FIELD PROJECT REPORTS

BY

Gaurab Roy

MAE – FETP Scholar, 2004-2005

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF APPLIED EPIDEMIOLOGY (M.A.E.)

OF

SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES AND TECHNOLOGY, THIRUVANANTHAPURAM – 695011, INDIA

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**NATIONAL INSTITUTE OF EPIDEMIOLOGY
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MAYOR V.R. RAMANATHAN ROAD, CHENNAI – 600031, INDIA**

January 2006

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Sree Chitra Tirunal Institute for Medical Sciences and Technology,
Thiruvananthapuram Kerala -695 011.

This work has been done as part of the two year Field Epidemiology Training Programme (FETP) conducted at

National Institute of Epidemiology,
(Indian Council of Medical Research),
Mayor V.R. Ramanathan Road, Chetput, Chennai - 600 031.

January, 2006

CERTIFICATION

This is to certify that all the field projects submitted in this Bound Volume are original work done by Dr. Gaurab Roy during the first two field postings of six months each under the guidance of faculty of National Institute of Epidemiology (ICMR), Chennai and the local supervisor specially nominated for this purpose. This is in partial fulfillment of the requirements for the degree of Master of Applied Epidemiology and has not been submitted earlier, in part or whole, for any other (Publication or degree) purpose.

Director

National Institute of Epidemiology

Dated:

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I also express my respect and gratitude to Dr. S. Bhattacharyaa, Director, National Institute of Cholera and Enteric Diseases (NICED), Kolkata for according me with the privilege to undertake some important portion of this study in his famous institute.

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Last but not the least I express my gratitude to my family for their patience, encouragement and cooperation.

Dated: (GAURAB ROY)

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SECTION 1:

FIRST FIELD POSTING

1. Introduction

I worked as Superintendent, Bishnupur Sub-divisional Hospital, a 230 bedded hospital, in district Bankura, West Bengal, more than two years before enrollment in the Master of Epidemiology (MAE) course. Before that I worked as Superintendent, Ranaghat Sub-divisional Hospital, a 190 bedded hospital, in district Nadia, West Bengal, for two years and as Medical Officer and Block Medical Officer of Health (BMOH) at Khargram Rural Hospital, a 60 bedded hospital, in district Murshidabad, West Bengal for four years. I was the administrative in-charge and drawing and disbursing officer of the sub-divisional hospital. Apart from that I was responsible with the block and municipality level health planning, implementation, monitoring and supervision of all public health programmes including national health programmes. I was also responsible for health management information system including the work involving hospital based data collection, compilation, interpretation and feedback. I had to send regular reports to the Chief Medical Officer of Health (CMOH), Deputy Chief Medical Officer of Health II (Dy CMOH II), Deputy Chief Medical Officer of Health III (Dy CMOH III), Assistant Chief Medical Officer of Health (ACMOH), District Project Officer (DPO) and the Director, State Bureau of Health Intelligence.

I have been posted as Medical Officer (on Training Reserve) under Directorate of Health Services, Government of West Bengal, undergoing MAE course at National Institute of Epidemiology (NIE), Chennai and have been placed under the CMOH, Haora for my field assignments. I have met the Directorate of Health Services (DHS), Joint Directorate of Health Services (Public Health & Communicable Diseases), the Director, West Bengal State AIDS Prevention and Control Society (WBSAPCS), the director, SBHI and other officers to get necessary permission and to get pertaining health related data. I have also met the Director, National Institute Cholera and Enteric Diseases (NICED) and have sought his help on investigation and laboratory diagnosis for my field projects.

In district Haora, I have visited the CMOH, DyCMOHs and other nodal officers, interviewed them as per project methodology to collect information about the present health situation, disease priorities and ongoing health programmes, secondary data, existing surveillance system and laboratory facilities. I have visited all Block Primary Health Centres (BPHC), Rural Hospitals (RH), State General Hospitals (SGH), Sub-divisional Hospital (SDH) and District Hospital (DH) to collect information related to health status, secondary data, existing health care facilities, surveillance system and laboratory facilities and discussed with the Superintendents, BMOHs and other staff. The objectives of the situation analysis of district Haora were to: (1) describe the geographic, socio-demographic and socio-economic characteristics, (2) describe the organization of the health system, (3) understand major public health priorities and (4) health status of the population with respect to indicators towards the millennium development goals.

2. Methods

2.1 Elements of situational analysis

The key elements of the situation analysis in district Haora are geographic, socio-demographic and socio-economic characteristics; organization of the health system (such as structure, establishments, mode of operation, surveillance system, reporting system, laboratory back up); the major public health priorities (such as diarrhoeal diseases, acute respiratory tract infections, tuberculosis, malaria, sexually transmitted diseases, viral hepatitis, enteric fever, arsenicosis, industrial and road traffic accidents) and important health related millennium development goal indicators (such as prevalence and death rate associated with tuberculosis, infant mortality rate, maternal mortality ratio per 100,000 live birth, measles immunization among children under one).

2.2 Data collection

We first visited different district level offices of health departments and other related departments. Then we visited the sub-divisional and block-level health and health related offices including all BPHCs, RHs, SGHs, SDHs and also DH to explain the objectives of my study and the importance of verification of records and collection of reports. We also discussed with the in-charges and other staff to understand the organizational set-up of

health system and the modus operandi of the system. We also consulted with various reports published at state and district level by department of health and family welfare, SBHI, Haora Zilla Parishad and district gazetteer.

3. Results

3.1 Geographic, demographic and socioeconomic characteristics

District Haora lies in the Gangetic plain in the southern part of West Bengal in between 22°48' and 22°12' latitude and 88°23' and 87°50' longitude. The total area is 1467 sq.k.m. and total population is 42,73,099 according to 2001 census. It constitutes 1.7% area of the state, but 5.3% of total population. The population density is 2,913 per sq.k.m. District Haora is surrounded by the districts of Hooghly, Kolkata, South-24 Paraganas and Purba Medinipur. The main rivers passing through or bordering the district are the rivers Hooghly (lower part of the Ganga), Rupnarayan and Damodar. Topography of the district is low-lying fertile land, which is prone to flood and water-logging. The eastern part of the district is made by new alluvial soil and the western part by old alluvial soil. The district has tropical climate, average annual temperature 26.5° C and average annual rain fall 150 – 200 cm. (Figure-1)

The district has two administrative sub-divisions (Haora Sadar and Uluberia), one municipal corporation (Haora city) and two municipalities (Bally and Uluberia), 19 police stations, 14 community development blocks, 14 panchayet samities, 157 gram panchayets, 836 mauzas, 2218 gram samsads, 734 villages and 19 towns. 93.4% area is rural and 6.7% area is urban. 50.4% population resides in urban area and 49.7% resides in rural area. 906 females stand per 1000 males. Decennial growth of the population from 1991 to 2001 was 14.6%. Overall literacy level was 77.7% (Male: 83.7%, Female:71%). (Table-1)

The economic resources are mainly agriculture and industry based. Most of the rural population is engaged in agriculture and most of the urban population is engaged in industry and allied services and businesses. Paddy, lentil, mustard, potato, vegetables, jute, fruits and fish are the main agricultural products. Haora is not only one of the ancient and major industrial region in the state, but also of the country. Several large and heavy

industries to innumerable small and ancillary industries are located here. Besides, there were several wholesale markets. Several national high ways are passing across the district. Haora station is the main gateway to the state and Eastern India. Therefore large number of in- and out-migration is occurring everyday.

3.2 Major public health priorities

The public health problems of the district are related with infantile and maternal conditions and migrant labourers; communicable and non-communicable diseases; aftermath of flood and water logging; environmental pollution; industrial and road traffic accidents. Important communicable diseases are diarrhoel diseases, acute respiratory tract infections including pneumonia, viral hepatitis, enteric fever, tuberculosis, malaria and sexually transmitted diseases. Table-2 indicates a brief description of main public health priorities with corresponding prevention and control programme.

3.3 Organization of the health system

The CMOH is the overall in-charge and responsible for the health care delivery system of the district. The DHS and District Health and Family Welfare Samity (DHFWS), Haora guide him. DHFWS is a society with Savadhipati, Haora Zilla Parishad as the chairman, District Magistrate as the vice-chairman, CMOH as the member secretary and other members are from the related departments. It was formed to take decision on policy making regarding district health matters and implementation of different health activities as per guidance from the state level.

Under the CMOH there are Deputy CMOH I, II and III. DyCMOH I is looking stores, vehicles and administration. DyCMOH II is responsible for all public health programmes. DyCMOH III is responsible for Reproductive and Child Health Programme. There are other district level officers, namely, District Immunization Officer (DMCO), Zonal Leprosy Officer (ZLO), ACMOH (Medical and Administration) and ACMOH (Family Welfare and Communicable Diseases) to look after immunization, leprosy, finance and Revised National Tuberculosis Control Programme (RNTCP) respectively. ACMOH (Sadar) and ACMOH (Uluberia) are responsible for discharging health care services to

Haora Sadar and Uluberia sub-divisions. Figure-2 indicates the flow chart showing the health administrative set-up.

Superintendents of DH (1), SDH (1) and SGHs (7) are directly accountable to the CMOH. BMOHs (14) are overall in-charges for discharging preventive and curative health services in the community blocks. The CMOH, ACMOH of respective sub-division and Block Health and Family Welfare Samity (a block level policy making society corresponding to DHFWS) guide him or her to take decision. Other Medical Officers (MO), Block Primary Health Nurse (BPHN), Block Sanitary Inspector (BSI), Sanitary Inspector (SI), Malaria Inspector (MI), Social Welfare Officer (SWO) and Computer assist him or her for discharging preventive and curative services. Under each BPHC there are few Primary Health Centres (PHC). Each PHC Medical Officer caters health care services to 30,000 – 50,000 population. Health supervizers (Male and Female) assist him and run the sector headquarter. Under each sector there are several sub-centres covering average 5000 population. Multipurpose health workers (Male and Female) run the sub-centres. Within a sub-centre there are some support personnel for every 1000 population – one Anganwadi worker, one Community Health Guide and one trained Dais. The first Saturday of every month is fixed for monthly review meeting at block level and sector level meetings commence on rest three Saturdays. In district, every 10^{th} and 20^{th} days of each month are fixed for Public Health Meeting' and 'Monitoring of Information and Education System (MIES)' meeting. Table-3 indicates detail of human resources in the district.

3.4 Indicators towards the millennium development goal

Present health status related to indicators towards the millennium development goal in district Haora, West Bengal, India are mostly on better side than that of state and national level. However prevalence associated with tuberculosis and case fatality rate from malaria indicated higher figure. Selected indicators with their values and comparison with data from state and national level were listed in Table 4.

4. Discussion

Low-lying areas encircled by large rivers and tropical climates make the district flood prone. This results prevalence of water and vector borne diseases in the district particularly in post monsoon. Besides heavy population density and continuous in- and out- migration turn the district vulnerable for communicable diseases. Moreover several industries, go downs, warehouses, dumping places, markets, highways, garages, workshops become the reason of environmental pollution and accidents.

Diarrhoeal diseases are major health problems in the entire district. Frequent occurrence of outbreaks and deaths due to dehydration take place, which are sometimes not reported. Tuberculosis, particularly resistant cases and incomplete treatment are major problems. Deaths due to acute respiratory tract infections, particularly among children, are still major public health problems. Malaria, particularly falciparum variety, is a serious problem. Enteric fevers and viral hepatitis are other problems. Due to lack of awareness, migrant livelihood of a formidable population, increasing promiscuous behaviour and presence of active sex industry, sexually transmitted diseases are becoming major problems. Two blocks of the district, Shyampur – II and Uluberia – II, are identified as arsenic contaminated. Industrial pollution and both industrial and road traffic accidents are major health problems in the district.

Though organizational set-up is in existence from district to sub-centre level, there are vacancies of manpower in some key posts particularly in the periphery. Moreover community block to sub-centre level, health personnel have to serve more population beyond the existing norm causing increased workload, which consequently decrease their quality of work.

Most of the data for Goal 1 are not available. Most of the criteria of Goal 4 are better than state and national level. In Goal 5, performance is also better than state and national level. For Goal 6, most of the data are not available. Here condom use rate is better but percentage of STI patients, who were diagnosed and treated, quite below the state and national level. Malarial death is also higher. Prevalence and death rate associated with tuberculosis are higher. For Goal 7 access of improved water source is better, but access to

improved sanitation is poor in comparison to state and national level. No data was available for Goal 8. (Table 4)

From sub-centres to district level some data are regularly generated, but some data pertaining to the indicators of millennium development goals are not being generated. Most of the health personnel are not aware of the millennium development goal and they are also not aware of analysis, interpretation and dissemination of data, which they have generated regularly.

On the basis of my present study I do recommend for further study related to secondary data analysis of the diseases with public health priorities in the district Haora.

