Fluorosis

By Dr BN Mua

Aetiology

- Dental flourosis or hypominerisation of tooth enamel/dentine is produced by chronic ingestion of excessive amounts of F- during the period when teeth are developing.
- Takes place during the first 8 years of life
- Both deciduos and permanent teeth may be affected but the effects are more in secondary dentition than in primary dentition

Environmental existence of fluoride

- Fluorine rarely exists freely in nature but exists as an inorganic fluoride.
- It is naturally found in the following spheres of earth.

1. Land (lithopshere)
2. Water(hydrosphere)
3. Biosphere(living things/plants and animals)
4. Atmosphere(air)

Distribution F- worldwide

- Is a world wide disease
- Endemic in 22 countries
- In Asia, India and China worst affected
- Mexico in N.America and Argentina in S.America
- In Africa, in East and North Africa
- Total number of people affected not known

Sources of F-

- Different soils contain different concentrations of F- depending on the underlying rock
- Different plants contain varying amounts of fluoride
- Sea animals eg fish a lot of F-
- All water contain varying amount of F- . It is highest in volcanic areas

Contd....

- Some F- concentrations is found is the air(atmosphere) particularly in highly industrialized areas.

Fluoride in Kenya

- Geology of East Africa is characterised by landscapes formed by faulting and volcanic activity.
- Volcanic rocks occur both on the surface and underground
- Volcanic rocks contain large amounts of F-
- F- rich areas Kenya include Mt Kenya Region, Mt Elgon, Rift Valley etc

Contd.....

- Most rivers and lakes outside Volcanic areas have low F- levels
- Ground water contains high levels of F-
- Some areas have very high concentration of F- upto 2888ppm
- L. Nakuru has the highest concentration of volcanic rock

Contd....

- Ground water is consumed to a large extent in Kenya
- Most people who drink water from boreholes in Rift Valley, Kiambu, Muranga risk developing Fluorosis
- Nairobi, Kitui,, Taveta, Limuru, Ngong, South Coast are are rich in F-

Contd.....

- Western Kenya, Nyanza and N.Eastern has low F- concentration of less than 0.5ppm
- Nairobi has got high concentration of F- (>8ppm)
- F- is widely is distributed in Kenya in underground water, some areas with below optimal level while others above optimal levels

Sorces of F- for man

Adults

- Water
- Food
- Cosmetics*
- Medicaments*

Infants

- Breast milk
- Formula feeds

Dietary sources of F-

- Water
- Food eg maize, banana, milk, fish, beans
- Beverages

NB plants such as tea, coffee, carrots,Spinachs, plums, cabbage, potatoes etc contain high amount

F- concentration in the body

- In soft tissue - very low and transient.
- But high in hard tissues eg bone, tooth due to presence of apatite which binds with F- to form CaF_2 and other forms

Significance of F- in the body

- F- crosses placental barrier and thus causes flourosis in primary dentition.
- At optimal levels(0.7ppm to 1.2ppm), F- increases teeth resistance to caries(tooth decay)*
- Above the optimal levels of F-, it causes flourosis of the teeth

Forms of fluorosis

- Dental fluorosis
- Skeletal fluorosis
- Non skeletal fluorosis

Contd…

Skeletal Fluorosis

Contd…

Contd…

Contd…

Contd…

Contd...

Contd…

Measurement of fluorosis

Using indices eg

- Dean's index
- FDI index
- Community index of fluorosis
- Tooth surface index fluorosis
- others

Preventive measures

- Create awareness to communities
- Educate communities on preventive measure
- Take recommended F- levels particularly in water(0.7 to 1.2 ppm)
- Defluoridate water at community, institutional and house hold levels. Various methods available
- Treat where applicable

Management if dental fluorosis

- Several treatment options available depending on severity eg masking, crowns, microbleaching, etc

END