

## Abstract

**Million Dollar Arsenic Projects in Bangladesh: Arsenic situation deteriorated in Eruani village of Laksham P.S. Comilla district from 1997-2005**



**Are some children lesser to GOD?**

**All the children shown in the picture were drinking 500-1100 µg/L of arsenic contaminated water till 18<sup>th</sup> April, 2005**

Eruani of P. S. Laksham, Comilla district, Bangladesh is a large village constituted of 6 parts: Madhyapara, Purbapara, Paschimpara, Uttar Para and Dakshinpara and Telibari. Total area and population of Eruani village are 2.2 sq. km and 6690, respectively. During the arsenic survey in Bangladesh (21<sup>st</sup> Dec 1997- 6<sup>th</sup> Jan 1998) Dhaka Community Hospital (DCH), Dhaka and School of Environmental Studies (SOES), Jadavpur University, Kolkata surveyed Eruani village on 30<sup>th</sup> Dec with the medical team and analyzed 110 water samples collected from the village. All of them contained arsenic above 50 µg/L while 40% had arsenic above 300 µg/L (at this concentration we expect patients with skin lesions if ingested for a couple of years) with the highest concentration recorded at 2160 µg/L. Then we identified 40 patients with arsenical skin lesions screening only 200 people who came to our camp. After spending only half a day at the end of the survey we realized that we have seen the tip of the iceberg. On 13<sup>th</sup> February, 2000 we again went to Eruani village and spent a day during our arsenic field survey in Comilla district. We could survey only Madhyapara and for a while Paschimpara. Normally, we do not find arsenical skin lesions in children unless the arsenic concentration in drinking water is quite high (around 0.75 mg/l and above) or the nutrition status is very poor with moderate arsenic. In Madhyapara, Paschimpara of Eruani village we

found children having arsenical skin lesions. We realized “Eruani village needs a detailed survey to know the magnitude of the calamity”.

Analysis of 164 nail samples from Eruani villagers with or without arsenical skin lesions during November 2003 clearly showed that the burden is quite high (98.8% samples had arsenic above the normal level) to most of the population though about 50% of the subjects had no arsenical skin lesions.

During 5<sup>th</sup> International Conference (February 15-17, 2004) in Dhaka, Bangladesh, jointly organized by DCH, Dhaka and SOES, Jadavpur University, Kolkata, February 16<sup>th</sup> was scheduled for field visit of the participants in Eruani village. Unfortunately on that day a 12-hour strike (6 AM to 6 PM) was declared all over Bangladesh forcing the organizers to call off the field visits. Nevertheless the medical team of DCH and SOES along with field team and Ph.D. scholars decided to go to the village and left Dhaka on 16<sup>th</sup> at 3 AM so that they could reach Eruani village before the strike commenced. During the whole day study, the medical team screened 700 people and out of them 210 (30%) was identified with arsenical skin lesions. Altogether 97 water samples were collected from hand tubewells people were using for drinking and cooking and analyzed. Arsenic concentration above 10 µg/L, WHO guideline value was found in 94 (96.9%) of them while 92 (94.8%) had arsenic above 50 µg/L (Bangladesh standard value), and 80 (82.5%) contained arsenic above 300 µg/L. All of the 200 urine samples collected from the villagers contained arsenic above normal level (normal level 5-40 µg/1.5L).

After February 2004, DCH and SOES decided to conduct a detailed survey on arsenic contamination situation and suffering of people in Eruani village. The present report describes the findings of the study from February 16, 2004 - April 18, 2005 (along with nail collection from villagers during November 2003).

Villagers’ replies to our questionnaire revealed that there is little awareness about the different aspects of arsenic toxicity among them. A through investigation was carried out along with GIS study to determine arsenic concentration situation in the village and it revealed that only five out of 193 tubewells were safe to drink according to Bangladesh standard (50µg/L) though none were safe by WHO guideline value (10µg/L). A population distribution was carried out showing number of people drinking at different ranges of arsenic concentration and the results were compared with the international studies dose response studies to find out the approximately number of people running the risk of different arsenical diseases. Different dermatological symptoms like diffuse melanosis, spotted melanosis, leucomelanosis, mucus membrane melanosis, spotted keratosis etc were noted in the affected population including children. Our clinical survey revealed 22 patients from Eruani

village having suspected Bowens, two of whom had suspected cancer. We had collected 122 nails and 161 urine samples from patients who had arsenical skin lesions and around 97% of both the nail and urine samples contained arsenic above the normal level proving that still the arsenic patients of Eruani village were consuming arsenic contaminated water. During our survey we had collected and analyzed 311 nail and 194 urine samples from patients (60%) with arsenical skin lesions and villagers (40%) without skin lesions. The results indicate that the persons with and without skin lesions both have elevated levels of arsenic in nail and urine. Thus many villagers may not show arsenical skin lesions but have huge arsenic body burden and may be sub clinically affected. From our study in Eruani village we have found children are also exposed to high arsenic and many of them have arsenical skin lesions. Huge nail arsenic body burden can be noticed. Neurological examination generally undertaken in patients with chronic arsenicosis whose skin lesions were already diagnosed revealed considerably high prevalence of neuropathy. Analyzing the data on obstetric history of these women along with arsenic in their drinking water, hair, nail and urine (n=26), our gynecologist opined that incidences of Preterm birth, Low birth weight, Spontaneous abortion, Still birth, Neonatal death in Eruani village is quite high. We also found high arsenic concentration in drinking water of 6 women during their first pregnancy. The overall study indicates higher arsenic in paddy and straw compared to the control samples. The results show though arsenic contaminated irrigation water is used the arsenic level in paddy is within the permissible limit. Our study also revealed social problems arising out of arsenical symptoms. According the information received, altogether there are 193 hand tubewells and two dugwells and two TARA pumps (around 675 feet) in Eruani village. Owners of 2 shallow tubewells do not use it for drinking and cooking due to bad smell and high iron. Two deep tubewells 250 feet and 270 feet are not available for public use. Out of two TARA pumps (around 675 feet), one people do not use (but during our survey it was defunct) due to bad smell and high iron, the other one is not available to the public. There are two dugwells, one installed by BAMWSP but people do not use it due to different reasons. Though the DCH dugwell safe according to Bangladesh standard (arsenic concentration 20 µg/L) is maintained by the villagers However due to small diameter of the dugwell (≈ 4 feet dia) quantity of water during summer is not enough for 16 user families. In this circumstances creating awareness among the villagers about problems of arsenic, use of alternate safe water options like dugwell, deep tubewells, rainwater harvesting, proper water shed management to utilize surface water, role of better nutrition, and above all active participation of people from all the strata of society including women in the struggle against arsenic menace hold the key for eradication of this deadly poison.