Figure 1: Map showing location of district Haora, West Bengal, Indis, 2004

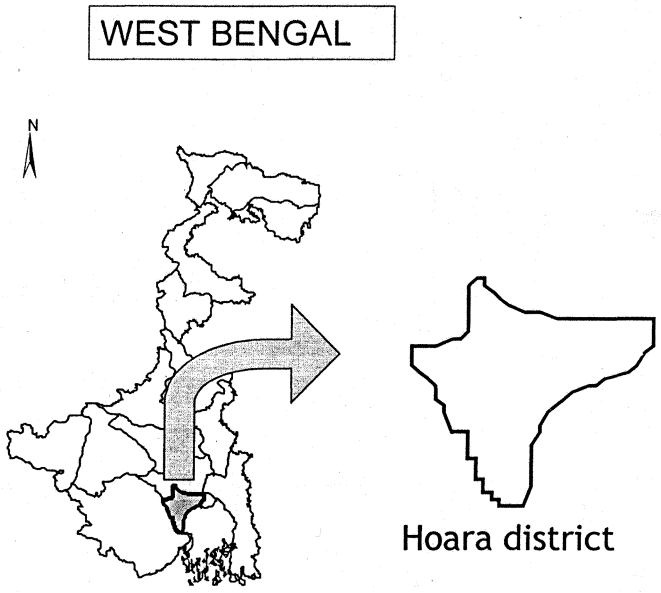

Figure 2: Flow chart illustrating the administrative structure of health system, Haora district

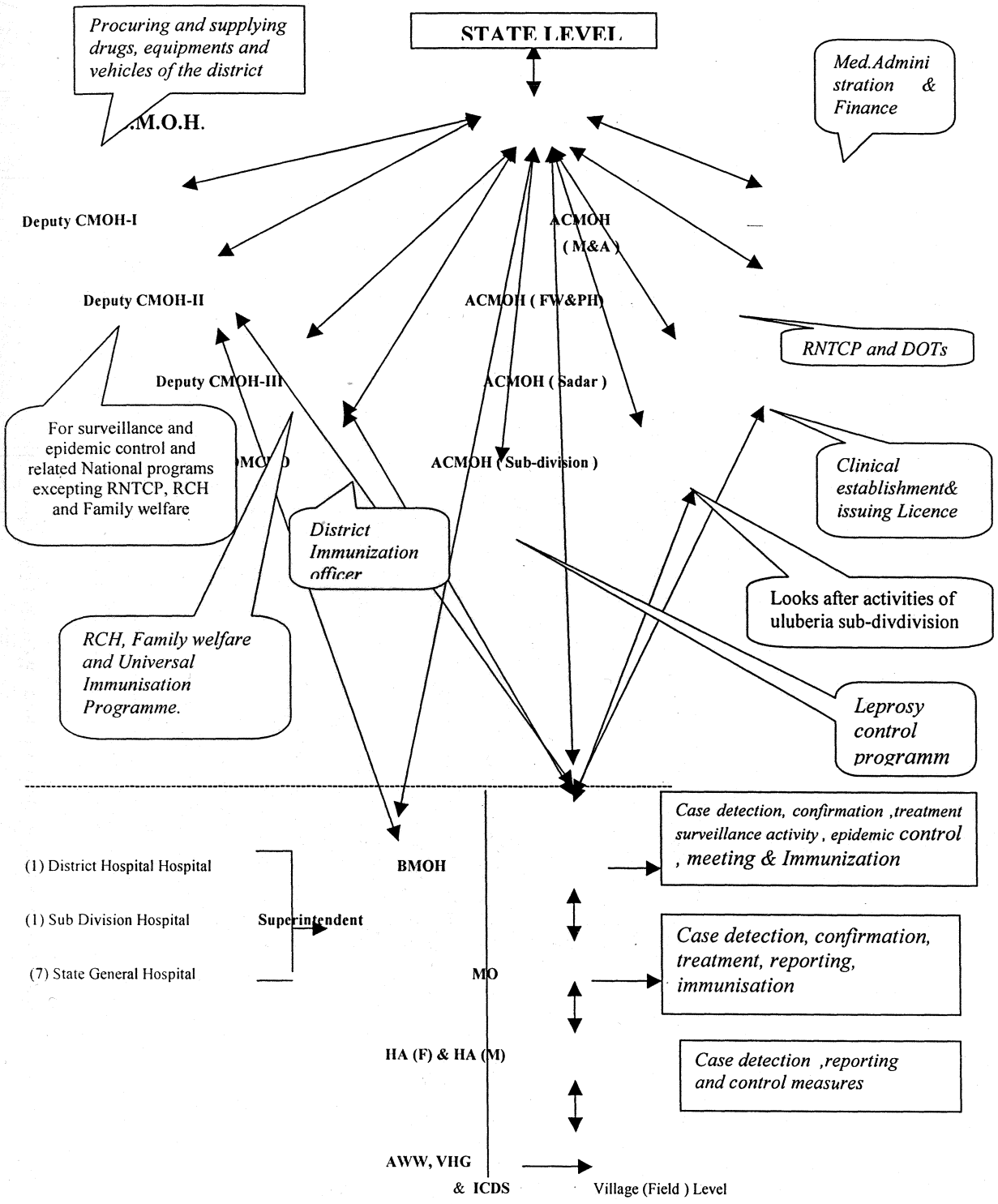

Table 1: Characteristics of population of district Haora, West Bengal, India, 2001

Population Age group	Population size (2001)	Proportion of the total (%)
Population 0-4 years of age	3,43,375	8.0
Population 5-14 years of age	9,26,037	21.7
Population 15-29 years of age	12,30,994	28.8
Population 30-44 years of age	9,26,628	21.8
Population 44-59 years of age	5,15,482	12.0
Population 60 + years of age	3,30,583	7.7
Male population	22,41,898	52.5
Female population	20,31,201	47.5
Population above poverty level	24,78,397	58
Population below poverty level	17,94,702	42
General caste	35,95,224	84.1
Schedule caste	6,58,707	15.4
Schedule tribe	19,168	0.5
Other backward caste	---	---
Total population size	42,73,099	

Table 2: Key public health priorities in district Haora, West Bengal, 2004

Public health priority	Key elements	Ongoing prevention and control programmes
Diarrhoeal diseases	• Frequent outbreak	• Reproductive and child health programme
Malaria	• Annual parasite index	• National vector control programme
Tuberculosis	• Increase morbidity and mortality	• Revised National Tuberculosis Control Programme
ARI	• High rise of incidence of ARI	• Routine Immunization / Nutrition, School Health Programme
AIDS	• Prevalence of AIDS cases	• National AIDS control Programme
Arsenicosis	• Prevalence of arsenical skin lesion	• Arsenic mitigation programme

Table – 3. Health manpower in district Haora, West Bengal, 2004

Category of staff	Number sanctioned	Number in-position	(%)
Medical Officer	181	170	(94)
Dental Surgeon	21	11	(52)
Senior Ayurvedic Medical Officer	8	8	(100)
Homeopathic Medical Officer	17	17	(100)
Pharmacist	87	73	(84)
Public Health Nurse	31	28	(90)
Nursing Staff	600	505	(84)
Social Welfare Officer	22	10	(45)
Medical Technologist (Laboratory)	35	36	(103)
Assistant Computer	24	10	(42)
Para Medical Opthalmic Assistant	13	12	(92)
Block Sanitary Inspector	14	2	(14)
Health Supervisor	130	65	(50)
Health Assistant (Male)	413	248	(60)
Health Assistant (Female)	413	379	(92)
General Duty Attendant	626	521	(83)
Sweeper	265	232	(88)

Table 4: Indicators of progress for the health related millennium development goal, Haora, India, 2004

Goal	Indicator	Value of the indicator		
		In [Haora] (Year)	In West Bengal state (Year)	In India (Year)
Goal 1	Prevalence of underweight children < 5 years of age	Not available	48.7(1998)	47.0(1998)
	Proportion of population below minimum level of dietary energy consumption	Not available	Not available	Not available
	Percentage of children 6-59 month of age who received one dose of vitamin A in the past six months	Not available	43.4 (1999)	29.7 (1999)
	Proportion of infants under six months who are exclusively breastfed	Not available	48.8 (1999)	55.2 (1999)
Goal 4	Under-five mortality rate	Not available	67.6 (1999)	87.0 (2003)
	Infant mortality rate	50.1 (2002)	49 (2002)	63 (2002)
	Measles immunization among children under one	90.5 (2004)	75.49 (2003)	67 (2003)
Goal 5	Maternal mortality ratio	33 (2004)	95 (2002)	540 (2001)
	Proportion of births attended by skilled health personnel	78.5 (2004)	44.2 (98-99)	42.5 (2001)
	Effective couple protection rate [1]	47.8 (98-99)	47.0 (98-99)	47 (2001)
	Percentage of women receiving antenatal care [2]	75.3 (2003-2004)	58.63 (2003-04)	41.3 (98-99)
Goal 6 (HIV)	HIV prevalence among 15-24 years old pregnant women [3]	Not available	Not available	0.7 (2001)
	Condom use rate of the contraceptive prevalence rate	16.4 (2001)	7.1 (98-99)	7.2 (98-99)
	Number of children orphaned by HIV/AIDS	Not available	Not available	Not available
	Percentage of people using a condom during most recent higher risk sexual encounter	Not available	Not available	Not available
	Percentage of STI clients who are diagnosed and treated according to guidelines	75% (2003)	86% (2003)	89% (2003)
	Percentage of HIV-positive women receiving anti-retroviral treatment during pregnancy to prevent mother to child transmission of HIV	Not available	Not available	84.5% (2003)**

** ***Denominator=Total live birth to HIV+ve women; Numerator=Total HIV+ve mother received Nevirapine.***

Table 4: Indicators of progress for the health related millennium development goal, Haora, India, 2004

Goal	Indicator	Value of the indicator		
		In [Haora] (Year)	In West Bengal state (Year)	In India (Year)
Goal 6 (Malaria) [4]	Malaria death rate [5]	0.0012 (2004)	0.004 (2004)	0.003 (2000)
	Proportion of people with uncomplicated malaria getting correct treatment at the health facility and community levels, according to the national guidelines, within 24 hours of the onset of symptoms	Not available	Not available	Not available
	Percentage of pregnant women who have taken chemoprophylaxis or drug treatment for malaria	Not available	Not available	Not available
	The proportion of households having at least one insecticide treated bed net	Not available	Not available	Not available
Goal 6 (TB)	Prevalence and death rate associated with tuberculosis	Prevalence=0.07 Death rate = 0.006 (2004)	Prevalence=0.1 Death rate = 0.002 (2004)	Prevalence=0.06 Death rate = 0.005 (2004)
	Proportion of tuberculosis cases detected and cured under DOTS	1.19 (2004)	1.17 (2004)	0.1 (2003)
	Percentage of estimated new smear-positive tuberculosis cases registered under the DOTS approach	46% (2004)	58% (2004)	47% (2004)
Goal 7	Proportion of population with sustainable access to an improved water source, [6] urban and rural	99.7 (1999)	89.3 (1999)	77.9 (1999)
	Proportion of urban population with access to improved sanitation [7]	27.3 (2004)	54.9 (1999)	64.0 (1999)
Goal 8	Proportion of population with access to affordable essential drugs on a sustainable basis [8]	Not available	Not available	Not available

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11. Records of office of the ACMOH (FW & PH), Haora
12. Records of office of the ACMOH (Uluberia), Haora

1. 2. Status of laboratory facilities in district Haora, West Bengal, India 2004

1. Introduction

Laboratory forms an integral part of national and state health services and contributes effectively to health care and disease prevention. In the health care system, laboratory services are essential not only for making diagnosis and follow-up of treatment for individuals but also supporting other public health programmes. High quality laboratory services contribute directly to reduce mortality and morbidity and cost of providing health services. Appropriate laboratory infrastructure of buildings, space, equipments, reagents and man power development and training programme are essential to tackle all locally prevalent communicable diseases. Rapid advances in scientific methodology have made it possible to develop diagnostic reagents for most of the locally prevalent diseases. Well-established linkages between various laboratories and electronic linkages with information databases and epidemic surveillance systems are equally vital. Integration of laboratories at various levels is needed to have complete information at the state level and to use the relevant information efficiently for control and prevention of communicable diseases and feedback.

In district Haora, several laboratories are functioning from first referral units that are Block Primary Health Centres (BPHC) and Rural Hospitals (RH) up to second tier hospitals that are, State General Hospitals (SGH), Sub-divisional Hospital (SDH) and district Hospital (DH) under State Government Health Department (SGHD). Besides there are other hospitals run by the central government agencies, other departments of state government, private agencies and local bodies. There are also several private laboratories. In this context, I described the status of laboratory facilities in district Haora under State Government Health Department.

The objectives of the study were to describe: (1) the laboratory facilities required in the district for control of locally prevalent diseases, (2) existing laboratory facilities available, (3) the extent of utilization of existing laboratory facilities, (4) the extent of

participation of those laboratories in surveillance and control of outbreak, (5) the role of state reference laboratories or other specialized laboratories to support the surveillance system and in epidemic control and (6) suggestions of recommendations on the basis of the study.

2. Methods

Laboratories representing all categories (BPHC, RH, SDH, SGH, DH) were visited. Concerned persons (superintendents, physicians, pathologists, other medical officers, laboratory technicians, public health workers) were discussed and interviewed and records of relevant sections were checked to understand the proposed and existing facilities available in those laboratories. Care was given to understand the gaps between them. Services offered to the patients including their satisfaction were verified by interviewing few patients at each site. Persons like store-keepers, reagent / chemical suppliers etc. were also consulted for this.

A number of private laboratories were also visited to understand their activities and role of them in district public health crisis.

3. Results

3.1 Infrastructure in Government facilities

The minimum laboratory set-up is present from the level of Block Primary Health Centre (BPHC). There is no facility of such at the Primary Health Centre (PHC) level. Graded laboratory services are available at state general, sub-divisional and district hospitals. In the district there are 10 Block Primary Health Centres (BPHC), 4 Rural Hospitals (RH), 7 State General Hospitals (SGH), 1 Sub-Divisional Hospital (SDH) and 1 District Hospital (DH). State Health System Development Project (SHSDP II) aided by World Bank, had taken some steps to expand the laboratory facilities at middle tier or secondary hospitals (SGH, SDH and DH). Infra-structural development of all these health facilities has been taken up by SHSDP II project both in terms of manpower and material input. With the instruction from the State Government Health Department, SHSDP II has formulated a guideline depicting what laboratory facilities should be available at which level.

Most of the proposed investigations were not conducted in the BPHC and RH level. Selected laboratory examinations conducted in the BPHC, RH, SDH and DH level are listed in Table 1. Stool analysis, semen analysis, CSF analysis, aspirated fluid analysis, FNAC, sputum cytology and malignant cell in haematology were performed in DH level; stool analysis and malignant cell in haematology were conducted in SDH; except stool analysis other tests of this group were not proposed for BPHC and RH, but stool analysis was not conducted in BPHC and RHs.

4. Discussion

4.1 Performance of District Public Health Laboratory

The district level public health laboratory was established at Deputy Chief Medical Officer of Health II (Dy CMOH II) office, but was not set up properly. Some material input had been given. Arrangements of bacteriological testing of water, detection facilities of kala-azar and malaria, preparation of transport media for stool culture have been made, but due to technical reasons they were not materialized. The district deserves a full-fledged functioning public health laboratory for proper discharge of disease surveillance and outbreak control.

4.2 Performance of laboratories at district hospital (DH) level

Most routine haematological, urine and stool, semen and aspirated fluid tests were carried out at this level. But histopathology, Pap smear, FNAC, sputum cytology, bone-marrow, immuno-haematology, coagulation disorder, sickle cell disease, thallasaemia, microbiology, culture sensitivity, blood sugar, BUN, CSF analysis, GTT, blood gas analysis, estimation of CPK, CPK-MB, serum electrolytes, acid phosphatase, alkaline phosphatase, lithium carbonate level in blood were not done at this level though it was decided by the health department under SHSDP II. This laboratory was the one having best infrastructure among all government health facilities in the district. If its full resources and infrastructures were utilized, it could act as a reference laboratory for different tests necessary for surveillance of diseases of public health importance and during outbreak situation. All, excepting the viral diseases, could be diagnosed at this

establishment. There was no facility of histopathology at any of the hospitals in the district. It was possibly due to lack of supply of all necessary equipments, lack of competence of the technicians and lack of orientation and initiative on the part of doctors and other technical staff.

