

## **Murshidabad – one of the nine groundwater arsenic affected districts of West Bengal, India. Part II: dermatological, neurological and obstetric findings**

Subhash Chandra Mukherjee,<sup>1</sup> Kshitish Chandra Saha,<sup>2</sup> Shymapada Pati,<sup>3</sup> Rathindra Nath Dutta,<sup>4</sup> Mohammad Mahmudur Rahman,\* Mrinal Kumar Sengupta,\* Sad Ahamed,\* Dilip Lodh,\* Bhaskar Das,\* M. Amir Hossain,\* Bishwajit Nayak,\* Shyamal Kanti Palit,<sup>5</sup> Imrul Kaies,<sup>5</sup> Ajoy Kishore Barua,<sup>5</sup> Khondaker Abdul Asad,<sup>5</sup> Amitava Mukherjee\* and Dipankar Chakraborti\*<sup>\*,#</sup>

\*School of Environmental Studies, Jadavpur University, Kolkata, India

<sup>1</sup>Department of Neurology, Medical College & Hospital, Kolkata, India

<sup>2</sup>Retired Professor of Dermatology, School of Tropical Medicine, Kolkata, India

<sup>3</sup>Department of Obstetrics and Gynaecology, Institute of Post Graduate Medical Education and Research, S.S.K.M. Hospital, Kolkata, India

<sup>4</sup>Department of Dermatology, Institute of Post Graduate Medical Education and Research, S.S.K.M. Hospital, Kolkata, India

<sup>5</sup>Dhaka Community Hospital, Dhaka, Bangladesh

#Correspondence: Dipankar Chakraborti, School of Environmental Studies, Jadavpur University, Kolkata-700 032, India; Fax: 91/33-2414-6266; E-mail: dcoesju@vsnl.com.

### **Abstract**

**Introduction:** To understand the severity of related health effects of chronic arsenic exposure in West Bengal, a detailed 3-year study was carried out in Murshidabad, one of the nine arsenic affected districts in West Bengal. **Methods:** We screened 25274 people from 139 arsenic affected villages in Murshidabad to identify patients suffering from chronic arsenic toxicity for evidence of multisystemic features and collected biological samples like head hair, nail and spot urine sample from the patients along with the tubewell water they were consuming. **Results:** Out of 25274 people screened, 4813 (19%) were registered with arsenical skin lesions. A case series involving arsenical skin lesions resulting in cancer and gangrene were noted during this study. Representative histopathological pictures of skin biopsy of different types of lesions were also presented. Out of 2595 children we examined for arsenical skin lesions 122 (4%) were registered with arsenical skin lesions, melanosis with or without keratosis. Different clinical and electrophysiological neurological features were noticed among the arsenic affected villagers. Both the arsenic content in the drinking water and duration of exposure may be responsible in increasing the susceptibility of pregnant women to spontaneous abortions, stillbirths, preterm births, low birth weights and neonatal deaths. Some additional multisystemic features like weakness and lethargy, chronic respiratory problems, gastrointestinal symptoms and anemia were also recorded in the affected population. **Discussion:** The findings from this survey on different health effects of arsenic exposure were compared to those from previous studies carried out on arsenic affected population in India and Bangladesh as well as other affected countries. **Conclusion:** Multisystemic disorders including dermal effects, neurological complications, adverse obstetric outcomes were observed to be associated with chronic arsenic exposure in the study population in Murshidabad, West Bengal. The magnitude of severity was related to the concentration of arsenic in water as well as duration of the exposure.