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Arsenicosis _A Major Public Health problem in West Bengal

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Abstract: West Bengal was placed in the position of highest episodes of arsenicosis throughout the world. In 1983 the first case of arsenicosis was detected in West Bengal[3]. In West Bengal among all Districts, Murshidabad is highly affected. The present study conducted in Nadia district indicates that there is arsenic problem in the remote villages of West Bengal and major numbers of rural people exposed to this contaminated water supply are at risk of arsenic toxicity. The population at risk inhabited an area covered by 7 villages in 3 blocks with an average arsenic concentration 0.20mg/l and a maximum concentration of 1.2 mg/l as revealed from the report of sample study. Altogether 29 arsenic cases were diagnosed clinically. The present study only indicates that there is arsenic problem in the distant villages of West Bengal. This is a major public health problem which has been accepted as a great concern[1]. Since many people are suffering with arsenicosis and many are at risk due to consumption of arsenic contaminated under-ground water, it is necessary to provide appropriate health care services and all mitigation measures must be supported with awareness, sensitization and motivation actions[16].

Key Notes: Arsenicosis- Cumulative Arsenic toxicity

Introduction:

In 1938 at Bell Villi Nagar of Argentina, the first case of arsenicosis was detected and was recognized as **Bell Villi Disease** , later in course of time it was found in different areas of East and middle parts of Argentina. The cause of this type of pollution was admixture of arsenic containing natural ores with water of shallow tube well. In 1968, first case of arsenic pollution came to surface in Taiwan and the cause of that was also leaching of arsenic from underground layer to ground water. Skin pigmentation and gangrene of the fingers of the toes were the chief manifestations. Here in Taiwan disease was named as **Black foot Disease** because of black colour of the fingers resulting from gangrene. In 1983 Professor K.C Saha of School of Tropical Medicine, Kolkata detected the first case of arsenicosis in West Bengal. There after West Bengal was placed in the position of highest episodes of arsenicosis throughout the world[3]. The School of Environmental Studies (SOES) in Jadavpur University conducted a survey between 1989 and 1996 and found that in seven districts like Malda, Murshidabad, Burdwan, Nadia, North and South 24 Parganas, Hooghly, more that 9 million people were drinking arsenic contaminated water (Dipankar *et al* 1996), of these, more than 200000 were estimated as having arsenical skin lesions. The population at risk inhabited an area covered by 560 villages with an average arsenic concentration of 0.20 mg/l and maximum concentration of 3.7 mg/l[7,9]. The most toxic form, arsenite, comprised 50% of the total arsenic in the water analysed (Dipankar *et* al 1994)[15].

The arsenic contamination in drinking water is now causing internal wounds in liver, stomach, kidney and in trachea. Diseases like Jaundice and Cancer are also caused by continuous consumption of contaminated drinking water. Factors lie behind this contamination are mainly (a) Ground water withdrawal in large scale, (b) Properties of iron-oxide present in the soil, (c) Percolation of oxygenated water through soil. Like New Delhi (India) and Nepal, Thailand Govt. has ordered to store rain water for various purpose. In some provinces of USA, Japan & Germany the Govts, are giving preferences to those who are utilizing rainwater for drinking purpose, maintaining a series of processes of bio-filtration[1,2].

Methods and Materials:

First Target group represents the population which is already affected or at risk of arsenic contamination, with a focus on the basic needs of the people in 2 arsenic affected villages of Nadia district have already been covered, the details are mentioned in the tabular form.Name of District-Nadia and name of Block-Haringhata and Karimpur-1, Debogram

Results & Discussion:

Table I of First Target Group shows on behalf of Swasthya Bhabna Welfare Society, its volunteers at the onset started house to house survey of 2 Arsenic affected villages named as Nonaghata Uttarpara and Nonaghata Majherhat selected for survey works as these two villages under Haringhata Block of Nadia District were mentioned as Arsenic affected villages by PHE (Public Health Engineering Department of Government of West Bengal, after 7 days survey works by the volunteers of Swasthya Bhabna Welfare Society, revelaled that out of 411 members surveyed of which 213 members belonged to Nonaghata-Uttarpara and 198 belonged to Nonaghata –Majherhat village, total male members were 177 and female members were 205 and child members were 29. In the medical camps organized by Society, Dermatologists detected 11 Arsenic patients of which 7 patients coming from Nonaghata Uttarpara and 4 patients from Nonaghata – Majherpara. **Table-II** shows that during the organization of health check up camps in Nonaghata-Uttarpara and Nonaghata- Majherhat villages, it has been found that total 11 arsencosis patients of which 7 from Uttarpara and 4 from Majherhat village were detected, whereas other non arsenic skin infected patients were 150 and 154 respectively and all were provided with proper medicines and treatment. **Table-III** shows out of 11 sufferers of arsenicosis all were suffering from moderate anaemia, 2-3 suffered from hypertension, hypotension, having low to moderate peek flow rate and 1-2 patients have ulceration and pre-malignant condition Table-IV shows that out of 11 Arsenicosis patients detected in two villages, 6 were male and 6 were female, lowest age was 13 years and highest age was 70 years, most of them suffered from moderate to severe anaemia. According to severity of symptoms and signs they were divided into Grade I to Grade IV of which Grade II sufferers were 8, Grade III- were 2 and only 1 case of Grade IV was detected and he was received carcinogenic treatment[9,11].