4.3 At Sub-Divisional / State General Hospital Level

A good number of routine haematological, urine and stool investigations, semen analysis tests were carried out at this level. Test like BUN, creatinine, CSF analysis, LFT, Cholesterol, GTT, Lipid profile, Blood gas analysis, estimation of CPK, CPK-MB, Serum electrolytes, Acid phophatase, Alkaline phosphatase, Lithium carbonate level in blood etc. were not done here though proposed to be done. Posts of one pathologist and three technicians were in vacant at the sub-divisional hospital. These laboratories could be utilized for appropriate tests necessary for the surveillance of the diseases and during an outbreak situation. Facilities could be mobilized to diagnose water borne diseases, malaria, kala-azar, filarial, bacterial diseases, tuberculosis, sexually tract infections including HIV, hepatitisB, arsenicosis etc.

4.4 At Rural Hospital & Block Primary Health Centre Level

The laboratory service at BPHC level was actually limited to examination of malaria slides and sputum microscopy for AFB under Revised National Tuberculosis Prevention and Control Programme (RNTCP) in most of the institutions. Only one technician was in place at most of the centres doing the malaria surveillance work only. Malaria technicians need up date training.

4.5 Quality Control

Quality control of the laboratory work was found to exist in case of sputum microscopy at the centres under RNTCP. There are 65 microscopy centres throughout the district, which were under quality control mechanism as per WHO norm.

4.6 Involvement of laboratories in outbreak situation

In BPHCs and Rural Hospitals, laboratories were routinely utilized for only malaria and tuberculosis passive surveillance work. None of those laboratories were involved in the

laboratory investigations of public health emergencies. The district hospital had a facility of water testing, which other institutions had rarely utilized. All these facilities could support in surveillance activities and during epidemic emergencies by laboratory back up of different level. What needed were proper orientation and networking of this establishments and utilization of their full potential.

4.7 Malaria Laboratories at sub divisional level

There was facility of examining malaria slides at ACMOH offices at two sub-divisions of this. But, in the later period, due to lack of laboratory technicians and other reasons, sadar sub-divisional malaria laboratory had not been functioning properly.

4.8 Involvement of laboratories in private sector

Besides seven other hospitals, there were 239 Nursing Homes and 128 Pathological Laboratories, which were government recognized. Most of them were concentrated in Haora Municipal Corporation, Bally Municipality and Uluberia Municipality areas. There was no policy to involve them from government health department.

4.9 Role of State level laboratories

Railway Orthopaedic Hospital and West Bank Hospital had two good laboratories, which could be involved in disease surveillance and outbreak investigation works. School of Tropical Medicine, Kolkata acted as the reference laboratory at the state level. Stools, water samples, blood samples were supposed to be examined at this institute to provide feedback to the concerned. UNICEF established two laboratories in collaboration with NGOs to test water samples for arsenic estimation.

4.10 Role of National level laboratories

Presently National Institute of Cholera and Enteric Diseases (NICED, ICMR), Kolkata, helps the state government during epidemic investigation, when asked for.National Institute of Virology (NIV, ICMR), Pune, also did some investigations. National level laboratories routinely helped in polio surveillance. National Institute of Epidemiology

(NIE, ICMR), Chennai, is also contributing by expertising our programme officers. All India Institute of Hygiene and Public Health (AIIH&PH), Kolkata, also helped the state government in this respect.

4.11 Conclusion

The laboratories at district, sub-divisional and state general hospitals were not doing many of the investigations, which they were supposed to do. Most of the centres had inadequate number of technicians. Supply of consumables and reagents was not steady. Some of the equipments were identified to be sub-standard as per opinion of the doctors and staff and there was no effective system of maintenance. People either used to gather in a large number in the Uluberia SDH and Haora DH for even a simple investigation or diverted their resources to the private laboratories, most of which had no stipulated specifications. There was no policy to involve other government and private health establishment on diversification of workload, expertization in particular subject or in epidemic preparedness. Absence of these services, were possibly due to weakness in the infrastructure and lack of motivation. However, the government had a chain of laboratories, which could be explored for better public health activities and clinical management.

4.12. Recommendations

The existing infrastructure needs to be strengthened including provision of properly trained manpower. There should be regular supervision from district health authority. There was under utilization of resources at most of the places. Health establishments need sensitization on disease surveillance and the role of laboratories in surveillance and in outbreak control. Laboratories of other government and private hospitals and private laboratories could play an important role in disease surveillance as many diseases were diagnosed first by them. By informing any unusual occurrence to the appropriate authority, they could play a major role in detecting and control of an epidemic at its early stage. A strategic planning is needed to fix up the responsibility at all tiers. Consistent supply of reagents and introduction of annual maintenance acts with the manufacturers of the equipments were other points, which need attention.

Figure 1: Flow Chart of Laboratories of Government facilities

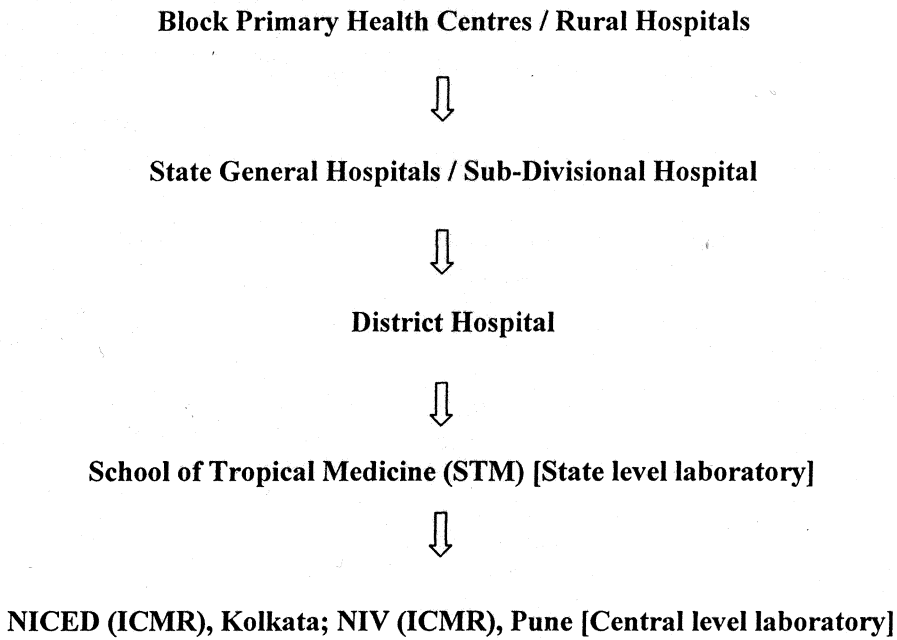


Table 1: Laboratory resources and test performed at different level laboratories in district Hoara, West Bengal, India,2004

Category of the Unit	Man Power			Equipments	Reagents	Tests done
	Pathologist	Medical Technologist	General duty assistant			
Block Primary Health Centre	Nil	Two	One	Microscope -2	Adequate	Blood for TC, DC,Hb, ESR, M.P., Sputum for AFB
Rural Hospital	Nil	Two	One	Microscope -2 Centrifuge machine -1 Colorimeter -1	Adequate	Blood for TC, DC, Hb, ESR, M.P., Sugar Urine for Routine examination, Stool for Routine examination, Sputum for AFB
Subdivision / District Hospital,	Two / three	Six	Two	Semi auto analyzer-1 Centrifuge machine – 3 Colorimeter 3, Hot air oven -3 Autoclave vertical-3 Dry Heat Sterilizer - 1 Microscope - 4	Adequate	Blood for TC, DC, Hb, ESR, Platelet, M.P., Sugar, Urea, Creatinine, Uric acid, Liver function test, Lipid profile, Urine for Routine examination, Stool for Routine examination

7. References

1. Records of State Health System Development Project – II (SHSDP – II) under Department of Health and Family Welfare, Govt. of West Bengal
2. Records of Dy CMOH I Office, Haora
3. Records of Dy CMOH II Office, Haora
4. Records of ACMOH Office, Uluberia, Haora
5. Records of Superintendents' Offices, DH,SDH,SGHs, Haora
6. Records of BPHCs and RHs, Haora

1.3 Description of existing surveillance system in district Hoara, West Bengal, India, 2004.

1. Introduction

Effective communicable disease control relies on effective disease surveillance. A functional communicable disease surveillance system is essential for action on priority communicable diseases and for improvement of core surveillance functions, namely, setting of standards (case definitions), training and supervision, setting up laboratory support, setting up communications, resource management.

In India, Ministry of Health and Family Welfare has launched the National Surveillance Programme for Communicable Diseases (NSPCD) for detection of early warning signals of outbreaks and rapid response for prevention and control of these outbreaks and diseases. Outbreak of plague (1994), malaria (1995) and dengue haemorrhagic fever (1996) highlighted the urgency for disease surveillance system so that early warning signals are recognized and appropriate follow-up actions are initiated. In 1997, a model district plan was drafted. In 1998, subsequently, a concept plan was developed by the National Apical Advisory Committee under the secretary (Health). Under the programme, the surveillance system, is strengthened through training of medical or paramedical personnel, dissemination of technical information and guidelines, up gradation of laboratories, modernization of communication and data processing systems. The programme includes IEC activities to promote community participation in the prevention and control of outbreaks. Presently the programme is operationional in 80 districts of 28 states / union territories. Multi-disciplinary Rapid Response teams (RRTs) have been constituted at state and district levels under the programme. These teams have been provided training in surveillance, prevention and control of outbreaks. Now NSPCD is merged in the Integrated Disease Surveillance Programme (IDSP) under National Rural Health Mission (NRHM).

Under the Director of Health Services, Government of West Bengal, there are separate wings for surveillance and control of different communicable diseases and national health programmes with independent charges by Additional / Joint / Deputy/ Assistant Directors of Health Services. Advantage is that most of the wings are situated under a single umbrella at Swasthya Bhawan, which is well

connected with the district. Besides having regular reporting systems and conducting regular review meetings, different senior officers of health directorate are assigned to monitor health activities including surveillance of each district. State Bureau of Health Intelligence, situated also at Swasthya Bhawan, is performing an excellent job by compiling, analyzing and disseminating all data and reports. Monthly, quarterly and annual reports of different health indicators and hospital performances including analytical reports of communicable diseases in West Bengal are being published regularly. The diseases of high outbreak potential like cholera and other diarrhoel diseases, acute respiratory Infections, tuberculosis, malaria, viral hepatitis, enteric fever, sexually transmitted diseases and arsenicosis are prevalent in district Haora. Certain socio-economic factors leading to environmental changes increase the risk of disease and their epidemic. The receptivity of an area to outbreak is related to inadequate and contaminated drinking water, lack of unhygienic food practice, poor sanitary condition and weak public health system.

The objectives of the study are to: (i) describe the existing disease surveillance system in district Haora and (ii) identify the strengths, weaknesses, opportunities and threats of the disease surveillance.

2. Methods

2.1 Study design

Descriptive study based on records and reports.

2.2 Setting

District Haora.

2.3 Data collection

We collected data through interviews and discussion with district health officials and other key health personnel. We met with Rapid Response Team, superintendents of different hospitals and block medical officers of health. We consulted with Child Development Project Officer and with different non-government organizations, who are working in Haora in health related programmes. We reviewed records and registers of district health offices and different hospitals. We collected data from Haora Municipal Corporation to describe the urban surveillance. We also visited the archive of State Bureau of Health Intelligence.

2.4 Data analysis

We analysed the collected data and prepared flow charts and tables for interpretation. We considered various steps of a surveillance system while describing the existing surveillance system in district Haora.

3. Results

3.1 Surveillance system in respect to existing health programmes in the district

The disease surveillance activities in the district Haora are based on reporting patterns received from different levels, namely, sub centres, primary health centres, community block health centres, state general, sub-divisional and district hospitals. Presently five major surveillance programmes are going in the district.

1. Monthly disease surveillance for 19 communicable diseases.
2. Monthly surveillance system for 12 other diseases of public health importance.
3. Monthly hospital-based surveillance under Health Management and Information System (HMIS) for 84 disease conditions.
4. Ongoing vertical National Health Programmes for important communicable and non-communicable diseases for preventive and promotive health like National Vector Control Programme (NVCP), Modified Leprosy Eradication Programme (MLEP), Revised National Tuberculosis Control Programme (RNTCP), National AIDS Control Programme II ($NACP_{II}$), Reproductive and Child Health Programme (RCH), National Programme for Control of Blindness etc. Weekly disease surveillance system for acute flaccid paralysis and acute diarrhoeal diseases are to be sent.
5. Weekly NSPCD Report. In West Bengal, Murshidabad, Bardhaman and Haora, these three districts are under NSPCD Programme. In every week reports on NSPCD diseases (zero reporting in case of non-occurrence of any NSPCD disease) and NSPCD Laboratory Report are to be sent to National Institute of Communicable Diseases (NICD), New Delhi and to State Nodal Officer of NSPCD Programme, Swasthya Bhawan, Kolkata in the prescribed formats.

Besides daily disease surveillance reporting system is to be introduced for epidemic prone diseases during epidemic situation

The core activities are described below.

3.2 Data collection

Multipurpose health workers collect data from house-to-house visits. It is also obtained from out patient clinics, during various health camps or when patients are admitted to a hospital. During the field visits, they have regular interaction with the village elders, womenfolk and Panchayet dignitaries who give them health related information. The health workers also get disease information from the Awanwadi workers, community health guides, dais and private practitioners during their interactions for other activities. During epidemic all other activities become secondary to the epidemic work. Health workers often receive the first information about epidemic from the community leaders, local Panchayat members or NGOs working in the area. In all such situations, the health worker first verifies the information and determines the type of outbreak and its location, before passing it on to the higher authority. After collecting data it is recorded in pre-designed formats. Reporting is done in duplicate copies (one is sent to the concerned officer and the other is kept for records) weekly or monthly, but during epidemic reporting is on a daily basis and a nil report is also to be sent.

