The Menace of Arsenic : Effects On the Common People of Bengal

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The Government of India's (GOI) Environmental Hygiene Committee estimated in a 1949 report that cholera, dysentery and diarrhea were alone responsible for over 400,000 annual deaths in India from 1940 to 1950. Although India at that time had ample surface water, the necessary infrastructure for distribution, purification and storage was not widely available. The growing use of fertilizers and pesticides resulted in the pollution of many traditional drinking water sources. Now WHO and UNICEF proposed large scale use of tube wells for drinking water, anticipating that ground water would be relatively free of contaminants plaguing surface water. Though the initiative of GOI accelerated Rural Water Supply Programme (1972) ground water utilization continued as this programme assisted states with rural drinking water provision. Increased ground water use led to numerous agricultural and health benefits but ground water arsenic contamination and the health effects resulting from chronic exposure were discovered as early as 1976 in north India but were not taken seriously.

The problem of arsenic contamination in ground water in large areas of West Bengal has received wide attention because ground water is the major source of drinking water in this part. This vast area is contaminated and locally populated and a large number of people are affected by this menace. Arsenic affected areas in Bengal basin are confined within the Ganga delta, mostly in the eastern part of arsenical dermatosis in the districts of North and South 24 Parganas ,

Nadia, Murshidabad, and Bardhaman were reported. By the end of December 2001, this problem spreads from few villages of 75 blocks in 8 districts. About 10% of the total population of the state is exposed to yhe above risk. Arsenic is generally found in water from the shallow aquifer, the deep aquifer has not so been found contaminated, except for rare cases where no perceptible clay layer separates the lower one from the upper aquifer. Different aspects of the problem, including the source of arsenic are being investigated by several workers. It is considered that excessive withdrawal of ground water induces oxidation of aquifer material, causing decomposition of pyrite and arsenopyrite and releasing of arsenic from them into the ground water.

All the arsenic affected river plains have the river routes originated from the Himalayan region. Over the years the problem of ground water arsenic contamination has been complicated at local and regional scale. it has far reaching consequences including its ingestion through food chain, which are in the form of social disorders, health hazards and socio economic dissolution and exploitation of ground water. The food crops grown in arsenic contaminated water are sold off to uncontaminated regions where the inhabitants may consume arsenic from the contaminated food which may give rise to a new danger.

As of 2008, West Bengal along with few other states have been expose to drinking arsenic contaminated hand tube wells water. The maximum arsenic concentration was found in Ramnagar village in South 24 Parganas districts. The tube well was a private one and all 9 members of the owner's family has arsenic lesions, 7 other members with severe arsenical skin lesions had already died, 4 of them from cancer. Most of the highly arsenic affected districts of West Bengal are on the eastern side of the Bhagirathi river. Based on the intensity of arsenic concentrations West Bengal is demarcated into 3

zones—highly affected, mildly affected and unaffected. Malda, Murshidabad, Nadia, North and South 24 Parganas, Bardhaman, Howrah, Hooghly and Kolkata are considered highly affected.

Kolkata, the capital of Bengal, is an urban area where the present drinking water demand is around 1262 million litres per day. From study it has been estimated that the southern part of Kolkata is more contaminated than the northern and central parts. During July-September 1989, some residents of Behala, in south west Kolkata, were found to have signs of chronic arsenic toxicity. There had been a chemical factory for the last 20 years in the locality from where the suspected cases of arsenic toxicity came and it had produced the insecticide Paris green. The factory's effluent was connected to drain and a canal about 400 miles away. The population around the factory uses water from 3 sources – shallow tube wells, deep tube wells, and tap water. Due to the availability of few tube wells and taps many dwellings have their own shallow tube wells whose water has been used for many years for drinking, cooking and washing. Out of 30 houses visited, 9 with 17 families were found to have cases of arsenical dermatoses. The people who lived close to the factory had used water from their own tube wells for drinking and cooking. The occupants of the few remaining houses close to the factory had used Calcutta Municipal Corporation's deep tube well or tap water whose arsenic concentration was on safe level. Those who drank contaminated water and resided near the factory were afflicted with skin pigmentation, thickening of palms and soles, peripheral neuropathy and gastro intestinal and pulmonary manifestations. The cumulative effect of the last 20 years dumping of arsenic waste was reason for the contamination. The removal of arsenic from the effluent by the factory authorities had been inadequate. After 8 years a follow up study in the affected areas was made and it was found that the total arsenic concentrations in hand tube wells decreased only 10% to 15%. Many new tube wells got arsenic contaminated.

However, local people no longer used tube well water for drinking and cooking.

Human health effects of chronic arsenic toxicity are designated by the term arsenicosis which was used by WHO to imply a chronic disease caused by prolonged exposure in humans to arsenic. Long term exposure to arsenic in drinking water is related to increased risks of cancer in the skin, lung, bladder and kidney and other skin change such as hyperkeratosis and pigmentation change, increased risk of lung and bladder cancer of arsenic associated skin lesions. Cases of gastro enteritis, hepatomegaly, cerebrovascular disease, conjunctival congestion and non pitting oedema of the legs and hands have been reported in patients of chronic arsenic toxicity in West Bengal. Duration of exposure, quantity of water consumed, availability of nutritious food etc. play important role in developing the symptoms. Most of the people suffering from arsenicosis , they belong to very poor family. Their socio economic status is very low , so they are unable to use costly technique for mitigation of arsenic in water. Researches at the School of Environmental studies, Jadavpur University, West Bengal, have observed from their last 18 years' field experience in West Bengal that poor people with poor nutrition have been suffering more. Arsenic affected people face serious social problems. Sometime other villagers force an arsenic affected patient to maintain an isolated life or avoid them socially whenever possible. Preliminary studies have shown the presence of elevated levels of inorganic arsenic in rice and vegetables, the staple food for villagers. Majority of the population living in the arsenic affected villages had inadequate education and were engaged in agricultural farming or physical labour who are marginal farmers. Many of them are unaware of contamination of their home tube wells with arsenic. Such farmers are reported to drink water from multiple sources, especially pumped ground water for irrigation purposes. Although arsenic free drinking water may be available in their locality, these

farmers have higher risk of arsenic exposure due to their occupational vulnerability. Most of the people suffering from arsenicosis, belong to very poor family. Their socio economic status is low and is unable to use costly technique for mitigation of arsenic in water.

