Proceeding of the 3rd International Conference on Public Health, Vol. 3, 2017, pp. 223-228

ISSN 2324 – 6735 online
DOI: https://doi.org/10.17501/icoph.2017.3225

DENTAL FLUOROSIS IN URBAN SLUMS OF SOUTHERN INDIAN CITY OF MYSORE-A PILOT STUDY REPORT

Saniya Sadaf Khan[1] and Mudassir Azeez Khan[2]

[1,2] *Dept of Community Medicine/Public Health, Mysore Medical College & Research Institute, Mysore, India*

Email: [1]sanyasadafkhan@gmail.com
Email: [2]mudkhan@gmail.com

Introduction

Fluorine is the most abundant element in nature, and about 96% of fluoride in the human body is found in bones and teeth. Fluorine is essential for the normal mineralisation of bones and formation of dental enamel [1].The principal sources of fluorine was drinking water and food such as sea fish, cheese and tea [2]. The recommended level of fluoride in drinking water in India is 0.5 to 0.8 mg/l [3].

Fluorosis is an important public health problem in 24 countries, including India, which lies in the geographical fluoride belt that extends from Turkey to China and Japan through Iraq, Iran and Afghanistan [4]. Of the 85 million tons of fluoride deposits on the earth's crust, 12 million are found in India [5]. Hence it is natural that fluoride contamination is widespread, intensive and alarming in India. Endemic fluorosis is prevalent in India since 1937 [6]. It has been estimated that the total population consuming drinking water containing elevated levels of fluoride is over 66 million [7]. Endemic fluorosis resulting from high fluoride concentration in groundwater is a public health problem in India [8].

The available data suggest that 15 States in India are endemic for fluorosis (fluoride level in drinking water >1.5 mg/l), and about bout 62 million people in India suffer from dental, skeletal and non-skeletal fluorosis. Out of these; 6 million are children below the age of 14 years [9]. Groundwater is considered as the major source of drinking water in most places on earth [10].

India was one of the worst fluorosis affected countries, with large number of people suffering. This is because a large number of Indians rely on groundwater for drinking purposes and water at many places is rich in fluoride [11]. In India 62 million people including 6million children are estimated to have serious health problems due to consumption of fluoride contaminated water [12].

World Health Organization (WHO) has set the upper limit of fluoride concentration in drinking water at 1.5 mg/l [13], and The Bureau of Indian Standards, has therefore, laid down Indian standards as 1.0 mg/l as maximum permissible limit of fluoride with further remarks as "lesser the better" [14]. Intake of fluoride higher than the optimum level is the main reason for dental and skeletal fluorosis. The main source of fluoride in groundwater is the rocks which are rich in fluoride. Most of the people affected by high fluoride concentration in groundwater live in the tropical countries where the per capita consumption of water is more because of the prevailing climate [10]. Some regions in north western and southern India are heavily affected with fluorosis [15,16]. Similarly, the rocks in southern India are rich with fluoride which forms the major reason for fluoride contamination in groundwater [10], and the granites in the district of Nalgonda, Andhra Pradesh contain much higher fluoride than the world average fluoride concentration of 810 mg/kg [17]. Fluorine is often called as two-edged sword. Prolonged ingestion of fluoride through drinking water in Fluorosis in India: an overview COMMUNITY MEDICINE Arlappa N1 , Aatif Qureshi I2 , Srinivas R3 www. ijrdh.com Review Article ISSN: 2321 – 1431 Int J Res Dev Health. April 2013; Vol 1(2) 97 excess of

the daily requirement is associated with dental and skeletal Fluorosis. Similarly, inadequate intake of fluoride in drinking water is associated with dental caries [1].

