

# Endemic-Fluorosis: Fluorosis Prevention & Control Mission A-Policy, Leadership and Management

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## Abstract:

Fluoride is required for normal development and growth of the body. Excessive consumption of fluorides in various forms leads to development of fluorosis. Fluorosis is a crippling disease resulted from deposition of fluorides in the hard and soft tissues of the body.

It has emerged as an important public health problem in India. It affects multiple body organs and systems, Its clinical manifestations start from damaged and discolored teeth and end in crippling conditions.

It is estimated that in India, over 18 million people are affected by dental fluorosis and nearly eight million people by skeletal fluorosis.

The root cause of this fluorosis is the excess fluoride levels in drinking water, lack of awareness, nutritional deficiencies and lack of diagnostic facilities, lack of intersectoral/departmental coordination. Hence, addressing these issues is essential for a successful fluorosis prevention and control.

**Keywords:** fluorosis, endemic, dental,skeletal, Non-skeletal fluorosis,strategic planning ,stake holder analysis, SWOT analysis

## INTRODUCTION

It is a crippling disease resulted from deposition of fluorides in the hard and soft tissues of body.

It is a public health problem caused by excess intake of fluoride through drinking water/food products/industrial pollutants over a long period.

Ingestion of excess fluoride, most commonly in drinking-water affects the teeth and bones.

Fluorosis is a public health issue brought on by long-term exposure to excessive fluoride levels in drinking water, food, and industrial pollution. The time it takes for the clinical symptoms to develop varies depending on a number of variables, including age, nutritional health, the amount of fluoride consumed, how well the kidneys eliminate fluoride, etc.

- One of the most common fluorosis non-skeletal symptoms is anaemia.

## Fluorosis related major health disorders-

- Dental fluorosis,
- Skeletal fluorosis and
- Non-skeletal fluorosis.

**Other types of fluorosis :-**

Hydrofluorosis, Industrial fluorosis and Neighborhood fluorosis.

People exposed to large amounts of fluoride show dental effects much earlier than the skeletal effects. Dental fluorosis affects children and discolours and disfigures the teeth. Skeletal fluorosis affects the bones and major joints of the body like neck, back bone, shoulder, hip and knee joints resulting in to severe pain, rigidity or stiffness in joints. Severe forms of skeletal fluorosis results in marked disability. Non-skeletal fluorosis affects the nervous system, Gastro-intestinal symptoms, muscles and blood hemoglobin level which could lead to anemia.

Anemia is one of the most common non-skeletal manifestations of fluorosis.

It affects Pregnant women, men, women and childrens of all age groups.

Fluorosis is one of the important public health issues in many parts of the developing world.

In India many areas are fluoride endemic and around 25 millions people are currently affected by fluorosis.

India is also located in the topographical fluoride belt where owing to high fluoride amount in rocks or soil, the leakage of fluoride happens, causing surplus fluoride level in groundwater.

Drinking water is usually the chief source of fluoride.

The WHO has set the standard of fluoride in drinking water at 1.5mg/L to be adopted by nations.

The desirable limit of fluoride as per Bureau of Indian Standards (BIS) is 1ppm ( 1 mg per litre).

As the damage/change in skeletal system and teeth due to prolonged exposure to high fluoride levels is irreversible, the focus of management of fluorosis is on prevention, health promotion, deformity correction and rehabilitation.

**Project objectives:**

1. To raise community knowledge of fluorosis and its effects on health
2. Dissemination of information and expertise among healthcare professionals in order to conduct screening, diagnosis, counselling, and comprehensive management in order to improve outcomes for patients who have been identified with these disorders and prevent/reduce the occurrence of similar disorders in the future.
3. Strengthening and increasing the system's capacity to screen, identify, and treat persons with this disease.
4. To promote the Positive health seeking behavior among community particularly in fluoride prone zone
5. For the Ministry of Health, Ministry of Jal Shakti, and PHED to collect, evaluate, and apply the baseline survey data on fluorosis for drinking water supply.

**Expected Outcome**

The expected outcome of the Fluorosis Prevention & Control mission will be:-

- A. Number of fluorosis cases managed and rehabilitated in mission
- B. Capacity for laboratory testing for fluoride in water, urine to be developed.
- C. Trained health sector manpower in Government as well as privet sector set up for measuring fluoride in urine and water.
- D. Improve information base for the community and all concerned in the mission.

