MERIT RESEARCH JOURNALS
www.meritresearchjournals.org

Merit Research Journal of Medicine and Medical Sciences (ISSN: 2354-323X) Vol. 6(3) pp. 121-125, March, 2018
Available online http://www.meritresearchjournals.org/mms/index.htm

Original Research Article

Dental Fluorosis Prevails among Primary-Schools' Students in Najran City-Saudi Arabia

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Abstract

The aim of this study was to determine the prevalence and risk factors associated with dental fluorosis among school children in Najran, Saudi Arabia. A multi-stage sample technique was used and 288 girl students from 3 different public primary schools were surveyed and examined for fluorosis. The principal method of data collection was a semi-structured questionnaire beside clinical examination that was guided by Dean's Index. The number of surveyed students with dental fluorosis among the total examined population was 172 (60%) and the most prevailing types were the mild and moderate forms of fluorosis that affect 129 students (44.79%). Statistically, no significant difference was identified among the reported age groups (*P*-value 0.071), while the fluorosis occurrence was significantly associated with hereditary factors as well as frequency of exposure to toothpastes (fluoride) with *P*-value 0.001 and 0.012 respectively. Fluorosis was significantly (P<0.05) influenced by family history of fluorosis, drinking water source and abstaining from using fluoride-toothpastes. Dental fluorosis prevails among school children in Najran city and associates with family history of fluorosis, consuming well water and abstaining from using fluoride-toothpastes.

Keywords: Children, Dental fluorosis, Prevalence, Risk factors.

INTRODUCTION

Dental fluorosis (also termed mottled enamel), is an extremely common teeth disorder that is characterized by hypomineralization of tooth enamel which is caused by ingestion of excessive fluoride during enamel formation (Chauhan et al., 2012). Dental fluorosis is a dental public health concern in countries or areas that is enriched with a high amount of natural existing fluoride (Mascarenhas, 2000). McDonagh et al stated that the prevalence of dental fluorosis indicates that children are ingesting other sources of fluoride besides drinking water (McDonagh et al., 2000). In areas where drinking water is obtained directly from deep wells, dental fluorosis is often endemic and in many cases, the deeper the wells, the higher the fluoride concentration in drinking water (Maya et al., 2016).

Fluorosis appears as a range of visual changes in enamel which causes degrees of intrinsic tooth discoloration, and in some cases, physical damage to the teeth (Catani et al., 2007).

Fluoride is considered an important factor in the prevention and management of dental caries, inhibiting demineralization and stimulating remineralization. However, excessive usage of fluoride will lead to fluorosis (McDonagh et al., 2000). The severity of dental fluorosis depends on when and for how long the overexposure to fluoride occurs, the age of the child, individual susceptibility to fluorosis that is influenced by genetic factors. Other factors that may increase the individual susceptibility to dental fluorosis are malnutrition and renal insufficiency (Jiang et al., 2005).

The most common form of fluorosis is the "very mild" form that is characterized by small, opaque "paper" white areas that scattered irregularly over the tooth and cover less than 25% of the tooth surface. The "mild" form of fluorosis is characterized by mottled patches that can involve up to half of the surface area of the teeth. When fluorosis is moderate, all of the surfaces of the teeth are mottled and teeth may be ground down and brown stains frequently "disfigure" the teeth. Moreover, severe fluorosis is characterized by brown discoloration and discrete or confluent pitting, brown stains are widespread and the affected teeth often have a corroded-looking appearance. In moderate to severe fluorosis, teeth are physically damaged (Aoba and Fejerskov, 2002). Interestingly, people with fluorosis are relatively resistant to dental caries (tooth decay that caused by bacteria), although they may be of cosmetic concern (Clark and Slayton, 2014).

Statement and analysis of the problem

It is known that the middle years of childhood are extremely sensitive times for a number of health issues, especially when it comes to dental health problems; one of these problems is dental fluorosis. During this period the teeth are at high risk to developing fluorosis, though there have been some researches that propose that the most crucial course is during the first 4 years of life. There is very limited information in the literature regarding the prevalence of dental fluorosis in Najran. Therefore, this study was carried out to assess the prevalence of dental fluorosis as well as to study the associated risk factors among school attendees in Najran, Saudi Arabia.

MATERIAL AND METHODOLOGY

A descriptive study with cross-sectional design was carried for 9 months from September 2016 to May, 2017 on girl students from 3 public primary girls' schools in Najran city to determine the prevalence rate of dental fluorosis among girl students. Furthermore, the influences of family history, family income, caregivers' (mothers) level of education and employment status, frequency of teeth-brushing, age of students and sources of drinking water were examined. Before examining the students, a verbal informed consent was obtained from spouse, parents or caregiver of each subject. A multistage random sample technique was used and therefore, 288 students from 3 different public primary schools for girls were surveyed and examined for fluorosis. The principle method for data collection was a semi-structured questionnaire beside clinical examination guided by Dean's index (Dean, 1942). It is the first ever index for measuring prevalence and severity of dental fluorosis, and it is widely recognized and accepted until date. The dental examination was carried out in a common hall at each school outside the class room under bright day light. A licensed and experienced female dentist examined the teeth of each student with a separate sterile set of no.-4 mouth mirrors and no. 23 explorers.

