STATUS OF FLUOROSIS: A GEOGRAPHICAL DISTRIBUTION

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Abstract

This paper presents the geographical distribution of fluorosis and reveals a conceptual frame work of fluorosis. Fluoride levels beyond permissible limits [1.5mg acc. WHO] have negative effects on human health and development.Because fluoride is the most electronegative element,that is why it is attracted by positively charged Calcium in teeth and bones causing dental fluorosis and skeletal fluorosis in children as well as in adults.

Keywords: Fluorosis, Fluoride, Dental Fluorosis, Skeletal Fluorosis.

Introduction

Floursis is an abnormal condition in livestocks due to prolonged ingestion/ exposure of excessive amounts/ large dosages of element fluorine or its compound. It is characterized mainly by mottling of teeth and soft and crumby bones. Excessive ingestion of fluouride is mainly due to use of fluoridated drinking water for along period but this may effect minors who work in alimuminum ore [bauxites] minors and the workers who are engaged in insecticides and phosphate fertilizers manufacture. It also occurs due to chronic inhalation of industrial dusts and gases.

Table: Permissible limit of fluoride in drinkingwater prescribed by various organizations [SIHFW: an ISO9001: 2008 certified institution]

Name of the organization	Desirable limit (mg/L)
Bureau of Indian Standards (BIS)	0.6-1.2
Indian Council of Medical Research (ICMR)	1.0
The Committee on Public Health Engineering Manual and Code of Practice, Government of India	1.0
World Health Organization (International Standards for Drinking Water)	1.5

Dental Fluorsis

This form of fluorosis effects the tooth enamel, i.e. mainly made up of hydroxide apatite [87%] which is crystalline calcium phosphate [Brudevold F.,1967]. Hydroxy apatite is less stable then fluordide that is why fluoride displaces the hydroxide ions from hydroxy apatite to form fluoro apatite. The natural shine or lustre of the teeth disappears and tooth brcome rough, opaque and chalky due to dental floursis. It appears as mottling of teeth in starting and leads to pitting or chipping [Rao,2003]. Dental floursis is classified by Dean[91] into many categories that is based upon the degree of severity of the defects. Dental Fluorosis is the most common warning sign due to excessive dose of Fluoride.It is the most common symptom due to excessive dose of fluoride.It is a condition involving interaction of fluoride with tooth Enamel,which involves staining or blackening, weakening and possible eventual loss of teeth.

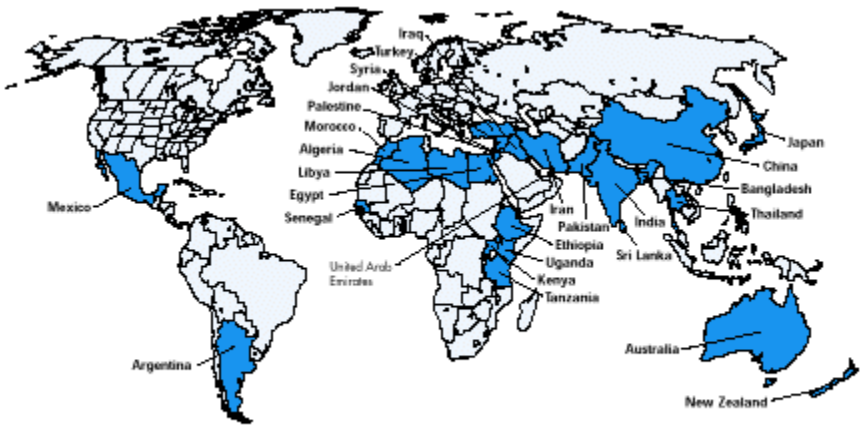
Skeletal Fluorosis

It occurs when excess fluoride is ingested over a prolonged period of time in 1993 it was obserbed that Skeletel fluorosis occurs if some one has ingested 10-20 mg of fluoride/day for over 10-20 years. Increased bone mass and density is the result of skeltonfluoris its mechanism is poorly understood how ever development stages are well documented [Hileman1988, WHO 1999, Rao 2003, Sushila 2003, Edmunds and Smedley 2005]. Pain and stiffness in the hip region,

joints and back bone are the symptoms of skeltonfloursis in earky stages. In severe cases, there is complete rigidity of joints resulting in stiff spine, called as bamboo spine and immobile to pelvic and shoulder joints. In this stage the patient has to lie on the ground to see aaeroplane in the final stage of this diseases the patient is left crippled[Arlappa N 2013]. in the early stages as osteoporosis, involving hardening and calcifying of bones and causes pain ,stiffness and irregular bone growth.[W.M.EdmundsandP.l.Smedley].