**Socio economic implications of Fluorosis-** in India social and economic implications due to fluorosis are enormous because of wide spread crippling effects, disability and decrease work capacity.

**Risk factors-**

- Lack of awareness about role of fluorine in human health
- Increase of population and industrialization leading to shortage of safe drinking water.
- Ground water supply having excess of fluoride content.

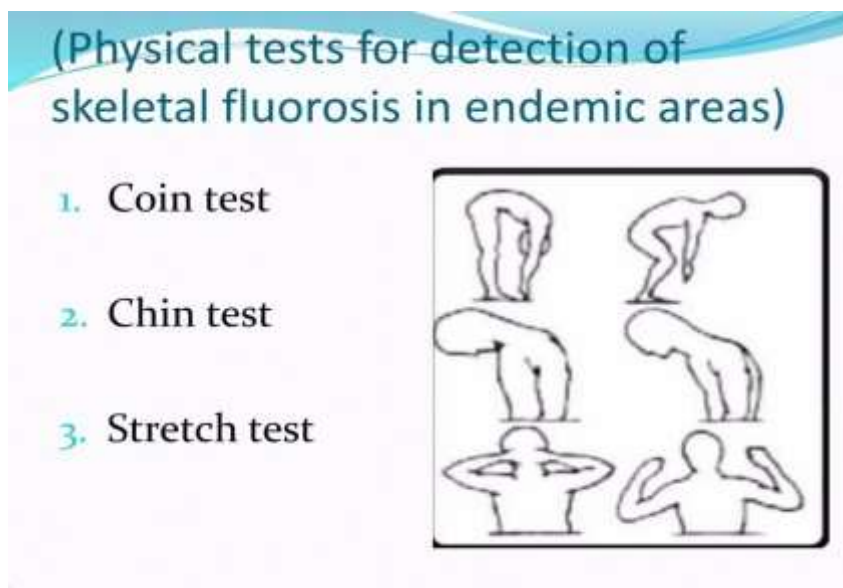
**Strategic planning**

- Building human resource capacity through training and workforce support.
- Fluorosis in the population, notably among school children, is being monitored
- Establishment of diagnostic facilities in the district/ medical Collage.
- Management of fluorosis cases including treatment, surgery, rehabilitation.

**Strategic Planning Cycle**



- **Early Detection-**Physical examination, laboratories test and radiographic examination

