

How Much Is Too Much?

Abstract The fact that arsenic is poisonous is well known. Complete avoidance is the best preventive action. However, this remains an implausible situation in arsenic affected areas of West Bengal. The obvious question that arises then is what is the safe or permissible limit of arsenic in drinking water. To find out the answer to this critical question, we reviewed literature that spells out the diverse and contrasting safe limits prescribed by various international nodal authorities as well as national governments. These variations are partly due to the fact that political and administrative policies are, at least in the case of West Bengal, if not India, limited by the lack of dedicated research and specific information and know-how. Moreover, apart from the fact that the policies are not always devised based on scientific information they are also, at times, heavily weighed down by several other operation-related factors. However, this adherence to inefficient safe levels brings forth several real-life implications for those suffering.

Arsenic has been clinically proven to cause adverse health effects even at very low concentrations.^{1, 2, 3, 4, 5, 6} At the same time, it ranks 20th in the list of naturally occurring elements in earth's crust and hence its presence in water cannot be completely avoided.⁷ Therefore, the standard limit for arsenic in drinking water is set accepting certain risks that do not result in any adverse health effects over the human lifetime of water consumption. The World Health Organisation's According to (WHO) most recent guideline values for a standard person (60 kg of body weight with a lifespan of 70 years) drinking 2 L of water per day is 10 µg/L. In other words, 10 µg/L of arsenic in drinking water will not mortally affect an individual weighing 60 kg over a lifetime of 70 years of drinking 2 L of water daily. Just to put

¹Navas-Acien et al. (2008).

²Moon et al. (2013).

³Dangleben et al. (2013).

⁴Gilbert-Diamond et al. (2013).

⁵García-Esquinas et al. (2013).

⁶Mostafa and Cherry (2013).

⁷Refer to Table A.4.

into perspective, to arrive at this value WHO has deliberated for over four and a half decades.⁸

The guideline thus arrived at, however, is merely suggestive. Countries⁹ have adopted WHO guidelines from different eras to suit their convenience and abilities. Interestingly, there are countries willing to push the permissible limit to even lower levels, e.g., Australia has adopted 7 µg/L as its standard. Incidentally, in India, the maximum permissible limit is fixed at 50 µg/L¹⁰; a figure arrived at by WHO in 1963! According to one section of the stakeholders, this level is simply not good enough. The source of this displeasure is principally two reports; one by National Research Council of America, 2001 and the other by Science Journal, 2002. These reports stated that there is a possibility of 13 deaths due to cancer in every 1000 individuals if they consume 1 L of water containing 50 µg of arsenic, regularly, over a lifetime. Manifestations of this threat get even uglier due to the poor level of nutrition,^{11, 12} coupled with inadequate healthcare facility for many of those exposed, especially in developing countries like India. Based on these observations, the Bureau of Indian Standards (BIS) recommended in September 2003, that 10 µg/L should be adopted as the standard of arsenic in drinking water. Shortly after this announcement, a publication (Smith and Hira Smith 2004) suggested raising it to 50 µg/L for India and other developing countries due to current resource limitations and the likely slowing of short-term solutions imposed by this stricter standard. In a somewhat kneejerk reaction, partly influenced by this publication, the Indian standard was quickly reinstated to 50 µg/L. This decision did not go down well with one section of the stakeholders who argued that the potential health effects of arsenic exposure were too severe even at concentrations below 50 µg/L and that concerned authorities should strive to overcome resource limitations. In an attempted compromise, BIS has recently published revised standards for arsenic in drinking water, listing 10 µg/L as the desirable level but 50 µg/L as the legally enforceable standard if alternative sources are unavailable (Chakraborti et al. 2011).

At this juncture, questions may arise, naturally, about the justification of lowering of the safe level. To be honest, we could find none. It cannot be justified under neither scientific nor any human welfare rationale that why should Indians be exposed to higher arsenic concentration levels. The only beneficiary out of this play of words is, probably, the administrative organisations. The lowered level allows them some breathing space and in effect justifies their inefficiency. For example, if WHO standard is to be adopted, then 56 % of end user-accessed water service points (tube wells) in West Bengal are arsenic unsafe. On the other hand, adherence to the national legally enforceable standard reduces the unsafe percentage by less than half, i.e. 26 %. There are ample dermatological surveys (e.g. Saha and

⁸Refer to Table A.2.