3.3 Case definition

Except RNTCP and AFP surveillance, the surveillance system does not have standard case definitions.

3.4 Case detection and confirmation

Health personnel are mostly depended on clinical provisional diagnosis without proper laboratory back up except RNTCP and malaia control programme (under national vector control programme).

3.5 Data compilation

The data received are mostly in the form of frequency tables at the community block level. The data of reporting units are compiled there and sent to the district offices in the form of weekly and monthly reports. The reporting units also maintain registers to keep records. At the statistical cell of district, various data are received from periphery and are compiled as reports before sending to state headquarter.

3.6 Data analysis and interpretation

Currently data is simply transferred from one level to another, but analysis is not done from sub-centre to district level, except a portion at the district level. This consists primarily of tabulation of data from monthly reports in a ledger style register. The seasonal trend of the epidemic prone disease and cyclic trend are little examined regularly at district level. The monthly trends of the diseases in individual block are not systematically examined by calculating the rates.

3.7 Data dissemination and feedback

Feedback mechanism is practically absent. After the surveillance data is submitted, it travels at various levels from the primary health centre to district to state head quarters but no feedback is given to the ground staff about the interpretation and proposed plan of action.

3.8 Response

Any case, reported from a sub-centre or a villager or a community leader or from media, is immediately taken care by respective health personnel as well as block, sub-divisional and district health officials. Usually a team from health facilities of community block visits the site and examines the patients for verification. If outbreak is confirmed, block medical officer informs the district head quarter. From district head quarter an epidemic control team moves according to the demand of situation and patients are referred to health facilities. The Chief Medical Officer of Health of the district informs the state head quarter about the status of the outbreak and the condition of the patients. In large epidemic he or she seeks further guidance and logistics, if required

3.10 Existing situation of epidemic investigation

Information about probable epidemic is usually obtained from various sources – from health personnel, community health guides, dais, community, panchayet functionaries, municipal authorities in urban area and from media. On the basis of first information, the block team consisting of block sanitary inspector and sanitary inspector, respective health supervisor, respective multi-purpose health worker and sometime medical officer visit the site to observe and control the situations and to verify the epidemic. If outbreak is confirmed, initial steps to control it are started by the block authority and the medical officer in charge informs to the sub-division and district head quarter by telephone and written message through a special messenger.

3.11 Urban Surveillance

49.61% of population of this district lives in urban area and 23.60% of the total population lives in Haora Municipal Corporation (HMC) area. Beside Haora there are two municipalities: Bally and Uluberia. In HMC, there is a post of Chief Medical Officer, two posts of Assistant Chief Medical Officer and seven posts of Medical Officer (Allopathy-4 & Homeopathy-3). Besides 22 Medical Officers are attached in 13 Health Outdoors and 10 charitable dispensaries (Allopathy-5 & Homeopathy-5) under government schemes. HMC has a zonal network of health system where except NVCP and RCH activities mainly outdoor activities are going on. It has no separate surveillance set-up except monthly reporting from different zonal units. In case of an outbreak, HMC health set up combats the situation by its own strength and sends report to the State Government Health Department and Urban Development Department. In case of a large epidemic or epidemic in serious nature assistance is sought from health department and central agencies like NICED. Here and in other municipalities, different national health programmes are conducted jointly with district health authority. Bally and Uluberia Municipalities have relatively poor health structure where voluntary health workers are getting paltry honorarium. If an outbreak occurs, necessary assistance is sought from district or sub-divisional health authority.

3.12 Laboratory infrastructure

It is deficient in all levels. The district public health laboratory is in defunct state. Private sector has almost no involvement in surveillance and outbreak control. Culture of microorganism, histopathology, FNAC, CSF, Bio-chemistry facilities are not available at any of the hospitals of the district. The laboratory facility of RNTCP is well developed throughout the district and blood slide examination for malaria parasites is done at all tiers of health institution. Quality assurance is only present in RNTCP.

3.13 Integrated Child Development Scheme infrastructure

All the blocks are covered by ICDS infrastructure. In each block there is a Community Development Project Officer. Supervisors are responsible for their sectors. Anganwadi workers are in charges of anganwadi kendras. ICDS is involved in routine immunization, child nutrition, sanitation, pre-school education, food supplementation etc. programmes. Health education is imparted in the mothers' meetings. They refer suspected cases of tuberculosis and leprosy. They are involved in passive disease surveillance activities.

3.14 Training infrastructure

The district has no separate arrangement for training. The district officers used to get training time to time from state. They in turn impart training to the medical officers and other health staffs of the district as and when necessary. State facilitators used to attend these training programmes. However, almost all of the training courses on different national health programmes, have been successfully conducted by the district health authority.

3.15 Private Health Sector

Private health sector is a large one particularly in HMC. There are seven private hospitals, 104 nursing homes,135 clinics and 128 laboratories in the district which are government recognized. Apart from these, a large number of independent medical practitioners and quacks render medical service in urban and rural areas. Apart from health service doctors and doctors from other establishments the number of general practitioners registered in Medical Council is 263. There are several representative bodies of the medical professionals. Doctors in private sector are mostly represented by Indian Medical Association and doctors in government service are mostly assembled in Association of Health Services Doctors. They are time to time involved in different health activities like IPPI, Blood Donation Camps etc. programmes but they are not as such involved in any regular surveillance activity.

3.16 Voluntary Organizations

Voluntary organizations are popularly known as NGOs. There are several NGOs active in Haora district. Among them 'Haora Ganatantrik Nagarik Samity' is famous for its state wise activities mainly in civic and environmental issues. Several NGOs are active in health sector like CARE, VHAI, Lion's Club, Rotary International etc. Involvement of NGOs in health sector is rising. New NGOs are enlisting to participate in different NHPs. In RNTCP, 12 NGOs are working very sincerely and internationally famed NGO 'Durbar Mahila Samannay Samity' is rendering cooperation in NACP. There is lack of coordination existing between government and NGOs.

3.17 Rapid Response Team

A 'Rapid Response Team (RRT)', comprising Deputy CMOH II, a physician and an entomologist, has been formed to combat an epidemic or disaster. Public health laboratory has been established but is not functioning properly.

4. Discussion

Subcentres are situated all over the district, covering almost all the parts of the district, are the primary surveillance centres of the district. They spread up to grass root level, that is, up to Gram Panchayet and village level. Health personnel working at subcentres generally have two-way interaction with the community. Usually they are local and are highly integrated with the community. Although most health workers claimed that data was reliable as well as valid, they did agree that it did not represent the whole picture. Many patients seek care from the private sector and are hence left out of the reporting system. There are also areas that are left out during surveillance activities because of being scattered over a large geographical area. Duplication of data is also a possibility due to the same patients being contacted during field visits and subsequently attending the health facilities. In the field, some community members give incomplete or invalid information. The senior officers and health supervisors do not regularly supervise data collection and data compilation processes. We identified that data analysis was the weakest component of the existing surveillance system in district Haora. Some of the reasons include the absence of knowledge and skills to analyze data as well as an absence of the tools to analyze (software) at the health facility level. We also identified that data analysis was not satisfactory at the district level and was not done in time. This not only resulted in failing to interpret data but also delayed the response mechanism, particularly in outbreak situation. At the community block level most of the assistant computers are not trained in basic statistics and computer technology. Data were not interpreted and disseminated from the higher level to the periphery in routine situation. Many times the health workers come to know about the response to data through other channels. Thus most health workers are not accustomed with the current use of the surveillance data for response, planning and improving health systems. On the basis of absolute figures district authority has attempted to identify the vulnerable areas of the district, specifically in relation to diarrhoea, ARI, tuberculosis, malaria, HIV, arsenicosis etc. Due to lack of proper laboratory back up except RNTCP, diagnosis part of any disease was neglected. Absence of proper case definition also causes problem in diagnosis and specific action.

Urban surveillance is absent except at the time of epidemic. Other government hospitals, private sectors and non-governmental organizations are not involved in this system. Strengths, Weakness, Opportunities and Threats (SWOT) analysis is summarized as follows:

Strengths of the existing surveillance system

- Availability of a strong and wide-reached surveillance system.
- Availability of manpower and infrastructure from periphery to district.
- Normally reporting of communicable diseases on monthly basis.
- Reporting channels are clearly identified.
- Suspected outbreaks are reported, mostly by the community and health workers.
- Laboratory set up is available from block to district level.
- Presence of ongoing national health programmes.

Weakness

- Absence of standard definition except in RNTCP and AFP surveillance.
- Too many health problems and health programmes which hamper normal surveillance activities
- Excess number of diseases for surveillance causes overburdening and duplication.
- In present format both hospital data and field data are mixed causing chances of double mentioning of hospital and field cases as well as indoor and outdoor cases.
- Reporting directly from block to district causes information overload in district level, on the other hand information gap in sub-divisional level.
- Problems of understanding the disease pattern and reporting procedure.
- Manual reporting, so chances of both error and manipulation.
- Vacancies in several posts.

Opportunities of the existing system

- The laboratories can be made better functioning with some inputs in terms of materials, manpower and training.
- Several unutilized and underutilized staff may be utilized in a better way after reorientation training and reshuffling.
- Health network present in Haora MC and other municipalities, railways and other state government organizations to be explored and utilized in a concerted way.
- ICDS network can be utilized to a greater extent.
- Private sectors and non-governmental organizations can be utilized.
- Initiation of Integrated Disease Surveillance Programme (IDSP) phase II.

- Introduction of West Bengal Public Health cum Administrative Service.

Threats in the existing system

- High level migration.
- Overburdening of field staff have already resulted in grievances, which is affecting the quality of works.
- Increased population mobility to high-risk areas and increased number of people with high-risk behavior.

5. Conclusion

The existing disease surveillance system in the district Haora, West Bengal, at the primary level had active and passive data collection mechanism for not less than 84 different conditions in the district which over burdened the system with a substantial percentage of the time of the health workers spent on surveillance related activities. Quality of reporting is hampered by absence of clear case definitions. There is no horizontal integration of surveillance activities of existing disease control programmes. Data is not collected from private practitioners, private laboratories and private hospitals. Data collection during emergencies and epidemic is of better quality. There is no system of quality control for the data collected and there is very little analysis and action based on the data. There is no system of feedback to the lower levels of the health system. At the district level, analysis of data is inadequate for meaningful interpretation. There is lack of skilled personnel and tools (software) for data analysis. The information is not shared across disease control programmes. District level response system is activated only in times of outbreak. Public health laboratory is defunct. Most of the non-communicable diseases are not included in surveillance system.

6. Recommendations

In order to validate existing surveillance system report of Haora district, West Bengal, I do recommend conducting an evaluation of a disease surveillance system in terms of its various attributes. I also recommend considering the issues of data analysis and feedback mechanism to improve the surveillance system in the district by capacity building and logistic support at various levels.

Figure 1: Flow of health information, district, Haora, 2004

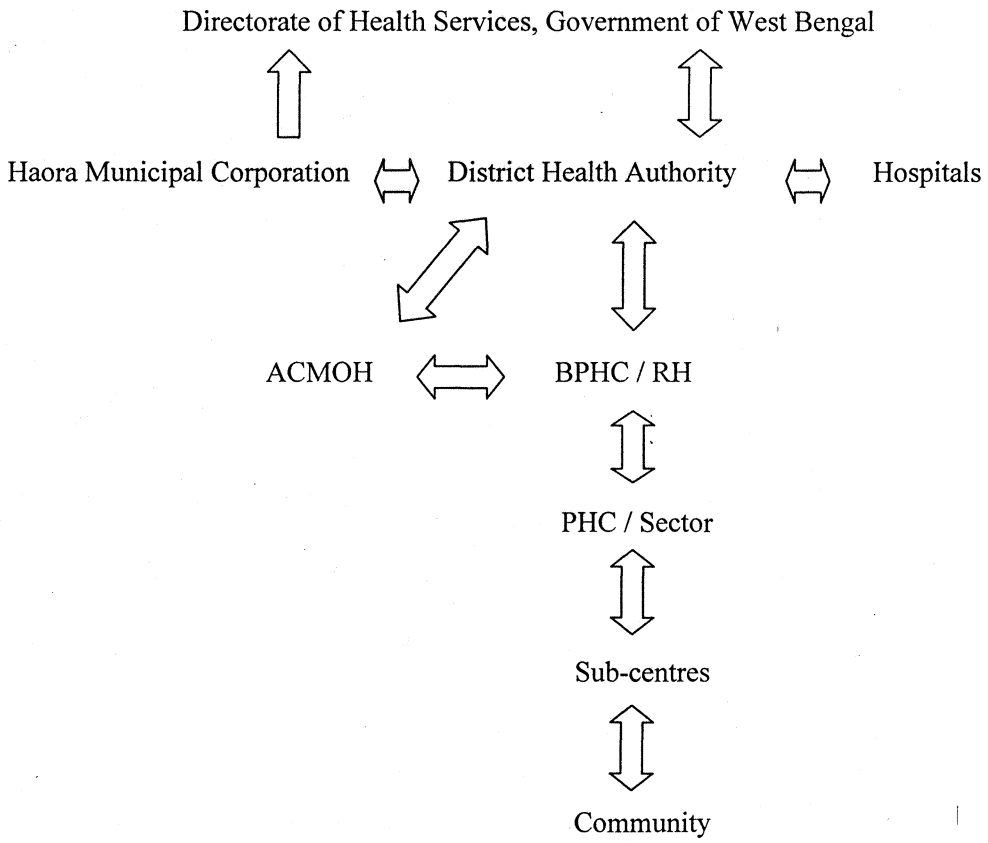


Table – 1: List of communicable diseases under surveillance (n=19), district Haora, 2004

- Diarrhoeal diseases
  - a) Cholera
  - b) Gastroenteritis
  - c) Bacillary dysentery
  - d) Others
- Diptheria
- Acute poliomyelitis
- Neonatal tetanus
- Other tetanus
- Whooping cough
- Measles
- Pneumonia
- Enteric fever
  - Viral hepatitis
  - Japanese encephalitis
  - Meningococcal meningitis
  - Rabies
- STD
- Tuberculosis
- Malaria
- Kala-azar
- ARI (including influenza, excluding pneumonia)
- Chicken pox

Table –2. List of other communicable and non-communicable diseases (n=12), which have been included under surveillance in separate format, district Haora, 2004

- Dog bite
- Snake bite
- Other animal bite
- Sun stroke
- Guinea worm disease
- Filaria
- Food poisoning
- Dengue
- Influenza
- Anthrax
- Arsenicosis
- Cancer