The data were analyzed with Statistical Package for Social Science (SPSS) version 20. Data was displayed as counts and percentages. Chi-x test was used to test the effect of the studied variables on fluorosis. A probability of (0.05) was considered significant.

RESULTS

Demographic data of the surveyed students

As shown in table (1) the number of female students surveyed was 288. The age of the recruited participants was ranged from 6 to 12 years old. The students whose age range between 6 - 8 years old were 156(54.2%) and those of 9 – 12 years old were 132(45.8%). The mean age of the surveyed students was 9.6 ±1.3 years. The level of education of the majority of the students' mothers/caregivers 232(80.6%) is primary or secondary education respectively. The family's monthly income of 249 (86.4%) of them is over 6000 SR. Although, 186 (64.6%) of them are unemployed mothers.

Incidence of dental fluorosis among the surveyed students sample

As shown in figure (1) about 60% of the surveyed female students suffer from dental fluorosis. Six students suffer severe dental fluorosis, while only 10% suffer moderate fluorosis , moreover, 20% of them suffer from mild fluorosis and 14% suffer very mild fluorosis and 10% questionable, while 40% unaffected.

Effects of examined risk factors on incidence

The surveyed students' age and family income have no significant (P>0.05) effect on the incidence of fluorosis, while the incidence of fluorosis is significantly (P <0.05) increased with hereditary factors and frequency of exposure to toothpastes (Table 2).

Effect of water source on fluorosis incidence

Table (3) indicates the severity of dental fluorosis among respondents based on their sources of drinking water. Most of them were affected by mild to moderate extent. 17 individuals (5.9%) appear to have severe dental fluorosis. Chi-square test shows a significant association

Table 1. Socio-demographic characteristics of the selected sample and their caregivers

Variables	Category	Frequency	%
Age of student in years	6 -8	156	54.17%
	9 – 12	132	45.83%
Caregiver's level of education	Not educated	12	4.17%
	Primary/secondary education	232	80.56%
	University/higher education	44	15.28%
Family income	≤ 5000SR	39	13.54%
	6000-10000SR	84	29.17%
	≥11000 SR	165	57.29%
Caregiver's employment status	Employed	102	35.42%
	Not employed	186	64.58%

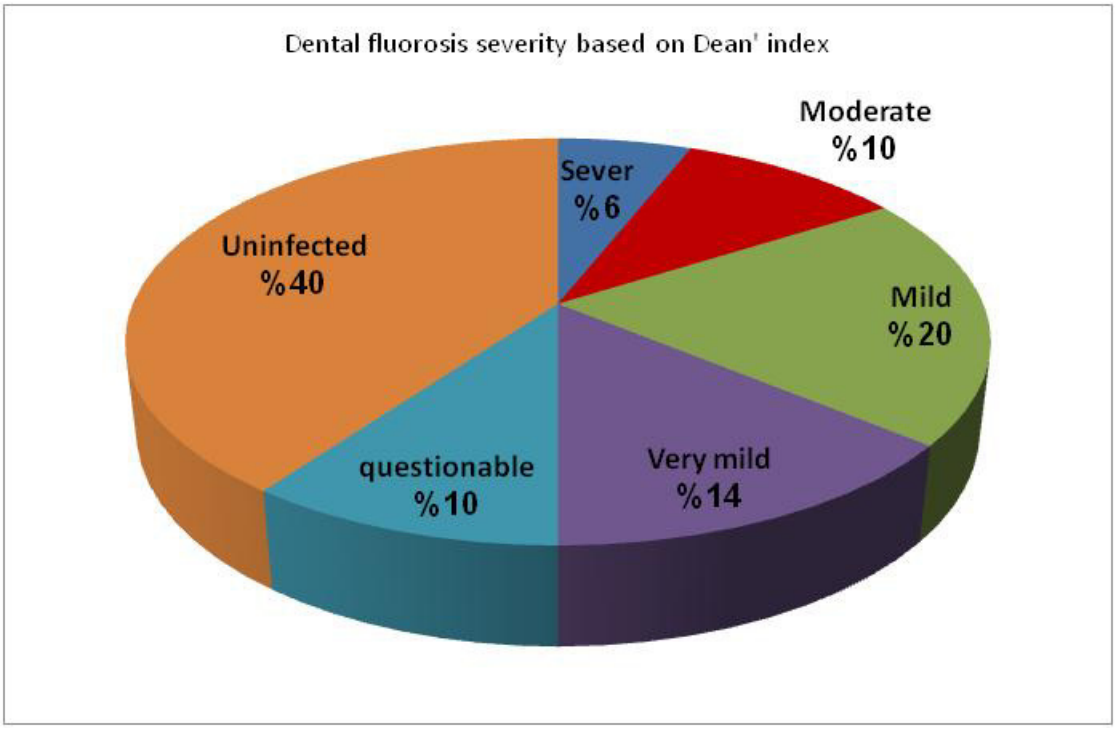

Figure 1. Displays incidence and severity of dental fluorosis among the surveyed sample

