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Spectrum of neurological disorders in the Gangetic plane in North Indian population

Vijaya Nath Mishra

Banaras Hindu University, India

Gangetic belt is one of the heavily populated areas in the world with people depending on Ganga River for daily needs. Throughout this stretch River, Ganges is life-line for the most densely populated area of the world having more than 4,000,000 people for multiple purposes. River Ganga has been polluted over the last several decades with increasing population, urbanization, defective sewage treatment and improper government policies. This expansion in the population results in extensively polluted water in river Ganga and can be the source of onset of several diseases. It has been witnessed the escalated growth of disease and disorders arising from the polluted river including many neurological disorders like Alzheimer's and Parkinson's disease.

Recently many studies have shown that Ganga water contains many heavy metal toxins and chemical toxins, which are far above the permissible limits and are harmful to human life. The concentration of heavy metal in sediments of Ganga river was examined along a 37-km stretch to find out whether there is a significant difference between sites situated upstream and downstream of Varanasi urban core. Pandey *et al.* found that metal concentration increased consistently along the studying gradient, showing the influence of urban sources. Concentration in the river sediment was found highest for Fe followed by Mn, Zn, Cr, Cu, Ni, Pb and Cd in Varanasi. Etiology of PD is mainly interplay between environmental and genetic factors. Toxic exposure to non-pesticide compounds, such as organohalogens, metals and solvents have received strong support as risk factors for PD and other parkinsonian disorders. People living near the Gangetic belt have the source of drinking water from the river Ganges itself.

Our study is a hospital based survey with prospective observational study involving 88 PD patients. Of these 88 PD patients, 52 were from Gangetic belt and 36 from the non-Gangetic region. For identification of the disease severity, we applied the modified H and Y scale on all the idiopathic PD (IPD) patients. Comparison of the modified H and Y scale between the two groups (Gangetic IPD and non-Gangetic IPD) showed that modified H and Y scale is higher in Gangetic belt group with a t value of 5.105 and is statistically significant with a p-value of <0.001.

The PD patients in the Gangetic belt were more severely affected with more severe H and Y scale. There are few strengths of the present study. First, this is the first study to the best of our knowledge looking into the prevalence of neurodegenerative disease and its link to the river population. Second, there are no previous studies done to show the severity of neurodegenerative disease in Gangetic belt. Exposure to polluted water of Ganga river might be act as bioaccumulation sink of various heavy metals. These heavy metals would increase the severity, early progression of Parkinsonism in Gangetic belts and result in severe modified H and Y scale in Gangetic disease group.

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Biography

Vijaya Nath Mishra is currently working as a Professor at Department of Neurology, Institute of Medical Sciences, Banaras Hindu University, Varanasi, India. His clinical interest is Neurodegeneration, Neurological Diseases, Imaging, Brain and many more.

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