Figure – 2. Present outbreak investigation and response mechanism in district Haora, 2004

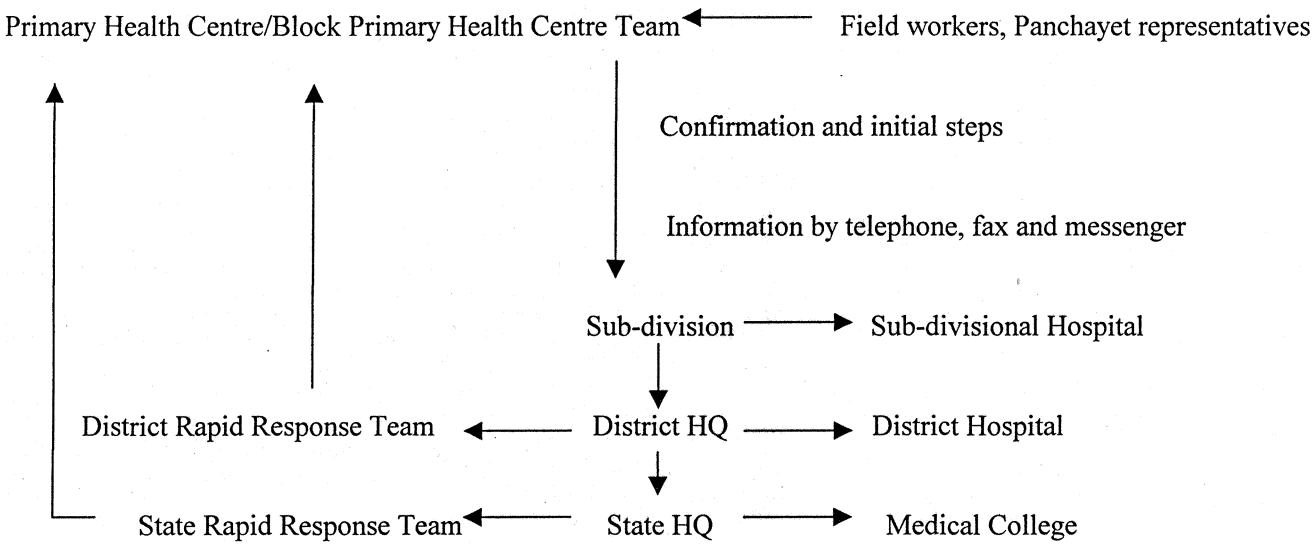


Table 4: Synopsis of five major disease surveillance systems in district Haora, West Bengal, 2004

Surveillance components	Communicable diseases (n=19)	Other important communicable and non-communicable diseases (n=12)	HMIS surveillance	National programmes	NSPCD
1. Case detection					
1.1 Number of diseases	19	12	84	Tuberculosis, malaria, vaccine preventable diseases, STI/HIV etc.	All major communicable diseases
1.2 Case definition	Nil	Nil	Nil	Yes	Yes
1.3 Register for case detection	In-door and out-door registers, field surveys	Out-door and in-door registers	Out-door and in-door registers	Yes	Yes
1.4 Case management manuals	No	No	No	Yes	Yes
1.5 Whether reporting units are clearly defined	Block primary health centre, rural hospital, state general hospital, sub-divisional hospital, district hospital	Block primary health centre, rural hospital, state general hospital, sub-divisional hospital, district hospital	Block primary health centre, rural hospital, state general hospital, sub-divisional hospital, district hospital	Block primary health centre, rural hospital, state general hospital, sub-divisional hospital, district hospital	Block primary health centre, rural hospital, state general hospital, sub-divisional hospital, district hospital
1.6 Different criteria for surveillance	Communicable diseases (n=19)	Other important communicable and non-communicable diseases (n=12)	HMIS surveillance	National programmes	NSPCD
2. Reporting					
2.1Format	Yes	Yes	Yes	Yes	Yes
2.2 Transmission	Yes (Block – sub-division – district – state – national)				
2.3 Frequency	Monthly, weekly	Monthly	Monthly	Monthly	Monthly, weekly
2.4 Whether specific person is assigned for reporting	Yes, but many posts are vacant	Yes, but many posts are vacant	Yes, but many posts are vacant	Yes, but many posts are vacant	Yes, but many posts are vacant
3. Data compilation					
3.1 Register	Yes	Yes	Yes	Yes	Yes
3.2 Mode	Manual, computer (computer is provided up to sub-divisional level)				
3.3 Specific software	No	No	No	Only in RNTCP	No
3.3 Specific person identified for compilation	Yes (many posts are vacant)	Yes (many posts are vacant)	Yes (many posts are vacant)	Yes	Yes
4. Analysis					
4.1 Whether done	Partial	Partial	Partial	Partial	Partial
4.2 Specific person	Yes (many posts are vacant)	Yes (many posts are vacant)	Yes (many posts are vacant)	Yes (many posts are vacant)	Yes (many posts are vacant)
4.3 Action threshold	Not defined	Not defined	Not defined	Defined in polio & p.f. malaria	Defined in polio & pf malaria
4.4 Software	No	No	No	Only in RNTCP	Only in RNTCP
5 Manpower	Some posts are vacant at block level				
6. Guidelines / Manuals	No	No	No	Only in AFP surveillance & RNTCP	Yes
6. Response mechanism					
6.1 Rapid response team	Available at district level				

Table 5: Major investigations performed at different government health facilities, district Haora, West Bengal, 2004

Health care level	Investigations performed
Block Primary Health Centre	Blood smear for Malaria, Sputum for AFB
Rural Hospital	Blood smear for Malaria, Sputum for AFB
State General & Sub- divisional Hospital	Blood smear for Malaria, Sputum for AFB, Haemogram, routine urine and stool examination, VDRL, Blood sugar, Serum bilirubin etc.
District Hospital	Blood smear for Malaria, Sputum for AFB, Liver function test, Serum cholesterol, Urea, Creatinine, HbsAg, Widal, HbcAg, HIV etc.

7.References

1. WHO surveillance guidelines, 2002
2. Sub centres registers and reports of Shyampur I and Shyampur II blocks, 2003.
3. Primary Health centre registers and reports of Nabagram, Pichaldaha, Bargram PHCs, 2003.
4. Reports and registers of all Block Primary Health Centres and Rural Hospitals, district Haora, 2003.
5. HMIS registers and reports, 2003, of all SGHs, SDH and DH, district Haora.
6. Registers and reports of Deputy Chief Medical Officer of Health II, Haora.
7. Registers and reports of Deputy Chief Medical Officer of Health III, Haora.
8. Registers and reports of Zonal Leprosy Officer, Haora.
9. Registers and reports of District Tuberculosis Officer, Haora.
10. Registers and reports of ACMOH, Uluberia, district Haora.

1. 4. Secondary data analysis on tuberculosis in district Hoara, West Hoara, West Bengal, 2004

1. Introduction

Tuberculosis is an infectious disease caused by Mycobactarium tuberculosis. The disease primarily affects lungs. It can also affect the intestine, the meninges, the bones and the joints, the lymph glands, the skin and other tissues of the body. Tuberculosis is a worldwide public health problem. Estimated cases of infectious tuberculosis are 16 to 20 million, estimated new cases 4 to 5 million and estimated death three million each year.

Tuberculosis continues to be a major public health problem in India. The overall prevalence of infection is 30%. The incidence of infection is 1 to 2 %. The prevalence of disease is 4 cases per thousand populations. Incidence of new cases is 1 per thousand excluding children below 5 years. Prevalence of infection in males increased in 45 years and in females below 35 years. There is no seasonal variation.

In West Bengal also, tuberculosis is a major public health problem. In our situation analysis report we described that it is one of the major public health problem in district, Haora. 'Directly Observed Treatment, Short Course (DOTS)' under 'Revised National Tuberculosis Programme (RNTCP)' in district Haora introduced since 1999 with the objectives of sputum microscopic case detection of 70% and achievement of cure rate to 85%. The estimated tuberculosis case-load in the Hoara district is about 2.0 per thousand populations and the new sputum positive case is 7.5 per thousand population. The objectives of the study were: (1) to understand the problem of tuberculosis in the district, (2) to determine the impact of the disease and (3) to recommend the plan of action to control the diasease.

2. Methods

2.1 Study design

We conducted a descriptive study based on secondary data.

2.2 Study population

Our study population was that of the district Haora (4.2 million as per 2001 census).

2.3 Operational definitions

Incidence rate

We defined incidence rate as the number of new tuberculosis cases (confirmed by bacteriological examination) per 1000 population during one year.

Case fatality rate

We defined case fatality rate from tuberculosis as proportion of deaths due to tuberculosis among total number of cases during the year.

Sputum positive tuberculosis

We defined a patient as sputum positive when at least two initial sputum smears positive for AFB or one AFB positive smear and one positive culture. Sputum smear examination is a laboratory technique to screen sputum for tuberculosis, where acid fast bacilli (AFB) are stained red by Ziehl Neelsen method, and then identified and counted using microscopy.

Cure rate

We defined cure rate as the proportion of patient registered for DOT completed treatment.

Failure case

A patient who was initially smear positive, who began treatment and who remained or became smear positive again at five months or later during the course of treatment.

Failure rate

We defined failure rate as the proportion of patient registered for DOT not completed their treatment.

Default

Patient some how fails to continue anti-tubercular regime more than two months.

3.4 Data collection

We collected data on demographic characteristics and various indicators of Revised National Tuberculosis Control Programme of district Haora from 1999 to 2004. We sought necessary permissions from the Joint Director of Health Services (Public Health & Communicable Diseases), Government of West Bengal and Chief Medical Officer of Health, Haora. We visited the Office of the Deputy Chief Medical Officer of Health II, Haora and Assistant Chief Medical Officer of Health (Public Health & Family Welfare), Haora, to collect data from the records and reports. We explained the purpose of the exercise to respective offices and collected the data. For the data at community block level we collected it from the office of Block Medical Officer of Health (n=14) and from the

Tuberculosis Units (n=10). For the denominators we used data available in the District Statistical Cell, Haora, State Bureau of Health Intelligence, West Bengal and Demography & evaluation cell of the department of Health, Government of West Bengal, Swasthya Bhawan, Kolkata.

3.5 Analysis plan

We compared tuberculosis cases in Haora in comparison in the state of West Bengal. We first calculated annual total patients registered, detection rate, total new smear positive cases registered, total new smear positive case cured, cure rate of new smear positive cases, case fatality rate, defaulter rate of new smear positive cases and failure rate of new smear positive cases from 1999 to 2004. Then we calculated incidence over time, geographical distribution of cases inside the district and age and sex specific incidence of tuberculosis using denominators provided by the District Tuberculosis Centre (DTC) and Tuberculosis Units (TUs). We assessed the chest symptomatic patients attended in different out patient departments, case fatality rate over time and compared cure rate with defaulter rate. Thus we ascertained the epidemiological trend of the disease from 1999 to 2004 and compared the trend with month wise epidemiological data of 2003 and 2004. We identified endemic geographical areas, high-risk TUs, using criteria laid down in RNTCP. We would also like to analyze study reports related to problem with tuberculosis control like multi-drug resistance, failure rate, relapse and HIV co-existence in terms of their distributions and magnitudes in the district.

3. Results

Morbidity

- **Incidence rate**

The number of tuberculosis patient registered in Hoara district was increase from 2,105 in 1999 to 5,983 in 2004 (Figure 1). The annual incidence of tuberculosis increased from 0.5 per thousand population in 1999 to 1.4 per thousand population in 2004. This incidence rate was below the state average of 2 per thousand populations.

- **Age and sex distribution**

The age incidence of tuberculosis indicated that all age group were affected. Highest incidence rate were in the age group 15-44 years (1.6 per thousand). The incidence by sex indicated higher incidence among male (1.5 versus 1.3 per thousand populations) [Table 1]

- **Geographical distribution**

Community blocks with in the jurisdiction of tuberculosis units of district tuberculosis centre, Jaiswal Hospital and Uluberia indicated higher incidence (> 1.80 per thousand) while blocks with in the jurisdiction of tuberculosis units of Udaynarayanpur and Gabberia indicated lower incidence (< 1.30 per thousand). Other blocks were at per with district average incidence. (Figure 2)

Mortality

- **Case fatality rate over time**

Case fatality rate is reduced from 3% in 2000 to 1.5% in 2004, however there was peak during 2002 (4.3%) (Figure3).

Programme

Proportion of chest symptomatic patient in OPD increased from 3.1% in 2001 to 3.7% in 2004 (Figure 4). Of the new tuberculosis patient diagnosed sputum positive rate was below 50% during 2000 to 2004 (Figure 5). Cure rate of tuberculosis patient treated with DOTS ranges from 73% in 2000 to 88% in 2004. Defaulter rate was 17% in 2000, which decreases to 6% in 2004.

4. Discussion

Overall incidence of tuberculosis in the Hoara district was low as compared to average incidence in the state of West Bengal. Before the implementation of DOTS programme in district Haora the incidence was low due to logistic constraint. With the estabilishment of microscopic centres there was increase in diagnostic facilities that result in increase case reporting, case detection and higher incidence rate.

Age distribution of tuberculosis cases correlated with other part of the state and country. More incidence rates among males may be due to their better access to health care facilities than the females. In addition, being the productive forces of the population they come to more exposures.

Community blocks with in the jurisdiction of tuberculosis units of district tuberculosis centre, Jaiswal Hospital and Uluberia have more congested and urban population. More over the area enjoyed better health care facilities including laboratory diagnosis, which result in the higher incidence. In contrast,

blocks with in the jurisdiction of tuberculosis units of Udaynarayanpur and Gabberia had rural scattered population that lead to low incidence rate.

The pattern of case fatality indicated initial rise followed by a fall. During the initial years of inception of DOT programme, there was delay in diagnosis and at the same time the accessibility to anti tubercular medicine to poor population was less. With the progress of the programme, people came early when they were symptomatic and took the benefit of DOT from health centres, which resulted in better compliance and low case fatality.

So far as the revised national tuberculosis control programme in district Hoara concerned, there were much improvement of the indicators. The proportion of chest symptomatic patient is comparable with the state average and this indicates better sensitization of medical officers. But, proportion of sputum positive cases among the new cases were poor and below the specified 70% level. Capacity building of the technician should improve the situation. A gradual improvement of cure rate with reduction of defaulter rate over years indicated an increase in availability and accessibility to DOT by the people. The message for early detection and information on places of availability of DOT should decrease the case fatality rate.