Table 2. Prevalence of dental fluorosis and its association with selected risk factors

Variable	Category	Dental fluorosis (%)		$\chi 2$	*P* value
		Present	Absent		
Age in years	6-8	80	76	0.37	0.071
	9-12	92	40		
Frequency of brushing teeth/ day	Once	55	64	2.86	0.012*
	twice	94	47		
	≥ three times	23	5		
Family history	Yes	137	64	3.80	0.001*
	No	35	52		
Family income	≤ 5000SR	20	24		
	6000-10000SR	51	33	0.79	0.084
	≥11000 SR	101	59		

Significant at $P< 0.05$

Table 3. Association between dental fluorosis and sources of drinking water

Variable	Severity of dental fluorosis						Total	$\chi 2$	*P*- value
	None	questionable	Very Mild	Mild	Moderate	Sever			
Commercial bottle/ mineral water	83	16	22	36	12	6	175	0.37	0.071
Community tanks / wells/ (refilling places)	33	10	19	24	16	11	113	2.86	0.012*
Tap water	0	0	0	0	0	0	0	0	0
Total	116 (40.28%)	26 (9.03%)	41 (14.24%)	60 (20.38%)	28 (9.72%)	17 (5.9%)	288		
P<0.001*									

among various sources of drinking water and extent of dental fluorosis (*P*< 0.001).

DISCUSSION

The presented study provides preliminary data on prevalence, severity and risk factors of dental fluorosis in Najran city, Saudi Arabia. Prevalence of dental fluorosis was found to be 59.72% among the total screened children (n=288). This finding is almost equal to the finding of Kotecha et al who reported an incidence of dental fluorosis of 59.31% among children of the district of Gujarat, India (Kotecha et al., 2012).

This obtained result is higher than what stated by AlDosari et al who reported a prevalence of 18% among 6-7 years old children and 28% among children aged 12 – 13 years old living in 11 different regions of Saudi Arabia (AlDosari et al., 2010). Moreover, this obtained result is higher than what was concluded by Kadir and Al-Maqtari in Yemen and Khan et al who stated that the prevalence of dental fluorosis among children aged 6 -11 was (33.4% and 30.8%) respectively (Beltran-Aguilar et al., 2010; Kadir and Al-Maqtari, 2010; Khan et al., 2015). These variations in results could be due to the different sources of drinking water, as here in Najran many people drink from wells. This assumption is supported by Otecha et al in India who reported that fluoridated water is directly or indirectly, responsible for 40% of dental fluorosis. Through water intake, children's formula or consuming food repared with drinking water and 60% of cases were attributed to other sources of fluoride (Otecha et al., 2012).

The results of the current study are far less than what reported by ALObaid and Wesal in Yemen, Hazza et al in Hail and Kola et al in India who stated that the prevalence of dental fluorosis was 77.8%, 73.5% and 70% in their studies respectively (AlObaid and Wesal, 2017; Hazza et al., 2015; Kola et al., 2017).

The results of the present study revealed that the prevalence of mild fluorosis was the highest among the rest of the fluorosis levels. It was found that out of the total number of screened children around 20% were suffering from mild fluorosis, followed by very mild and moderate degrees. Same pattern of fluorosis have been observed previously in a study conducted in Dammam, Saudi Arabia (Khan et al., 2015).

CONCLUSION AND RECOMMENDATION

Dental fluorosis prevails among school going children in Najran city and associates with family history of fluorosis, consuming wells' water and abstaining from using fluoridated toothpastes.

Controlling the fluoride intake is the best preventive measure for dental fluorosis. To identify different ways of intake fluoride by children are important too for determining which sources represent the most risk for the development of dental fluorosis. Moreover, creating public awareness on the various home defluoridation techniques is also equally important. This requires the synergistic action of health planners, health administrators, and water supply authorities.

The dentists too have to consider the recommendations for professional topical fluoride application, as well as instruct the parents or caregivers in what refers to the age for toothpaste introduction, the amount and concentration to be used in each age, in order to diminish the prevalence of dental fluorosis. Additionally, reduction in the amount of the used toothpaste can be achieved by educating parents or caregivers to offer small amount that equivalent to "pea size" and therefore, safe amounts of toothpaste.