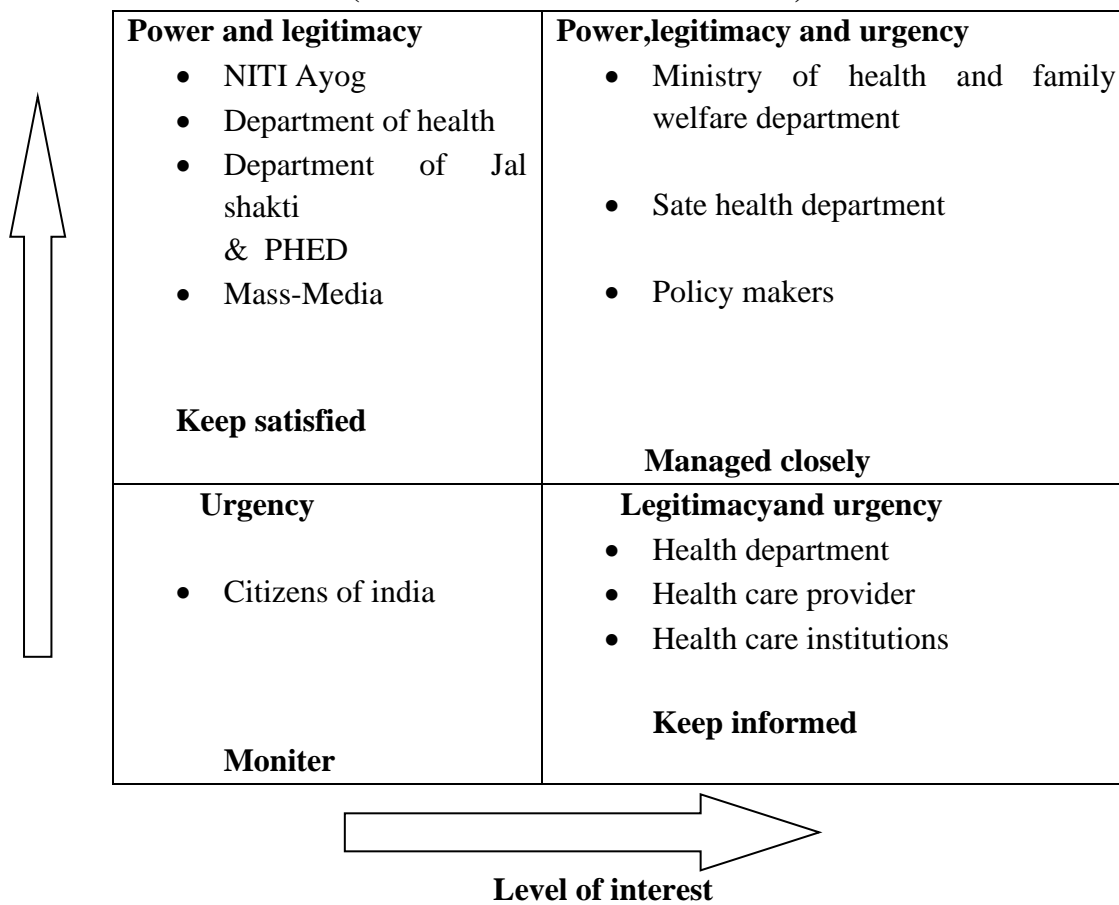


- **Prompt Intervention**-Health Education Provision of safe drinking water, water harvesting (rain water).
- **Referral** effective linkages would be developed from village level to district with the help of functionaries and personnel from grass root level (ASHA, ANM,CHO etc.) PHC/CHC level Medical Officers, Health personnel School teachers and District level Officers.
- **Medical Management**-supplementation of Vitamins C & D, Calcium, antioxidants and treatment of malnutrition. Treatment of deformity includes physiotherapy, corrective plasters, orthoses

**Stakeholder’s analysis**

**Level of power**

**(POWER-INTEREST MATRIX)**



**Framework and Activities**

Framework and Activities required to initiate the mission

Baseline survey, diagnosis of Fluorosis-affected areas, capacity building by establishing/improving a laboratory for fluoride measurement, training of medical and laboratory personnel, early detection and prompt management, and awareness-raising through Informative Education Communications (IEC).

1. Procurement of Ion Meter and other items for Fluoride testing.
2. Training of Laboratory Technicians
3. Training of Consultants on all aspects of Fluorosis

### **Programme activities**

1. Community Diagnosis of Fluorosis village/Gram panchayat/block/District wise.
2. Facility mapping from prevention, health promotion, diagnostic facilities, reconstructive surgery and medical rehabilitation point of view – village/block/district wise.
3. Gap analysis in facilities and organization of physical and financial support for bridging the gaps, as per strategies listed above.
4. Behavioral changes through appropriate IEC strategy .
5. All members having Fluorosis should be introduced to interventions and monitored to improve health.
6. Referrals for severe cases and their follow up

### **The Activities Proposed at 5 levels**

1. Community (Village)
2. Community Health Centres (CHCs)/ FRU
3. District
4. State
5. Centre

### **Infrastructure**

#### **Survey of Fluorosis in a Community**

Case-Suspect Case and Confirmation of a Case.

#### **Sampling procedure** -Survey Methodology

Two types of surveys are expected to be carried out the school and the community survey.

**Analysis of urine sample** -Urinary analysis is carried out using an Ion meter.

#### **Sample Collection (Urine and Water)**

### **Capacity Building:**

#### **Information, Education and communication (IEC) for Prevention and Control of Fluorosis Mission.**

Slogans for Prevention and Control of Fluorosis

- a. Peele dant, haddi jam yeh hay pani mey fluoride ka kam.
- b. Doodh, dahi, hari sabzi khao, fluorosis se mukti pao.
- c. Peeney ke pani mey fluoride hay jahan fluorosis hay vahan.
- d. Peeney ke pani ki janch karo, apenko fluorosis se bachao

#### **Dietary counseling:-**

it is a crucial component of prevention. In addition to encouraging people to drink safe water, it's critical to steer clear of foods that are rich in fluoride.