Distribution of Fluorosis at Global Level

Fluorosis is a major health problem widespread all over the world and specially sin developing countries and has become a smoldering issue of 21th century. More than 200million people are using such water for their drinking purpose that is above permissible limit determined by WHO that is 1.5 mg/l.Thisincludes around 66millions in India[Mazumdar 2011],45million people in China[Wuyi*et.at*]and some 5million in Mexico [Diaz-Barriga et.al,1997]African population might be around tens of millions.Seventeen states of India have been identified as endemic for fluorosis and Haryana is one of them. Atleast 25 countries of the world is suffering from endemic floursis[Unicef]. It is not exactely estimated that how much population of the world are effected by floursis but approximately around millions people of total population. In Tanzania concentration of fluoride was found as high as 95ppm. Lake Nakuru has been considered as the highest natural fluoride concentration in the rift valley in Kenya at 2800ppm. Lake shore's soil contained up to 5600ppm and 150ppm concitration was found in the dust in the huts of local inhabitants.Geographical areas associated with high concentration of fluoride include the East African Rift system (running from Jordan in northern Africa to Kenya and Tanzania in east Africa, large tracts of the middle East (Iran, Iraq and Syria) and Indian subcontinent (India, Pakistan, Shrilanka), northern China, western USA and Argentina.



Countries with endemic fluorosis due to excess fluoride in drinking water

- There are mainly three geographical endemic belts of floursis
- first belt extends from Turkey via Syria, Jordan, Egypt, Libya, Algeria to Morocoo and from Egypt and Sudan through the rift valley to Kenya, Tanzania, Mozambique and South Africa
- Another belt is the one stretching from Turkey through Iran, Iraq and Afghanistan to India, Northern Thailand, China and Japan
- In the America a similar belt stretched from USA [Texas, New Maxico]. Maxcio and Central America along the foot hills of the Andes to northern Chile and Argentina

  Asia and Africa continent are most endemic area of the world.

India is one of 23 countries affected by high level of fluoride in drinking water. Geological survey of India (GSI) have adentified some areas as Red Alert Zone of high fluoride in India :Fazilka and Jalalabad in the border dostriet of Ferozepur in Punjab, parts of Gurgaon, Rewari, Mahandergarh, Hisar, Fatehabad and Faridabad in Haryana, Unnao, Rae Barevlly and soorbhadra in uttarpradesh, Sudhe district in Madhya Pradesh, Beed district in Maharashtra, Nalganda district in Andhra Pradesh and Dindigul District in Tamilnadu. Endemic fluorosis is a major public health problem in India that was first described as a public health problem by Shorttet. al in India [Shortt et el 1937]. Apporixmately 62 million people including six million children's suffer from fluorosis in India [Sushila A.K 1999]. 15 states like Rajasthan, Telangana, Andhra Pradesh, Madhya Pradesh, Bihar , Uttar Pradesh, etc. in India are Endemic for fluorosis

References:

1. Arlappa N., [2013] "Fluorosis in India An Overview", International Journal of Research and Development of Health, vol 1.[2] pp 97-102.
2. Brudevold F and Soremark R. [1967]. "Structural and Chemical Organization of Teeth", Edited by A.G.W. Mies Academic Press, New York & London, Vol. 2, 247.
3. Edmunds WM and Smedley P.L. [2005] "Fluoride in Natural Waters" In Selinus O [ed], Elsevier Academic Press Burlington, M.A. pp-301-329.
4. Hileman B. [1988], "Fluoridation of Water Questions about Health Risks and Benefits remain after more than 40 years", Chem, Eng News 1: 26-42.
5. Rao NCR [2003]. "Fluoride and Environment- A Review", 3rd International Conference on Environment and Health.
6. Shortt H E, Pandit CG, Raghavachari TN [1937], "Endemic Fluorosis in the Nellore Distt. Of South India", Indian Medical Gaztt 72: 396-08
7. Sushila A.K [2003], "Treatise on Fluorosis", 2nd Edition Fluorosis Research and Rural Development Foundation, Delhi- India pp137.
8. Sushila A.K [1999], " Fluorosis Management programmes in India Current Science, 77: 1250-06
9. WHO (2011) Guidelines for drinking water quality, 4th edn. World Health Organization, Geneva.
10. Wuyi W, Ribang L, Jain an T, Kunli L Lisheng Y, Haironge L, Yonghua L (2002) Absorption and teaching of fluorides in soils of China Fluoride 35:122-129