Second Target groups represent the population which were already affected or at risk of arsenic contamination, with a focus on the basic needs of the people in arsenic affected villages under the district of Nadia of West Bengal State. 2 arsenic affected villages of Nadia district named Kalaberia, Majlishpur, and 2 Chitmahals named as Jamalpore and Charmegha under the Block of Karimpur-I of Tehatta Sub Division, have already been covered, the details are mentioned in the tabular form. **Table IV** shows that on the Health check up camp total 40 patients came for their health check up from the above mentioned villages mainly came from Kalaberia village out of which 20 persons were male and 16 persons were female and 4 were children. Out of 40 patients attended the camp, 39 patients were suffering from skin diseases other than Arsenicosis. One female patient attended the camp for her skin complaints and she was diagnosed as Arsenicosis Grade-II came with the complaints of Melanosis in the Forehead, Raindrop Pigmentation in the back, hands and legs and Black pigmentation inside the gums and tongue but no keratosis, hyperkeratosis or ulceration was found[10,12]. She has been suffering for the last 5-6 years but with the availability of Arsenic Free water arranged by Arsenic Awareness Society and PHE of Govt. of West Bengal, her complaints remarkably improved. **Table-V** shows that out of 40 patients attended the Health Check up camp, 39 patients suffered from skin diseases like Allergy, Eczema, Impetigo, Onicomycosis, Tenia cruris etc. but 1 patient was suffering from Grade-II Arsenicosis.

Table-VI shows that one arsenicosis female patient, aged about 53 years was suffering from moderate anaemia, normotensive, having low peek flow rate and atypical presentation of pigmentation inside the mouth and gums.

Third Target groups represent the population which was already affected or at risk of arsenic contamination, with a focus on the basic needs of the people in arsenic affected village under the district of Nadia of West Bengal State. **Table VII** shows that on the Health check up camp total 66 patients came for their health check up from the Jampukur Purbapara village of Debogram Block under Nadia district. Out of which 40 persons were male and 20 persons were female and 6 were children. Out of 66 patients attended the camp, 49 patients were suffering from skin diseases other than Arsenicosis. Twenty female patients attended the came for her skin complaints and five was diagnosed as Arsenicosis Grade-II came with the complaints of Melanosis in the Forehead, Raindrop Pigmentation in the back, hands and legs and Black pigmentation inside the gums and tongue but no keratosis, hyperkeratosis or ulceration was found. They have been suffering for the last 5-6 years but with the availability of Arsenic Free water arranged by Arsenic Awareness Society and PHE of Govt. of West Bengal , her complaints remarkably improved. **Table-VIII** shows that out of 66 patients attended the Health Check up camp, 49 patients suffered from skin diseases like Allergy, Eczema, Impetigo, Onicomycosis, Teniasis etc. but 17 patients were suffering from Grade-I to Grade-III Arsenicosis. **Table-X** Profile picture of Arsenicosis Patients. It reveals that most of the patients suffered from moderate to severe Anaemia with

restricted lung functions and most of them have mild to moderate hypertension. Out of 17 patients 6 of them are female and 12 are male and their average age is 54.4 yrs. The grade of arsenicosis is from Grade I to III. Moreover 6 patients have atypical presentations like Pigmentation inside the mouth, conjunctival congestion, Non pitting edema, gangrene of the fingers of Rt foot apart from melanosis, keratosis and others.

Conclusion

The present study only indicates that there is arsenic problem in the remote village of West Bengal. In spite of that through our study works and social services we already established self-sustaining 'community group' in the project village. These community groups become actively involved in preventing and reducing arsenicosis. Reliable and scientifically accepted database on arsenic levels in groundwater for the project village becomes available. Manpower trained to carry out water quality analysis. Capacity building of local NGO, Voluntary Organisations and Panchayats to tackle similar problem in the locality in the future..Better health status assured for the arsenic affected villagers..Development of effective and qualitative IEC materials for creating mass awareness (such as posters, hand bills, booklets, visual display) were prepared and circulated. Awareness camps organized and awareness generated in project villages. Medical treatment camps organized and medicines were given to the affected patients free of cost. Overall sustained environmental development and better quality of life assured in the arsenic affected areas by socioeconomic upliftment of the people[17]. There are however other districts in West Bengal having the same geological and climatic conditions as in found in nine districts, are likely that problem of arsenic in ground water is prevalent in vast areas of West Bengal putting millions of people living in those areas at risk of arsenicosis[16]. This is a great public health problem which has been accepted as a calamity. The problem is reversible and must take adequate measures for its preventions with no wasting of time.