We failed to comment on different tuberculosis related problems like multi-drug resistance, HIV co-existence, as no such data was available from the district health authority. However strategy to collect data on the said issues will be beneficiary for better management.

The study was purely based on the data available with the various tuberculosis units. This did not examine the completeness of the data, functioning of existing surveillance system, operational issues related to RNTCP and quality control mechanism particularly in peripheries. So it may or may not simulate with the actual tuberculosis situation in terms of distribution and magnitude of tuberculosis related morbidity and or mortality.

The results and subsequent discussion enable us to recommend for better management of tuberculosis control programmes. The recommendations included (1) strengthen case detection methodology introducing both qualitative and logistic inputs, (2) capacity building at tuberculosis unit level, (3)

strengthen home visits to registered cases and strengthen counseling particularly to DOT defaulters (4) improve health management and information system and (5) focus on information, education and communication activities.

Table 1: Distribution of tuberculosis patient by age and sex, district Haora, West Bengal, 2004

Characteristics		Population in million	Number of cases	Incidence rate per thousand
Age	< 15 years	1.2	1,340	1.1
	15-44 years	2.2	3,545	1.6
	45-59 years	0.5	618	1.2
	60 years +	0.3	380	1.3
Sex	Male	2.2	3,207	1.5
	Female	2.1	2,776	1.3
Overall		4.3	5,983	1.4

Figure 1: Tuberculosis case patient registered, district Hoara, West Bengal, India, 1999-2004

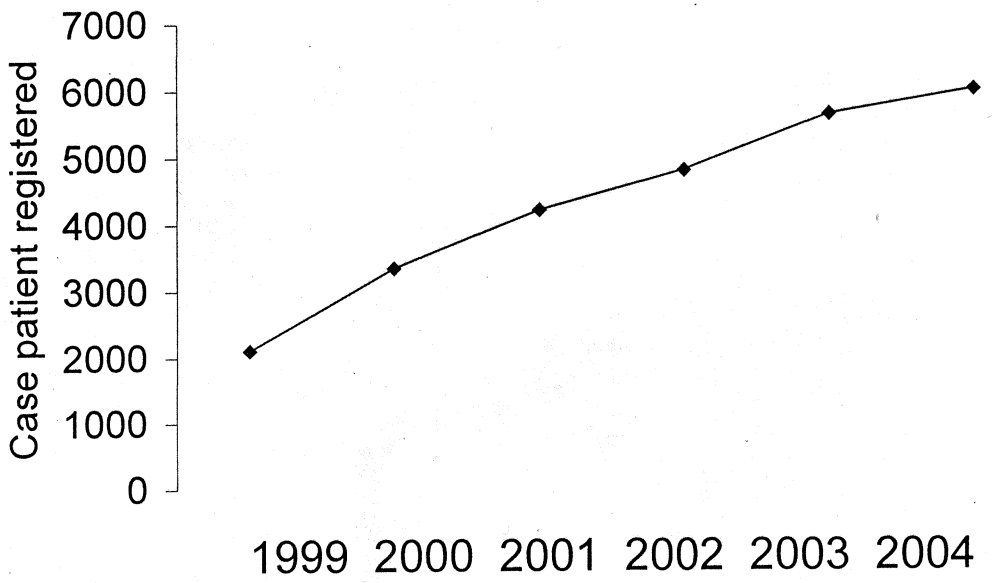


Figure 1: Incidence rate by tuberculosis unit, Hoara district, West Bengal, India, 2004

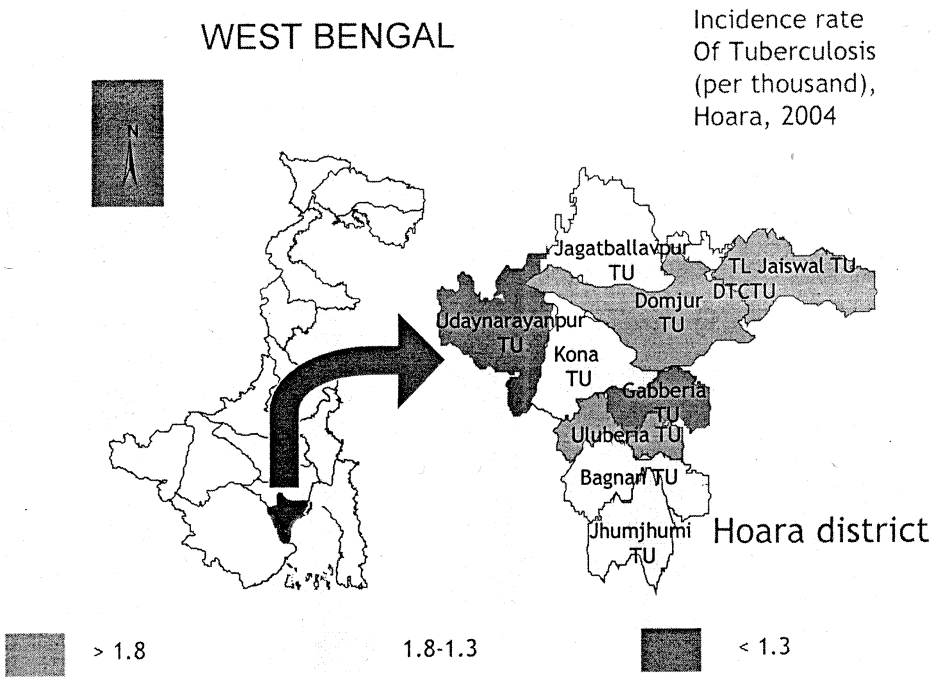


Figure3: Case fatality rate 2000-2004, district Hoara, West Bengal, India, 2000-2004

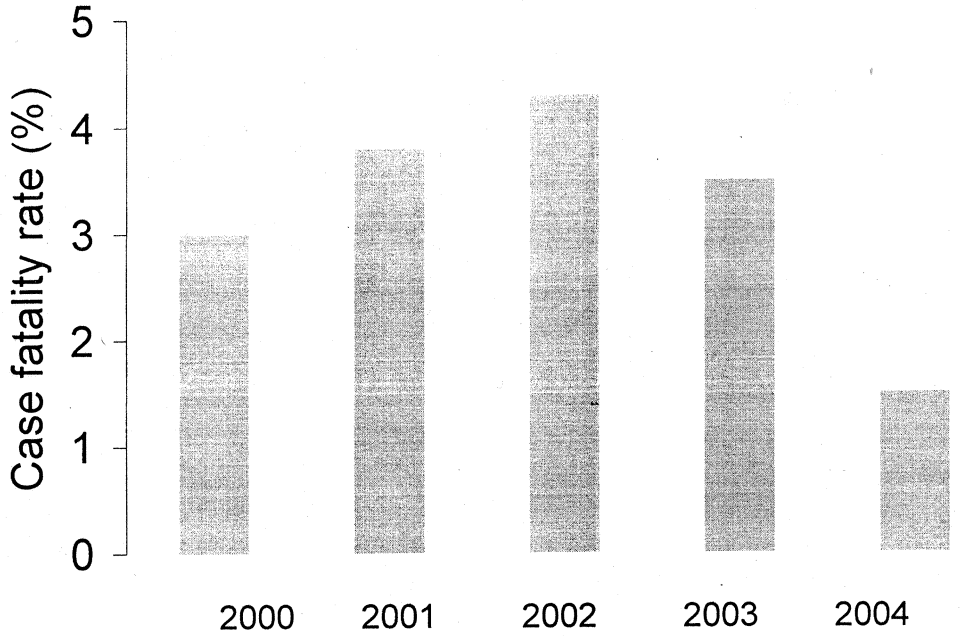


Figure 4: Chest symptomatic patient in OPD, district Hoara, West Bengal, India, 2001-2004

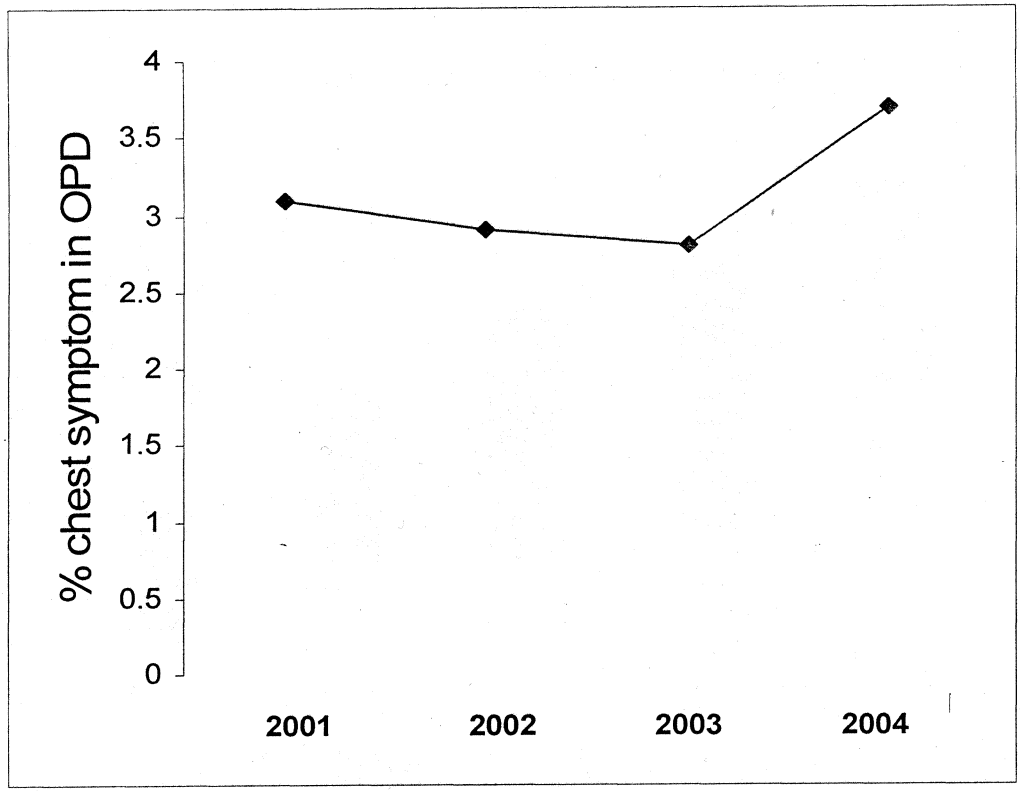
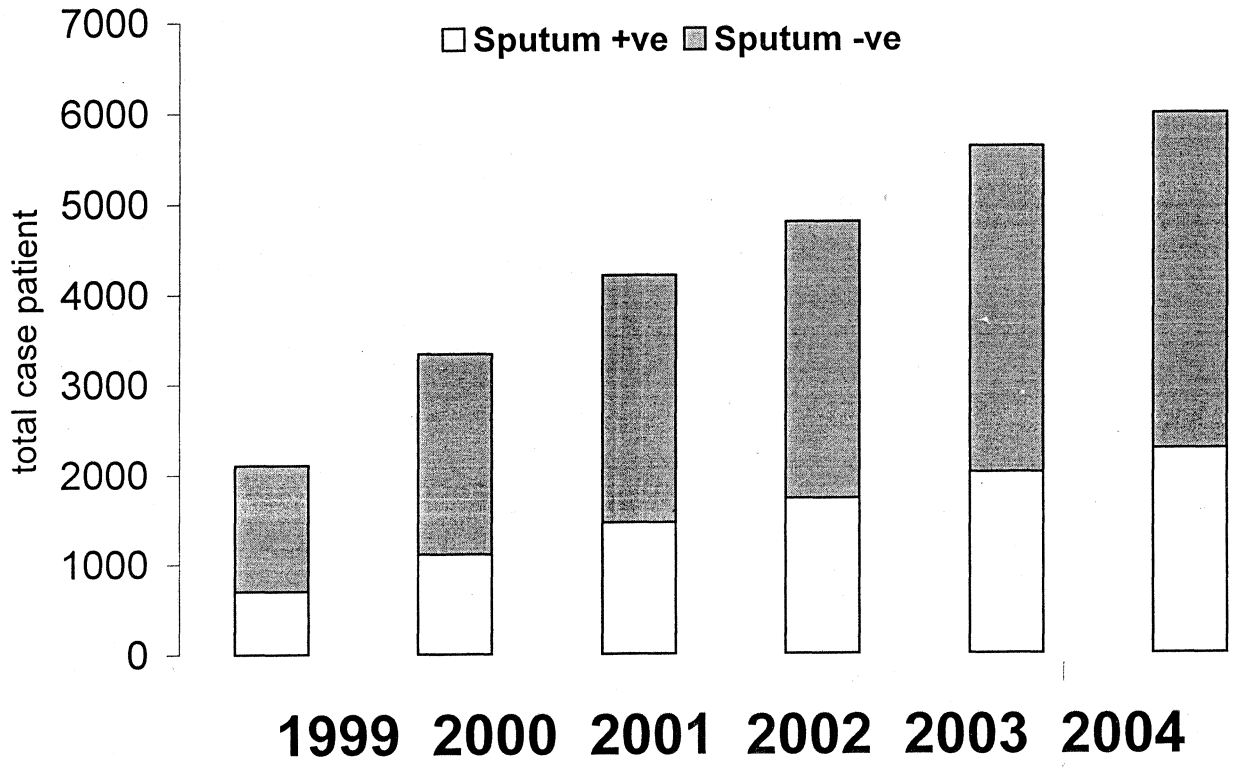


Figure 5: Proportion of sputum positive cases of total registered cases, district Hoara, West Bengal, India, 1999-2004



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SECTION 2:

SECOND FIELD POSTING

2.1 Evaluation of the surveillance system for HIV infection in district Haora, West Bengal, India, 2005

1. Introduction

In India, 5.1 million people are infected with HIV/AIDS, of which 86% cases occur due to unsafe sexual practices. The cumulative AIDS cases were reported to have reached 86,028 by the end of July 2004. The prevalence in 15-49 years group is 0.98%. Considering the large population, a mere 0.1% increase in the prevalence would increase the number living with HIV by over half a million. HIV continues to be concentrated amongst the poor, marginalized and vulnerable section of the society. It is spreading beyond "at risk" groups to the general population and from urban to rural areas. The number of women infected is steadily rising.