Dental Fluorosis

Tooth enamel is principally made up of hydroxyapatite (87%) which is crystalline calcium phosphate [18]. Fluoride which is more stable than hydroxyapatite displaces the hydroxide ions from hydroxyapatite to form fluoroapatite. Fluorosis of dental enamel occurs when excess Fluoride is ingested during the years of tooth calcification-essentially during the first 7 years of life. It is characterised by mottling of dental enamel, which has been reported at levels above 1.5 mg/L intake [19]. On prolonged continuation of this process the teeth become hard and brittle. This is called dental fluorosis. Dental fluorosis in the initial stages results in the tooth becoming coloured from yellow to brown to black. Depending upon the severity, it may be only discolouration of the teeth or formation of pits in the teeth. The colouration on the teeth may be in the form of spots or as streaks. Dean's

Background

The prevalence of dental fluorosis in various geographical regions of India is presented in Table-2. Table 2: Prevalence (%) of dental fluorosis in different parts of India by age groups State/Area Agegroup (Years) Prevalence (%) Author Cuddalore, TN 5-12 31.4 Sarvanan et.al. Indian J Community Med. 2008; 33(3): 146–150. Alapuzzha, kerala 10-17 35.6 Gopalakrishnan et.al. Natl Med J India. 1999; 12(3):99-103. Vadodara, Gujarat Adults 39.2 - 59.3 Kotecha et al. Indian J Med Res. 2012 June; 135(6): 873–877. Davangere, karnataka 12-15 13-100 Chandrasekhar and Anuradha. Int Dent J. 2004; 54(5):235-9. Jhajjar, Haryana 7-15 30-94.9 Yadav et al. Environ Geochem Health. 2009; 31(4):431-8. Birbhum, West Bengal Adults 61-66.7 Majumdhar. Indian J Public Health 2011; 55:303-8. Punjab 5-60 91.1 Shashi and Bhardwaj. Biosci. Biotech. Res. Comm. 2011; 2:155-163. Nalgonda, A.P 12-15 71.5 Shekar et al. Indian J Public Health. 2012; 56(2):122-8. Durg, Chattisgarh Adults 8.2 Pandey. Trop Doct. 2010; 40(4):217-9. Dungarpur, Udaipur (Rajasthan) All ages 39.2-72.1 Choubisa et al. J Environ Sci Eng. 2010; 52(3):199-204. Palamau Jharkhand children 83.2 Srikanth et al. Research report Fluoride. 2008; 41(3)206–211. Assam All ages 31.3 Chakraborti et al. Current Science. 2000; 78 (12): 1421-1423. Uttar Pradesh All ages 28.6 Srivastava et al. Int J Oral & Maxillofacial Pathology; 2011:2(2):7-12. Kareka, Shivpuri Madhya Pradesh 13-50 86.8 Saksena and Narwaria. Int j Environ Sci. 2012; 3(3). Raigad, Maharashtra 0-23 91.7 Bawaskar and Bawaskar. Trop Doct. 2006; 36: 221. Nalgonda, A.P Adults 30.6 Nirgude et al. Indian J Public Health. 2010;54(4):194-6.

Purpose: The Purpose of this study was to clinically detect dental flourosis, dental caries and overall oral hygiene –related quality of life people in slums of Mysore.

Methods: A cross –sectional study is planned in a slum area to detect dental flourosis ,dental caries ,oral hygiene in slums of Mysore city

Distribution of children according to Dental condition

Total Families	202
Children	106
Enamel Mottling	40
Enamel Opacities	65
Decayed teeth	93
Stains and Calculus	103

Males	106
Enamel Mottling	17
Enamel Opacities	28
Decayed teeth	62
Stains and Calculus	42

Females	106
Enamel Mottling	23
Enamel Opacities	37
Decayed teeth	31
Stains and Calculus	61

Results: Pilot study was done in 202 families. Out of 106 children examined, 40 had enamel mottling, 65 had enamel opacities. All these families used water from a bore well situated at a distance of about 50 meters.

A Study done also showed that stains , calculus and dental caries were present in the age group between 6 to 18 years

This was due to only few families using tooth brushes with good oral hygiene

Recommendations

Prevention and control of fluorosis: Rajasthan and Gujarat in North India and Andhra in South India are worst affected. Punjab, Haryana, Madhya Pradesh and Maharashtra are moderately affected states in India, while the states Tamil Nadu, West Bengal, Uttar Pradesh, Bihar and Assam are mildly affected [23]. Since, the fluorosis is irreversible; its prevention is the appropriate, using various intervention measures. Fluoride poisoning can be prevented or minimized by using alternative water sources, by removing excessive fluoride from drinking water, and by improving the nutritional status of populations at risk. The simple interventions include provision of surface water, rainwater and consumption of Low-fluoride groundwater [24]. Other interventions are defluoridation of water through flocculation and adsorption. Similarly, health education and better nutrition are the some of the cost-effective intervention measures [24]. Authors have no conflicts of interests.