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Table-I Tabular picture of Arsenic affected villages

Name of village	No. of Family members surveyed	Male Members	Female members	Child members	No. of Arsenic patients
Nonaghata-Uttarpara	213	86	112	15	07
Nonaghata-Majherpara	198	91	93	14	04
Total- 2 villages	411	177	205	29	11

Table-II Tabular picture of Arsenicosis patients

Total No. of Arsenicosis patients	No. of skin infections other than Arsenic/ Non Arsenic patients	No. of normal Persons not affected by any diseases	Name of the affected village		Total No. Members surveyed
			Nonaghata-Uttarpara	Nonaghata-Majherhat	
11	150	56	07	-	213
11	154	40	-	04	198

Table-III Profile picture of Arsenicosis Patients

Sl.No	Sex	Age In years	Wt. In Kg.	Ht. in Cm	Hbin gm/100ml.	PEFR in ml.	Gradation Of Arsenicosis	Atypical clinical presentation
1	F	55	45	135	9.6	50	II	Pitting Edema
2	F	17	43	150	9.7	230	II	
3	M	47	41	162	9.4	200	II	
4	M	42	60	160	9.4	190	IV	Pit.Edema,Low BP, Ulceration
5	F	55	50	143	9.3	130	II	Low BP
6	M	50	49	159	9.5	120	III	Myopathy, Neuropathy
7	M	40	48	161	9.6	140	II	Conjuctival congestion.
8	M	70	55	176	10.6	150	III	Conjuctival congestion,ulceration,High BP, buccal pigmentation
9	F	42	45	148	10.5	150	II	Buccal pigmentation
10	F	55	46	145	10.9	160	II	Hypertension
11	M	43	55	151	9.0	160	II	-

Table-IV Categorisation of Arsenicosis Patients according to their Anthropometric and Clinical gradation

Sl. No	Sex		Age in years		Wt in Kg		Ht. in Cm		Hb. In Gm%		PEFR in ml			Important clinical Gradation				Important clinical presentation			
	M	F	13-40	41-70	40-50	51-60	130-150	151-180	8-10	10+ to 12	50-100	101-150	Above 151	I	II	III	IV	Pig. &	Low BP	High B	Nuro &

																		Edema		P	ulcer
11	6	5	2	9	8	3	5	6	8	3	1	5	5	0	8	2	1	3	2	2	4

Table-V Tabular picture of Arsenic affected villages

Name of villages	No. of Patients examined	Male Members	Female members	Child members	No. of Arsenic patient
Kalaberia, Majlishpur, Jamalpur, Charmegha	40	20	16	04	01

Table-VI Tabular picture of Arsenicosis patients

Total No. of Arsenicosis patients	No. of skin infections other than Arsenic/ Non Arsenic patients
01	39

Table-VII Profile picture of Arsenicosis Patients

Sl.No	Sex	Age In years	Wt. In Kg.	Ht. in Cm	Hb in gm/100ml.	PEFR in ml.	Gradation Of Arsenicosis	Atypical clinical presentation
1	F	53	52	135	9.6	200	II	Pigmentation inside mouth and gums

Table-VIII Tabular picture of Arsenic affected village

Name of villages	No. of Patients examined	Male Members	Female members	Child members	No. of Arsenic patient
Jampukur Purbapara	66	40	20	06	17

Table-IX Tabular picture of Arsenicosis patients

Total No. of Arsenicosis patients	No. of skin infections other than Arsenic/ Non Arsenic patients
17	49

Table-X Profile picture of Arsenicosis Patients

1	M	60	50	132	10.7	160/90	170	II	Pigmentation inside mouth
2	M	56	57	134	11.5	150/90	200	I	
3	M	57	60	142	13.8	140/80	275	I	
4	F	55	54	130	11.7	120/80	250	I	
5	M	60	58	132	12.2	140/90	200	II	
6	M	40	59	136	11.9	150/90	210	II	Conjuctival congestion
7	M	60	52	132	11.4	120/70	180	II	
8	M	52	56	134	12.4	150/70	200	I	
9	F	70	47	128	9.6	110/60	160	II	
10	M	55	57	132	11.7	160/80	156	III	Conj.congestion 7 pigmentation inside mouth
11	F	50	47	126	10.7	150/80	160	III	Gangrene
12	M	56	52	128	11.6	120/60	170	III	
13	F	38	47	125	11.9	150/100	176	II	Non pitting edema
14	F	55	49	127	11.6	150/80	200	I	
15	M	48	54	132	11.8	130/80	200	II	
16	M	57	59	134	12.2	160/110	180	I	Inside mouth pigmentation
17	M	60	52	130	11.7	160/80	175	II	