Arsenic cripples the afflicted patient with his ability to labour , implying he is out of his source of livelihood that will bring less or no resources , greater expenditure for the cost of the treatment and subsequently leads to severe mental trauma. Often various forms of social exclusion and stigma add to the trauma. Wives are sent back to their parents, sometime together with their children. Boys and girls are barred from conjugal life and parents find themselves locked in despair when their efforts to marry off their daughters end in failure. During interview competent candidates are not offered jobs when their skin manifestations are discerned. Many people lose their jobs on account of widespread fear of disease mania. Ignorant villagers mistakenly suspect the skin manifestations as leprosy and therefore boycott the affected person.

In several villages of Murshidabad field study has been conducted where it has been found that the bulk of the population is under arsenic induced stress. For instance in Debipur village piped water supply had reached in 2011 after the persistence shown by the residents. However, water pipes were later damaged on account of widening of the roads in the region. Very few people were avid to invest in domestic water filtersbut unfortunately all popular products in the market were unable to successfully filter arsenic. As a consequence, it exacerbates their daily struggle to survive safely and impedes to afford for medical treatment after their investment into filter. On one hand they have made unwise investments based on improper information, on the other they have been robbed of benefits of development programs due to improper planning and execution. Arsenic has compelled many to leave the security of their homes.

Khidirpara, another village in Murshidabad, more than 70% of all households has atleast a single member living outside the state who send money to keep their families alive. They are unable to shift their entire families out of the district due to lack of earning capacity. Whatever they send back is exhausted because of health care or in search of safe water sources. Being poverty stricken they fail to cope with the problem unless they migrate to safer areas. In Mandra and Chak Rahatpur villages of Bardhaman district the villagers often depend on a few tube wells sunk by the government for drinking purposes. Most of the villagers cannot afford household electricity. Inadequate electricity supply keeps them away from mass media like television. Only around 10% of the households go through newspapers. Mandra is mainly inhabited by agricultural labourers or marginal farmers and female bidi binders, daily labourers and rickshaw pullers are also found. Both Mandra and Chak Rahatpur do not even have a primary health centre. Poor transport and medical facilities and insufficient nourishment primarily cause arsenic related health hazard in these villages. The better socio economic environment of Purbasthali and Parulia villages of Bardhaman district keep the villagers away from arsenic health hazard.

It has been surveyed and found that children and aged persons are more prone and succumb to arsenic hazard. A survey of UNICEF shows that women get subjugated to arsenicosis easily because they fetch water for domestic chores. Ignorance or lack of consciousness on part of the villagers hinders them to visit the health centres. Though campaigning on arsenic pollution is done seldom, they do not pay heed to it. Health hazards sometime brings social hazard especially to the women. Arsenicosis is a disease of poverty as well as a poverty aggravating disease. Women and children are often subjected to social attributes that are abandoned by their families leading to rift in family bondage. Uneducated rural communities are afflicted with superstitions such as arsenic is caused by 'evil spirit' or

it is a contagious disease and then accentuate agony and depression of the arsenic affected patients. They hesitate or participate less in socio cultural activities as they develop inferiority complex due to the spots developed on their skin and often their participation are disliked by their fellow unaffected neighbours. Hence the impact of arsenicosis has several psycho social implications. The arsenic affected victims have to confront discrimination and negligence also in the hands of their own family members. The worst victims have always been the women as they are ostracized by the community. They are looked down upon, kept isolated in separate room, reluctance of the neighbours to interact with them, restricted to share bed with non affected persons who resent cooperating with them. Unmarried girls having arsenicosis face difficulties to get married. Myths and misconceptions have deeper consequences in the lives of these afflicted people. Men suffering from arsenicosis are often not confident to marry. Alienation due to the lack of parental love cause retardation in Childs's psychological and physiological development, often they grumble about their peers in school who refuse to play with them. A 10 year field work conducted in West Bengal and Bangladesh (1989-1999) suggests that deficiency in protein, folate, and vitamin B in diet may cause skin lesions and other adverse health effects. Often corrupt ambience, lack of awareness or community solidarity in the both national and local level is a constraint for complete eradication of this menace.

To avoid social stigmatization of women and children with arsenic induced skin lesions, social counseling is required for the people in the community. It is imperative to persuade them about arsenicosis which is neither contagious nor hereditary and hence must not be alienated from others. Active community participation among the affected stake holders and full cooperation from the government are essential to create awareness. More research is required on the arsenic menace of ground water. Humanitarian efforts must be given

to ensure economic development, poverty reduction, social justice and sustainable community development. Though central and state governments have adopted and implemented several schemes such as Arsenic Removal Plant, Arsenic Removal Units and few others, coordination with village community is expected. The villagers must be given essential guide lines to colour the tube wells as unsafe or safe and safe tube wells should be regularly tested. For proper utilization of surface water resources the participation of villagers are fully required.

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