References

Park K. Park's text book of preventive and social medicine. Ed 21. Banarasisdas Bhanot Publishers, 1167. Premnagar, Jabalpur, India.2011.p:577.

Passmore R, Nicol BM, Rao MN, Beaton GH, Demayer EM. Hand book on Human Nutritional Requirements. Monogr Ser World Health Organ. 1974;(61):1-66..

Jolly SS, Singh ID, Prasad S, Sharma R, Singh BM, Mathur OC. An epidemiological study of endemic fluorosis in Punjab. Indian J Med Res. 1969 Jul;57(7):1333-46.

Saravanan S, Kalyani C, Vijayarani M, Jayakodi P, Felix A, Nagarajan S, Arunmozhi P, Krishnan V. Prevalence of dental fluorosis among primary school children in rural areas of Chidambaram Taluk, Cuddalore District,Tamil Nadu.India. Indian J Commun Med.2008.33:146-50.

Teotia SP, Teotia M. Endemic fluorosis in India: A challenging national health problem. J Assoc Physicians India. 1984 ;32(4):347-52.

Shortt HE, Pandit CG, Raghvachari TNS. Endemic fuorosis in Nellore district of South India. Indian Medical Gazettiar. 1937; 72: 396-400.

FRRDF. State of art report on the extent of fluoride in drinking water and the resulting endemicity in India. 1999. Fluorosis Research and Rural Development Foundation, New Delhi, India.

Kotecha PV, Patel SV, Bhalani KD, Shah D, Shah VS, Mehta KG. Prevalence of dental fluorosis & dental caries in association with high levels of drinking water fluoride content in a district of Gujarat, India. Indian J Med Res. 2012 ; 135(6): 873– 877.

Susheela AK. Fluorosis: Indian scienario: A treatise on fluorosis. Fluorosis Research and Rural Development Foundation; New Delhi, India. 2001.

Brindha K, Elango L. Fluoride in Groundwater: Causes, Implications and Mitigation Measures. In: Monroy, S.D. (Ed.), Fluoride Properties, Applications and Environmental Management, 111-136.

https://www.novapublishers.com/catalog/product_inf o.php?products_id=15895

http://articles.timesofindia.indiatimes.com/2012-07- 26/nagpur/32868877_1_fluoride-dental-fluorosisgroundwater).

Andezhath SK, Ghosh G. Fluorosis management in India: the impact due to networking between health and rural drinking water supply agencies. IAHSAISH Publication. 2000; 260: 159–165.

Guidelines for drinking water quality. Geneva: WHO; 2004. World Health Organization.

Prevention and control of fluorosis in India. New Delhi: Rajiv Gandhi National Drinking Water Mission; 1993. Government of India; p. 25. Int J Res Dev Health. April 2013; Vol 1(2) 101 Arlappa N et al., Fluorosis in India www.ijrdh.com

Agarwal V, Vaish AK, Vaish P. Ground water quality: Focus on fluoride and fluorosis in Rajasthan. Current Science. 1997; 73(9): 743–746.

Yadav S, Khan TI, Gupta S, Gupta AB, Yadava RN. Fluorosis in India with special reference to Rajasthan. In: Proceedings of the International Conference on Water, Environment, Ecology, Socioeconomics and Health Engineering (WEESHE), Seoul National University. 1999: p 3–10.

Brudevold F, Soremark R. In "Structural and Chemical Organisation of Teeth ", Vol.2, edited by A. G. W. Miles. Academic Press, New York and London, 1967, 247.

World Health Organization, Prevention Methods and Programmes for Oral Diseases. WHO, TRS. 1984; 713.

Dean. Health Effects of Ingested Fluoride, National Academy of Sciences. 1993: pp. 169.

National Research Council. Health effects of ingested fluoride, National Academy Press, Washington DC. 1993.

Chauhan D, Chauhan T, Sachdev V, Kirtaniya BC. Prevalence and severity of dental fluorosis among school children in a Northern hilly state of India. SRM J Res Dent Sci [serial online] 2012; 3:170-4.

Mathur SC. Epidemiology of Endemic Fluorosis. http://www.pptuu.com/show_22473_1.html.

UNICEF's Position on Water Fluoridation. Fluoride in water: An overview.