ACKNOWLEDGMENT

The authors like to acknowledge the effort of doctor Nadia Mustafa for her valuable time in examining children.

Conflict of Interest

We would like to declare that there is no any possible

conflict of interest to disclose.

REFERENCES

AlDosari AM, Akpata ES, Khan N (2010). Associations among dental caries experience, fluorosis and fluoride exposure in the United States, 1999 – 2004. NCHS data brief, no 53. Hyattsville, MD: National Center for Health Statistics. 70(3): 220 -6. Online information from this website: http://www.ncbi.nlm.nih.gov/pubmed/20459462. cited Aug.,5th. 2017.

AlObaid I and Wesal A (2017). Prevalence, severity and pattern of dental fluorosis among a group of children in Dahmar, Yemen. J of Baghdad College of Dentistry, 18(2): 92 – 96.

Aoba T, Fejerskov O (2002). Dental fluorosis: Chemistry and biology. Crit Rev Oral Biol Med. 13(2): 155-70.

Beltran-Aguilar ED, Barker L, Dye BA (2010). Prevalence and severity of dental fluorosis in the United states, 1999-2004. NCHS data brief, no 53. Hyattsville, MD: National Center for Health Statistics. Online information cited Aug., 5th, 2017 from this website: https://www.cdc.gov/nchs/products/databriefs/db53.htm.

Catani DB, Hugo FN, Cypriano S, Sousa ML, Cury JA (2007). Relationship between fluoride levels in the public water supply and dental fluorosis. Rev Saudi Publica. 41(1): 732 – 9.

Chauhan D, Chauhan T, Sachdev V, Kirtaniya BC (2012). A study of prevalence and severity of dental fluorosis among school children in a Northern hilly state of India. SRM J RES Den Sci. 3(3): 170.

Clark MB, Slayton RL (2014). Section on Oral Health. "Fluoride use in caries prevention in the primary care setting" Pediatrics. 134(3): 626 – 33.

Dean HT (1942). The Investigation of physiological effects by the epidemiological method. In: Moulton FR, Fluorine and Dental Health. Washington DC: American Association for the Advancement of Science; Pp. 23 – 31 Publication no. 19.

Hazza A, Alhobeira I, Ammar S, Rashid M (2015). Prevalence and severity of dental fluorosis in Hail, Saudi Arabia. J Int Oral Health. 7(12): 1-4.

Jiang H, Tai B, Du M, Peng B (2005). Effect of professional application of APE foam on caries reduction in permanent first molars in 6-7 years old children. 24-month Clinical trial J Dent. 33(1): 469 – 73.

Kadir RA, Al-Maqtari RA (2010). Endemic fluorosis among 14-years old Yemeni adolescents: An exploratory survey. Int Dent J. 60(6): 407 10.

Khan SQ, Moheet IA, Farooq FA, ArRejaie AS, AlAbbad MA Khabeer A (2015). Prevalence of dental fluorosis in school going children of Dammam, Saudi Arabia. J of Dent Allied Scie. 4(2): 69 -72.

Kola S, Reddy I, Ravindar P, Balaji K, Harvindher R et al. (Provide names of other authors) (2017). Prevalence of Dental Fluorosis among 6 -12 years old-school children of Mahabubnagar District, Talangana state, India- A cross-sectional study. 15(1): 42 47. Online information cited Sep. 2017 from this website: http://www.jiaphd.org/article.asp?issn=2319-5932.

Kotecha PV, Patel SV, Bhalani KD, Shah D et al. (Provide names of other authors) (2012). Prevalence of dental fluorosis and dental caries in association with high levels of drinking water fluoride content in a district of Gujarat, India. Indian J Med Res. 135(6): 873 – 877.

Mascarenhas AK (2000). Risk factors for dental fluorosis: A review of the recent literature. Pediatr Den, 22(4): 269 – 77.

Maya R, Malathi N, Ramesh K, Paul C et al. (Provide names of other authors) (2016). The prevalence of dental fluorosis and its associated factors in Salem district Contemp Clin Den. 7(2): 203 – 208.

McDonagh MS, Whiting PF, Wilson PM, Sutton AJ et al. (Provide names of other authors) (2000). Systematic review of water fluoridation. BMJ. 321(1): 855 -9.

Momeni A, Neuhauser A, Renner N, Heinzel-Gutenbrunner M, Abou-Fidah J, Rasch K et al. (Provide names of other authors) (2007). Prevalence of dental fluorosis in German schoolchildren in areas with different preventive programs. Caries Res. 41(6): 437 – 44.

Otecha PV, Patel SV, Bhalani KD, Shah VS, Mehta KG (2012). Prevalence of dental fluorosis in association with high levels of drinking water fluoride content in a district of Gujarat, India. Indian J Med Res. 135(1): 873 – 7.