The first case of HIV infection was detected in West Bengal in 1986. Since then, there has been a steady increase in the number of cases. Though West Bengal has a low-epidemic status (HIV prevalence is <5% in high-risk groups and <1% in antenatal mothers), a marked increase is noted since 2001. West Bengal State AIDS Prevention and Control Society (WBSAP&CS), under department of Health & Family Welfare, Government of West Bengal, took several initiatives to prevent and control HIV/AIDS and organized 53 Voluntary Counseling and Treatment Centres from health institutes and outside as per National AIDS Control Organization (NACO) guidelines for periodic sentinel surveillance. At block level WBSAP&CS trained all Medical Officers and health personnel. Workshops, group meetings, training and Information, Education and Communication (IEC) were organized to generate awareness of the people to control the epidemic. Actually a composite surveillance system is running up to village and sub-centre level. Here we evaluated this surveillance system.

District Haora consists 1.65% area of the state whereas it shares 5.33% population of the state. Shyampur I is a populous (0.18 million) block bordering three districts. A large number of people have migrated to different cities of Western and Southern parts of our country for livelihood and better income. They used to come to their families in vacations. Again about 1000 migrant workers are coming from outside to work in 107 brick kilns. Truckers are also frequenting and Commercial Sex

Workers are operating clandestinely at a popular tourist spot. Therefore Shyampur I is a vulnerable block for spread of HIV infection. So we chose the community block for assessing indicators of simplicity and flexibility of HIV surveillance.

The objectives of this evaluation were to: (1) describe the surveillance system of HIV in district Hoara (2) evaluate the system in terms of sensitivity, positive predictive value, representativeness, timeliness, simplicity, acceptability, cost and usefulness, (3) determine whether the surveillance system met the UNAIDS-WHO-NACO-WBSAC&PS guidelines and (4) suggest recommendations.

2. Methods

2.1 Description of the second-generation surveillance system

Traditional surveillance systems tracked HIV infection or other biological markers of risk such as STIs. Since HIV infection among adults must be preceded by one of a limited number of behaviours, such as unprotected sex with an infected partner, if this behaviour changes, there will be change in the spread of HIV. Therefore counseling became an integral part of our surveillance system.

2.2 Description of the existing surveillance system

2.2.1 Sentinel surveillance

Sentinel surveillance on HIV infection is conducted to know the trend of the disease among different states of the country. Every year two groups of population are surveyed in unlinked anonymous way from the month of August. Survey is continued till October or to the date of reaching the required number of samples, which one is earlier. As per guideline two sites, one site covering high-risk group (e.g., STD clinic) and another site covering low-risk group (e.g., ante-natal clinic), are selected. Trend is estimated from 400 samples of each antenatal site and 250 sample of each STD clinic site. In Haora, there are two sentinel sites. One is the antennal clinic and other is the STD clinic of district hospital since 2001.

2.2.2 Passive surveillance

a) VCTC: Patients attended or referred to the VCTC throughout the year.

As per national AIDS control programme there are one voluntary testing and counseling centre at district headquarter, where facilities are available for counseling and testing for HIV. In district Haora,

the VCTC, since its inception on 2004 acts as a passive surveillance unit, where any individual to suspected case report voluntarily. Performance report is sent to district nodal officer every quarterly in a year.

b) Blood bank: Blood banks are conducting passive surveillance for HIV infection by screening all the blood units collected. HIV positive blood units are simply discarded without tracing the linked person. In Haora, there are two blood banks (one at Hoara district hospital and the other at Uluberia sub-divisional hospital), which conducted blood screening and reported every quarterly to district nodal officer and state nodal officer.

c) Notification from referral centre: Patient clinically identified in different health care facilities of district Hoara are referred to designated referral centre at Kolkata Medical College and Hospital for diagnosis and treatment, if required. A feedback report from the referral unit is important to consider the magnitude of HIV infection.

2.2.3 Active surveillance

This is not done for HIV infection. However, under national AIDS control programme II, an active surveillance through family health awareness campaign is conducted in every year to screen suspected cases of sexually transmitted diseases. The target group is the population between 15-49 years.

2.3 Population under surveillance

Sentinel –Patients, who attended at STD clinic and mothers, who attended the ante-natal clinic of two designated sentinel sites during the period of survey.

Passive – Persons voluntarily attended VCTC and voluntary blood donors in blood banks.

Active- Clinically suspected patients in the community in reproductive age group, i.e., 15-49 years.

2.4 Case definitions

For community level HIV surveillance, no standardized case definition was available. We adapted WHO case definition of HIV-AIDS.

WHO case definition for AIDS: A patients is defined as having AIDS when cumulative points assigned for conditions hereafter equal or exceed 10 and HIV serology is positive.

Symptoms / Signs / Diagnosis	Points assigned
Kaposi sarcoma	10
Disseminated / extra-pulmonary / non-cavitory pulmonary tuberculosis	10
Oral candidiasis / hairy leukoplakia	5
Pulmonary tuberculosis with cavitation, or unspecified	5
Herpes zoster < 60 years age	5
Central nervous system disorder	5
Fever (> 38* C) > 1 month	2
Cachexia or > 10 % weight loss	2
Asthenia > 1 month	2
Persistent dermatitis > 1 month	2
Anaemia, lymphopenia / or thrombocytopenia	2
Persistent cough or any pneumonia (except TB) for > 1 month	2
Lymphadenopathy > 1 cm > 2 non- inguinal sites	2

2.4 HIV infection – window period

The interval between transmission of HIV infection and laboratory confirmation of HIV in serum sample is considered as window period. The length of the period varies from 6-12 weeks.

2.5 Data structure

Records and reports from sentinel surveillance, nodal referral centre, VCTC, ante-natal clinics, blood banks, health facilities and family health awareness campaign.

2.6 Feedback

Each year the district gets a feedback from state headquarter about the trend of the disease among high risk and low risk groups from the report on sentinel surveillance. The voluntary testing and counseling centre, reporting centre and blood banks give their feedback every quarterly. District nodal officer acts accordingly and gives feedback to health facilities.

2.6 Action taken

Action includes anti-retroviral treatment as per NACO-WBSAP&CS guideline, treatment of associated diseases like tuberculosis, pneumonia, fungal infections etc. and counseling of the patient, his or her family and the community. Now some non-governmental organizations, who are stake-holders of national AIDS control programme, are assigned to serve medicines to the door steps of the patients with necessary counseling.

2.7 Indicators

2.7.1 Sensitivity

We used the number of blood units tested for HIV out of the total blood units collected in blood banks. We considered number of person reported and requested for HIV testing as sensitivity indicator in voluntary testing and counseling centre. During family health awareness campaign we analysed number of persons suspected for sexually transmitted disease out of total person screened as sensitivity.

2.7.2 Positive predictive value

We considered number of blood units accepted (due to HIV negative result) out of the total blood units examined as positive predictive value for voluntary blood donation. For voluntary counseling and testing centre we took proportion of persons with HIV positive result out of the total persons tested. For sexually transmitted disease we considered number of person clinically diagnosed to have STD out of the suspected cases as positive predictive value.

2.7.3 Representativeness

Indicators used for Representativeness were number of blood banks and health facilities reported in monthly format of national AIDS control programme II.

2.7.4 Timeliness

We used two indicators for timeliness. First was the interval between diagnosis of HIV infection (HIV positive) and starting of anti retroviral therapy. Second was the interval between notification from the referral centre and starting of counseling, at individual and community level.

2.7.5 Simplicity

We estimated the proportion of medical officer, public health nurse and health workers, who were capable to suspect a HIV-infected case as simplicity indicator.

2.7.6 Acceptability

We used proportion of health facilities submitted report regularly to the district nodal officer as acceptability indicator.

2.7.7 Flexibility

We did qualitative assessment of whether this system could be used for hepatitis B surveillance.

2.8 Methods used for evaluation

We studied the system through reviewing records with the district programme officer, sub-divisional programme officer, medical officer in-charges of blood banks and voluntary testing and counseling centre and block medical officer of Shyampur-I block during the year 2004. We also reviewed the report of sentinel surveillance of the district since 2001. For simplicity and flexibility indicators we purposefully selected one community block i.e. Shyampur-I Block. We interviewed all medical officers, public health nurses and multipurpose health workers to record their ability to suspect a HIV patient

3. Result

In district Hoara, a network of 23 reporting units at health facility level and two blood banks did surveillance of different components of HIV surveillance activities. Data on HIV sentinel surveillance in between 2001 to 2003 indicated that there was an increase in prevalence in high-risk group (STD clinic). However, in low risk population (Ante natal clinic) prevalence was stationary (Figure 1).

3.1 Simplicity

Out of 39 health assistants 32 (80%) responded correctly to identify a suspected case of HIV. All of 5 medical officers and 2 public health nurses (100%) could identify a suspected case of HIV.

3.2 Acceptability

Out of the 23 reporting units (1 district hospital, 1 sub divisional hospital, 7 state general hospitals, 4 rural hospitals and 10 block primary health centres, 14 (62%) report every month to district

programme officer. There were two blood banks in the district and both of them (100%) report each month.

3.3 Sensitivity

In 2004, blood unit collected by two blood banks were 10,762. Of these all (100%) were tested for HIV. In voluntary counseling and testing centre 328 persons were reported. A total of 229 people (70%) of the reported cases were requested for HIV testing. During family health awareness campaign 38,612 (2%) people were suspected out of 1.9 million populations between 15-49 years screened.

3.4 Positive value positive

Out of the 10,762 units of blood examined for HIV screening, 10,666 (99%) were accepted. Out of 229 people tested for HIV in voluntary counseling and testing centre, 52 (23%) were HIV positive. The positivity was more with male, that was, 31 out of 124 (25%) than that of female 21 out of 105 (20%) ($p=0.37$). Among 38,612 persons suspected for sexually transmitted disease, 4,214 (11%) were diagnosed to have clinical STD. Three suspected cases of Shyampur-II block were referred to VCTC. One of them absconded, rest two were confirmed HIV-positive in VCTC.

3.5 Representativeness

Out of the 23 health facilities, 20 (88%) were reported in monthly format of national AIDS control programme II.

3.6 Timeliness

The district at present had 140 HIV cases, of which 17 patients developed symptoms of AIDS. Among 17 patients, 5 (30%) started anti retroviral therapy within one month and another five (30%) started the same within six months. Rest seven (40%) patients remain untreated. All 140 diagnosed patients (100%) were counseled within three months after notification. So far the community concerned, 44 (55%) were made aware among 80 required communities.

3.7 Flexibility

Out of five medical officers, three (60%) opined in favour of use of the sentinel surveillance network for hepatitis B infection.

4. Discussion

In district Hoara, a network of 23 reporting units at health facility level maintained a standard surveillance system of HIV infection as per national AIDS control programme guideline. Response on identification of a suspected HIV case by health workers and medical officers at health facilities indicated that the HIV surveillance was simple to follow in the district. Most of the reporting units accepted the surveillance system, which was reflected in submission of their monthly reports. But, there are opportunities to improve the acceptability by incorporating the non-reported health care facilities. However, acceptability in the blood bank is satisfactory.

Voluntary blood donation is highly sensitive so far as safe blood transfusion and prevention from HIV transmission in the district. Increased efforts are required to maintain the sustainability of this achievement. Reports from voluntary testing and counseling centre indicated that the centre is highly sensitive for passive surveillance of HIV infection. Information, education and communication message would be magnified to use the VCTC for passive surveillance of HIV. Sensitivity of family health awareness campaign programme was satisfactory to identify and treat sexually transmitted diseases among the target group in the community level.

High positive predictive value in HIV screening in blood banks indicated the quality performance of both the blood banks in the district. Monitoring the indicators in blood bank would be continued to maintain the standard. The functioning of voluntary counseling and testing centre was satisfactory so far as identification of HIV patient by passive surveillance. Family health awareness campaign also indicated satisfactory performance to identify sexual tract infection patients from clinically suspected cases.

The area that needs improvement in the surveillance system is the timeliness. The time gap between diagnosis and starting of anti retroviral treatment was longer. Efforts are to be given to synchronize the activities of service provider (both governmental and non governmental) and the beneficiaries, so that medicines are available to all patients (when required) in least possible time. Awareness in the community is another important issue. This activity should not be mechanical. The programme should ensure privacy, proper education and counseling to patients and their family members. It should also look on the acceptance of a HIV patient by the community by increasing information, education and

communication activities. Opinion of the medical officer on flexibility of the surveillance system towards its use in hepatitis B surveillance would consider seriously and may benefit to identify the magnitude of the burden of hepatitis B.

Blood banks and voluntary counseling centre maintained the difference attributes of surveillance system at their highest level. Active surveillance at community level through family health awareness campaign indicated successful achievement. Areas that need further efforts are the timeliness indicator. Resources are to be concentrated on this indicator to improve them.

This study suggested recommending measures to improve surveillance of HIV in district Hoara. First, maintain the existing sensitive surveillance system of HIV to identify the positive case patients. Second, improve the timeliness of treatment to AIDS patients. Third, organize updated and adequate training for the medical officers and individual practitioners to develop necessary capacity on identification of HIV patients. Diagnostic facilities are to be increased to increase the sensitivity of the system. Arrange training of health personnel to improve their ability to identify suspected cases of HIV infection.

Figure 1: Logical frame indicating surveillance attribute indicators of HIV surveillance in district Hoara, West Bengal, India, 2004.