⁹Refer to Table A.3.

¹⁰Indian Standards for Drinking Water, second revision of IS 10500 (2004).

¹¹Maharjan et al. (2007).

¹²Mitra et al. (2002).

Chakraborti 2001) to prove that exposed population not always exhibit similar manifestations in spite of having comparable arsenic intake. But, clinical examination of their hair, nail and urine reveals high concentration of arsenic! May be several of these villagers are subclinically affected, and it is just a matter of time before an arsenic-induced epidemic explodes on the public sphere.

All this while, at the ground level, safe water infrastructure development has, at best, made crawling progress. Resultantly, the 'Population at Risk', like those we visited in Jalangi, merely survives under the shadow of imminent death. Nobody knows how many of them will be diagnosed with cancer and die soon. No wonder, they seem a bit bitter towards visitors. But, maybe they still harbour some hope that things will get right if they participate in yet another survey, and eventually choose to talk to yet another team of researchers.

From the Field 2

Sometime in the year 2002, the villagers of Plachimada, a small village of Palakkad district, Kerala united in their struggle against the behemoth of an MNC, Coca Cola. They accused the global giant of stealing and polluting their water. The source of the trouble was the Coca Cola plant in the village and the untreated and highly toxic effluents it was dumping into the groundwater.

Around the same time, the villagers of Harekrishnapur, Khairamari GP, Jalangi block, Murshidabad started getting very angry too. Their water, like in Plachimada, was found to contain alarming levels of poison. The poison content, on an average, which in their case was Arsenic, was about five times safe national standard. But, that is where the similarity of their predicament to those in Plachimada ends. The residents of Harekrishnapur did not know whom they should unite against in protest. They do not know even now!

For the last decade or so, those living in Harekrishnapur have experienced fleeting moments of hope amidst continual feelings of despair. The list of ill and dead keeps growing by the day. So is the extent of anger. The hapless people are confused about who can bring an end to their misery, and therefore have believed at every promise of solution made to them, gullibly. Resultantly, today they are sceptic and utterly bitter. In their words, 'only death has kept its promise.' They hate having visitors. They dread promises.

When we visited Harekrishnapur, despite being named after Lord Krishna, the God of love and affinity, we found its residents rather hostile towards us. They ordered us to walk away. It was apparent that the villagers have had enough of sharing of their ordeal with information-hungry researchers and media personnel and tired of their false sympathies which inadvertently resulted in heartbreaks. When at last they agreed to speak with us the conversation began with a barrage of questions. 'Do you know how many families have lost their near and dear ones? How many people have had their organs amputated? How many people are suffering silently? How many children have lost their childhood, and education, and

have ended up as child labourers?’ they asked. ‘Do you know how difficult is to find a groom for our daughters and sisters?’ they continued. We, obviously, had no answer to offer. ‘There are several dug-wells in the village. They are all dry and all we have are skeletons of defunct Arsenic Treatment Units! This is a village where people live, not a laboratory dedicated to the cause of advancement of science!’ they concluded. This time they expected no answer or for that matter reaction from us.

Our mind could not but refer back to the Plachimada example. The international media was present, so were water crusaders from all over the world. It seems Coca Cola, being a private company can be held accountable. However, the government, at least in context of arsenic contamination of groundwater in Harekrishnapur, is not accountable to the public. The residents of Harekrishnapur are not certain whom to appeal to, to solve their crisis. However, there is the certainty that death will arrive, sooner rather than later.

For us, it was an ignominy never felt before.

Socio-Economic Analysis of Arsenic Contamination of
Groundwater in West Bengal

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2016, XXI, 136 p. 9 illus., 1 illus. in color., Hardcover

ISBN: 978-981-10-0680-7