals should create more awareness for oral hygiene, regular dental checkups, and preventive primary measures for caries prevention. More dental camps should be conducted in schools and colleges to create awareness for topical fluoride application in preventing dental caries at an early age.

CONCLUSION

The results of this study demonstrated nearly half of the participants were aware about fluoride gel application therapy.

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