Drinking water quality and health

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Introduction

Safe as well as readily available water is one of the vital points for public health, with multiple usage for drinking, domestic use, food production or recreational purposes. Better supply of water and sanitation, and improvised management of the water resources, can augment any nation's economic growth and contributing greatly to decline poverty. The

quality of water is risked both by anthropogenic as well as natural reasons in our nation. Improper sewage treatment accesses and bad capacity, under developed state of functional sewage networks and sewage treatment plants and unavailability of faecal sludge treatment plants in most of the urban section of India, is certainly most important point for water quality deterioration. Taking the instance of a study presented in the Lancet in 2014, the evidences of unsafe and polluted drinking contaminated water were presented by the survey in rural and urban areas in India. They asked mothers about the frequency of their children catching illness. It said that on an average a percentage of 24 children in urban homes and 55 in rural households were suffering from diarrhoea in the last fortnight lapse. Fever another big indication, was reported in 34 urban children and in 49 rural children by percent. Also, the survey pointed out that 11 per cent of urban homes and 23 per cent of rural homes seen infant mortality. So, there is the issue and we definitely need to know the quality parameters for drinking water, point of origination and health effects.

1. Fluoride

MPL (Max Permissible Limit**)-** 1.5 mg/l

Source of fluoride contamination is natural based upon climate, type of rock, geochemical conditions favouring fluoride release from aquifer rock.

Health effects

- Overabundant consumption of causes ***Fluorosis***, a disease that affects multiplex tissues, organs and systems in the human body. Fluorosis is of different kinds;
  - Dental Fluorosis- involves teeth discolouration, turning from white-yellow to brown-black.
  - Skeletal Fluorosis- involves a crippling deformity. There is complete joint rigidity in severe cases, with stiff spine and immobile knee, pelvic and shoulder joints
  - Non-Skeletal Fluorosis- Besides the two explained above, over-taken fluoride can result in non-skeletal fluorosis causing neurological, muscular and gastrointestinal damages.

2. Arsenic

MPL (Max Permissible Limit**)-** 0.05 mg/l

It is present naturally in the environment and is released into the water through rock dissolution, or hydrothermal action, mining, smelting, agriculture

Health effects

Acute exposure to arsenic in drinking water tends to–

- Inflated cancer risk in the skin, lungs, bladder and kidney
- Immediate symptoms of acute poisoning are vomiting, oesophageal and abdominal pain, and bloody ‘rice water’ diarrhoea
- ***Arsenicosis***- a disease in which skin have lesions, pigmentation changes and thickening (hyper keratosis)

3. Iron

MPL (Max Permissible Limit**)-** 1 mg/l

Naturally occurs in soils and minerals. In water, in soluble form as ferrous iron or ferric iron (dissolved state). Ferrous iron in water gets oxidised to ferric state and precipitates in the form of suspended solids.

Health effects

Water shows turbidity and is greatly unacceptable from an aesthetic point.

No other big health effects are associated other than–

• Taste issues

• Objectionable stains

• Gastrointestinal distress

• Bacterial growth (rotten egg smell)

4. Nitrate

MPL (Max Permissible Limit**)-** 100 mg/l

Anthropogenic activities leading to it are Chemical fertilisers, Pesticides, Uncontrolled animal feeding, waste contamination via storm and urban runoff.

Health effects

High nitrate concentration in surface and groundwater leads to-

- ***Methemoglobinemia*** (Blue Baby disease) in infants the skin turns blue due to dropped efficiency of haemoglobin to combine with oxygen. It can also result damage to brain and death
- Abdominal pains, diarrhoea, vomiting, hypertension, diabetes, respiratory tract infections
- Eutrophication – over burdening of the waterbodies with nutrients like phosphates and nitrates that promote excessive growth of algae, reduced dissolved oxygen in water and leading to physical changes such as increased turbidity, colour and odour.

5. Iron

MPL (Max Permissible Limit**)-** 2000 mg/l

Naturally present by rock weathering, windborne salt from sedimentary deposits

Health effects

• Unlikely water taste

• Affect osmotic flow and movement of fluids in body

• Acute cases include nausea, vomiting, convulsions, muscular twitching and rigidity, and cerebral and pulmonary oedema, aggravates chronic congestive heart failure