### **Prevention of fluorosis:-**

#### **(A)Primary prevention**

- Health education
- Capacity building for health promotion and prevention of fluorosis
- Defluoridation of water

**(B) Early diagnosis and treatment**

Capacity building for health personal in early diagnosis and prompt treatment

**(C) Application of diagnostic tools-**

Fluoride to be tested in :

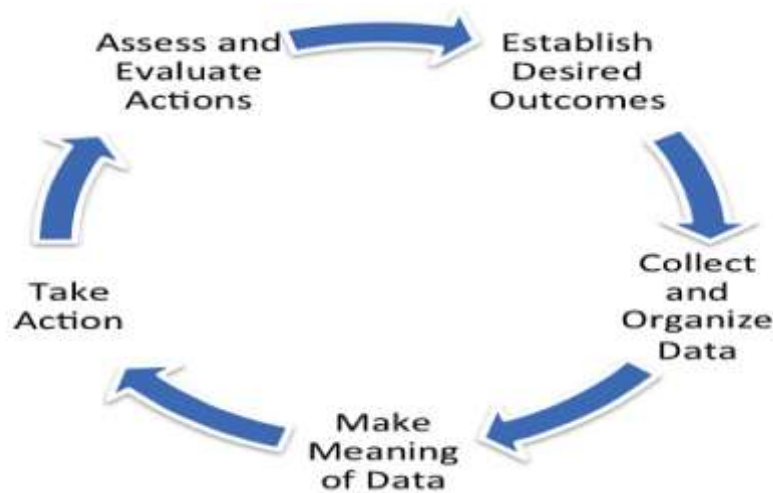
- Drinking water
- Blood (serum)
- Urine(spot urine sample)
- Radiograph of forearm

**(D) Water and Nutritional intervention.**

• **Monitoring & Evaluation the mission.**

Regular monitoring, monthly, quarterly, six monthly and yearly reports.

A systematic method for collecting, analyzing and using data to examine the effectiveness and efficiency of programs and, as importantly, to contribute to continuous program improvement.



**SWOT analysis for implementing fluorosis prevention and control mission**

	<b>Helpful To achieving the Objective</b>	<b>Harmful To achieving the Objectives</b>
Internal Origin	<b>STRENGTH</b>	<b>WEAKNESS</b>
	<ul style="list-style-type: none"> <li>• Stable economy</li> <li>• Political support and stability</li> <li>• Community participation</li> <li>• Stress on prevention</li> </ul>	<ul style="list-style-type: none"> <li>• Slow time frame</li> <li>• Implementation analysis not defined</li> <li>• No specific regulatory body</li> <li>• Lack of human resource and research</li> <li>• Overlooked health inequity</li> </ul>
External Origin	<b>Opportunities</b>	<b>THREATS</b>
	<ul style="list-style-type: none"> <li>• Education-increase health knowledge and awareness</li> </ul>	<ul style="list-style-type: none"> <li>• Population explosion Endemic fluorosis</li> </ul>

	<ul style="list-style-type: none"> <li>• Interdepartmental collaboration</li> <li>• Proper use of available resources</li> </ul>	<ul style="list-style-type: none"> <li>• Socio-economic diversity</li> <li>• Rapid urbanization</li> <li>• Increase use of ground water</li> <li>• Poor nutrition</li> </ul>
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• **Utilizing a systemic implementation approach:-**

In order to improve health at a reduced cost, a systems approach to health employs scientific insights to understand the factors that affect health outcomes, models the interactions between those factors, and changes design, procedures, or policies based on the knowledge gained.

Organize with various ministries, stakeholders, and organisations to create the design and provide implementation support.

Develop and maintain relationships with stakeholders to promote engagement.

If caught early, fluorosis is easily avoidable if safe drinking water is made available, good nutrition is encouraged, and foods with a high fluoride concentration are avoided.

It is possible to avoid fluorosis with nutritional and water interventions.

Early detection and treatment improve the prognosis of the disease.

The planning process for the policy and program's implementation has been strengthened.

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