Surveillance attribute	Case reporting
Sensitivity	Number of persons reported and requested for HIV testing as sensitivity indicator in voluntary counseling and testing centre.
	No. of blood units tested for HIV out of the total units collected.
	No. of persons suspected for STD during family health awareness campaign
Positive	No. of persons clinically diagnosed to have STD out of the suspected cases.
predictive value	No. of persons with HIV positive out of the total person reported in voluntary testing and counseling center
Representativeness	No. of blood bank /primary health centres submitted monthly report.
Timeliness	Interval between diagnosis and starting of treatment.
	Interval between notification and counseling, both at individual and community level.
Simplicity	No. of medical officers /health assistants, who can suspect a HIV infection.
Acceptability	No. of health facilities submitted regular monthly report.
Flexibility	Qualitative assessment whether this system could be used for hepatitis B surveillance

Figure 1: Prevalence of HIV infection among high risk (STD clinic) and low risk (Antenatal clinic) population in sentinel surveillance, district Hoara, West Bengal, India 2001-2003

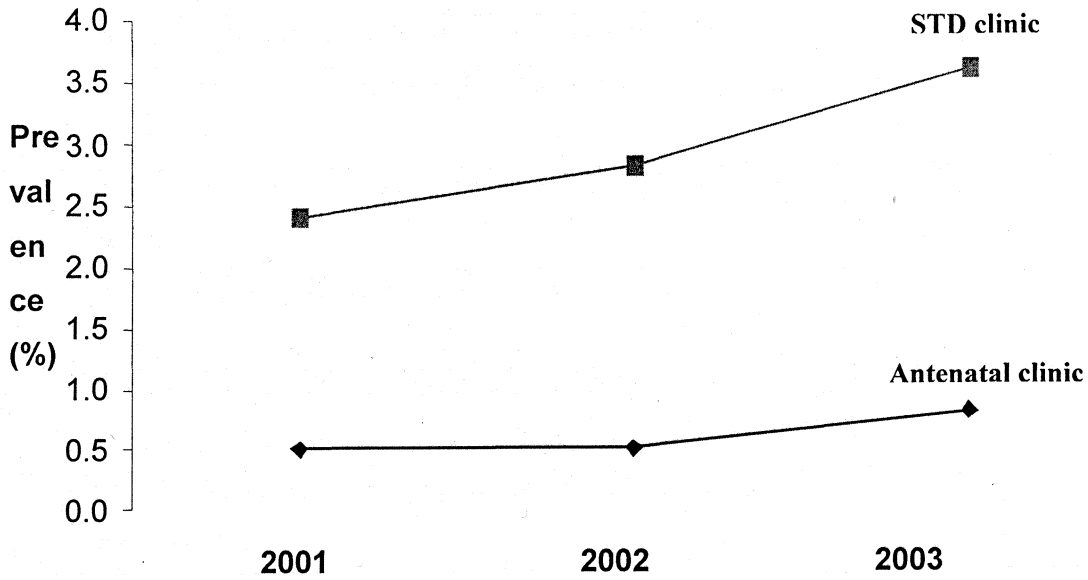
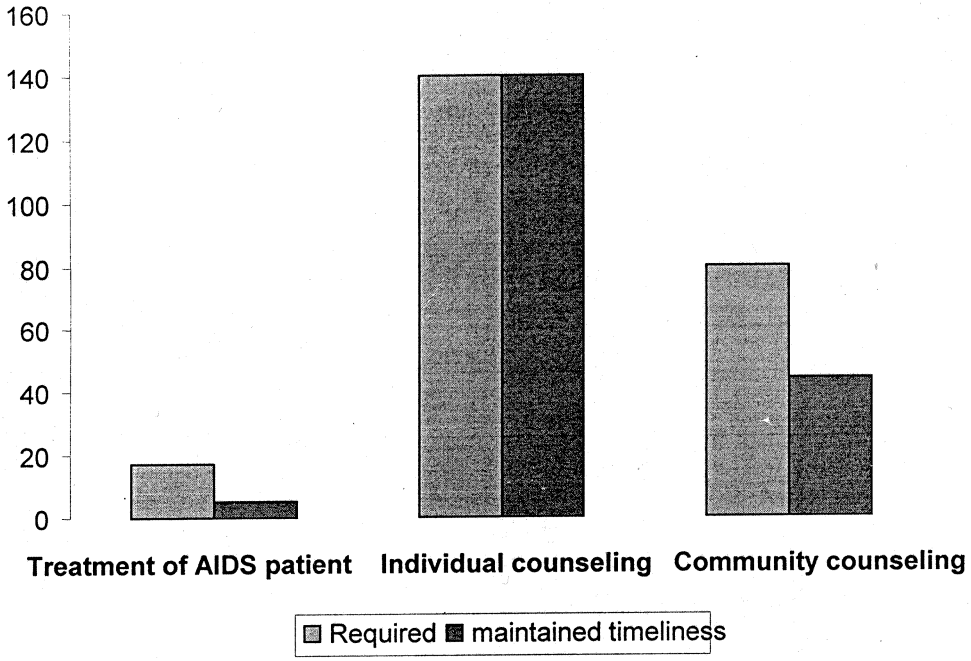


Table –2: Indicators for the attributes of HIV surveillance, distric Hoara , West Bengal, India, 2005

Attribute	Indicator	Number	Total	%
Sensitivity	Number of persons requested for HIV testing, as sensitivity indicator, in voluntary counseling and testing and centre	229	328	70
	No. of blood units tested for HIV out of the total units collected	10,762	10,762	100
	No of persons suspected for STI during family health awareness campaign	38,612	1,900,000	2
Positive Predictive value	No. of blood units accepted after screening for HIV out of the total units collected	10668	10,762	99
	No. of person clinically diagnosed to have STD out of the suspected cases.	4,214	38,612	11
	No. of persons with HIV positive out of the total persons reported in voluntary counseling and testing centre	52	229	23
Representativeness	No. of blood bank /primary health centre submitted monthly report	20	23	88
Simplicity	No. of health assistants who can suspect a HIV infected case	32	39	80
Acceptability	No. of health facilities submitted regular monthly report	14	23	62
Flexibility	Number of medical officers in favour of using this system for hepatitis B surveillance	3	5	60

Figure 2: Timeliness of HIV surveillance, district Hoara, West Bengal, India, 2005



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2.2 Evaluation of the Arsenicosis Mitigation Programme at Shyampur II Block, district Haora, West Bengal, India, 2005

1. Introduction

Globally, 23 countries reported arsenic contamination in groundwater and its impact on human[1]. In the South-East Asia Region, arsenic contamination of groundwater had been reported in Bangladesh, India, and Thailand and to a limited extent in Nepal and Myanmar. In India, West Bengal and Bihar are arsenic contaminated states. The worst affected area is Bengal delta plain. This environmental contamination began in West Bengal, in the late 1960s, when digging of tube wells commenced as part of a statewide irrigation and public health plan. The contamination of ground water with arsenic was first detected in 1978 and the first arsenic cases were reported at School of Tropical Medicine, Kolkata, in 1982. Nine of 19 districts of West Bengal had been reported to have ground water arsenic concentration above 0.05 mg/L The total population in these nine districts is over 47 million and it had been estimated that the population actually using arsenic-rich water was more than one million (above 0.05 mg/L).

The Government of West Bengal and the UNICEF initiated arsenic mitigation in 1999 through a strategic alliance, called the Joint Plan of Action. They identified 75 blocks in the state as arsenic contaminated and introduced mitigation programme. The basic goal is to address the arsenic-poisoning problem through a strategy of identification, education and mitigation.

Shyampur II block of district Haora, located along the western bank of the river Ganga, was identified as arsenic contaminated. The arsenic mitigation programme was in operation in the block since 1999. However, no evaluation of the mitigation programme was done till date. The objectives of this evaluation of arsenic mitigation programme were to describe the performances of different components of arsenic mitigation programme in terms of input, process, output, outcome and impact, explore the knowledge, attitude and practices including participation of the community in arsenicosis prevention and mitigation and formulate recommendations on pertaining issues which the programme encountering.

2. Methods

2.1 Description of the arsenicosis mitigation programme

We reviewed the document mission of Joint Plan Of Action, consulted with the stakeholders and compared the programme implementation with objectives, standards and recommendations. We collected both quantitative and qualitative information from different levels.

The major components of arsenicosis mitigation programme are (1) outlining the arsenic problem, its existence, impact, spread and challenges encountered in tackling it, (2) stressing on a revised concept of safe water – not just bacteria-free but arsenic-free too by creating awareness on arsenic contamination of tube well, (3) to disseminate information regarding mitigation measures (both alternative water supply and preventive, promotive and supportive health measures) by government and non-government agencies and (5) to create sufficient awareness among people to motivate owners of private tube wells to seek regular testing of their tube wells for arsenic voluntarily.

2.2 Indicators used

We considered the population of Shyampur block II, Hoara district to evaluate the arsenic mitigation programme in terms of input, process, output, outcome and impact indicators (Table 1).

2.2.1 Input indicator

The inputs of the programme, including activities conducted and human and financial resources involved, that were training of medical officers and health personnel and fund utilized for the programme.

2.2.2 Process indicator

The process of the programme including detection of unsafe water resources, IEC activities and number of arsenic clinics held.

2.2.3 Output indicator

The output of the programme included isolation of unsafe sources, detection of suspected cases and awareness on prevention from chronic arsenicosis.

2.2.4 Outcome indicator

The outcome of the programme included arrangement of safe drinking water, reduction of incidence of cases and mitigation of the problem.

2.2.5 Impact indicator

The impact of the programme included prevention of further contamination of water sources and further occurrence of the diseases by estimating prevalence of the disease and detection of water sources having arsenic content above permissible limit.

2.3 Survey

We discussed with the Medical Officers of Shyampur II block, Haora about the survey, formulated questionnaires, approved from the NIE and trained the health personnel about the survey. We applied thirty cluster sampling technique, which is used frequently in national programmes. We prepared village wise population list and divided the total population, 1,71,057 (vide 2001 census) of 165 villages in 30 clusters and surveyed seven households of each cluster. Total sample was 210. We formed 15 teams consisting of Medical Officers and Health Personnel covering two clusters by each team. The survey was conducted in April and May 2005. The health personnel interviewed the population with pre-designed and pre-tested schedule written in Bengali language. We also examined the reports and records related to arsenicosis and arsenic mitigation programme of Public Health Branch, The Directorate of Health Services, GOWB; The State Bureau of Health Intelligence, GOWB; office of the UNICEF (Eastern and North-Eastern India); Nodal Arsenic Clinic, IPGMER; Directorate of PHED; office of the Executive Engineer (PHED), Haora-Hooghly division; office of the Deputy Chief Medical Officer of Health II (Dy CMOH II); office of the Assistant Chief Medical Officer, Uluberia, Haora [ACMOH (Uluberia)]; office of the Block Medical Officer of Health (BMOH), Shyampur II; office of the Panchyet Samity, Shyampur – II and office of 'Anandaniketon', a NGO, attached with arsenic mitigation programme.

2.4 Operational definitions

Arsenicosis: According to the WHO-SEARO guidelines, arsenicosis is defined as chronic health condition arising from prolonged ingestion (not less than six months) of arsenic above a safe dose, usually manifested by characteristic skin lesion with or without involvement of internal organs.

Mitigation: Moderation, that is, the action of lessening in severity or intensity.

Mitigation programme: Programme is taken to improve conditions by limiting, reducing and controlling contamination and hazards of sources.

Maximum permissible limit of arsenic in drinking water: Water source containing arsenic is not more than 0.05 milligram / liter as per Bureau of Indian Standards.

3. Results

3.1 Description of the arsenicosis mitigation programme

Ever since arsenic was found to have contaminated drinking water sources, several organizations are involved in the job of mitigation measures in various roles. Public Health Branch, The Directorate of Health Services (DHS), Government of West Bengal (GOWB) upgrades the monitoring wings at state, district and block levels for disease surveillance and treatment of arsenic patients. The Public Health Engineering Department (PHED) plays a central role in coordinating with other organizations in all matters related to water supply, water quality surveillance and monitoring. It is responsible for designing demand driven approaches to water treatment installations on a community on cost-sharing basis. All India Institute of Hygiene and Public Health (AIIH&PH) has pioneered the development of arsenic filters. It involved in research and development activities. School of Tropical Medicine (STM) is involved in treatment of arsenicosis cases. They also have a well-equipped laboratory for water quality testing. School of Environmental Studies, Jadavpur University (SOES) has done substantial research in the field and developed a large and extensive database of water quality of tubewells in rural West Bengal. Institute of Post-Graduate Medical Education and Research (IPGMER) is involved in treatment of referred cases and training. Centre for Study of Man and Environment (CSME) is

involved in testing of arsenic in ground water. Central Ground Water Board – Eastern Region (CGWB – ER) is the source of all hydro-geological information and is mapping arsenic – risk areas. Bengal Engineering College (BEC) has contributed substantially in research and development of arsenic removal methodologies.

State Water Investigation Directorate (SWID) has analysed a large number of samples and prepared risk – area map. Department of Education provides all communication_material related to the programme required for schools. Zilla Parishads have set up district-level bodies including monitoring cells and identify suitable NGOs, in consultation with PHED and UNICEF for participation in the project. District Sanitation Cells play a significant role in promotion of domestic filters through the existing networking of Rural Sanitary Marts. Non- Government Organizations are be responsible for awareness generation in the affected areas and facilitate community participation in operation and maintenance of alternative water supply systems. The Arsenic Task Force continues to assist the PHED and DHS to formulate the strategy and co-ordinate all activities related to the arsenic mitigation programme. UNICEF as a primary partner provides support to the programme at all levels through several initiatives.

3.2. Evaluation of the programme

3.2.1 Input

Of the 5 medical officers 4 (80%) were trained. There were 40 multipurpose health workers, of which 26 (65%) were trained. All the three primary health facilities (100%) utilized funds on arsenic mitigation during 2004.

3.2.2 Process

There were 75 tube wells in the villages, which were surveyed. Out of them 11 (13%) tube wells were tested for arsenic contaminations during 2004. Information, education and communication activities were held in 14 out of 30 villages (46%) during 2004. Out of total 52 arsenic clinics planned in 2004, 50 were held (95%). House to house survey indicated 38% population took their drinking and cooking water from tube wells and ponds; 43% from tube wells, 9% from ponds, 4% from ponds and pipe line water, 3% from tube wells and pipe line water, 1% from tube wells and river-canal water, <1% from pipe line water and <1% from tube wells and ponds and pipe line water (Figure 1).

3.2.3 Output

Out of 11 samples examined, no water sources (0%) were detected unsafe. 5% chronic skin lesions were detected and were referred to the arsenic clinic. Out of total 50 clinics conducted, 109 case patients attended including 5 suspected cases, who were identified during the survey.

3.2.4 Outcome

Networking for water testing facility was available 27 out of 30 surveyed villages (90%). Out of total 210 villagers responded on questionnaires, 65 (31%) answered correctly on knowledge of drinking safe water.

3.2.5 Impact

We identified 8 case patients of arsenicosis from 210 villages (prevalence 4%) during survey. None of the 75 water sources (0%) was reported to contain arsenic above permissible limit.

4. Discussion

The perspective of the evaluation was developmental because we did not get sufficient data about the ongoing programme in the block. The result indicated that almost all medical officers and two-third of the health personnel were trained. Health facilities were utilized their fund fully. There was a logistic gap in water testing because less number of sources was tested for arsenic content. At present we could arrange water testing through the panchayet with a service charge of Rs. 80 per sample (reagent cost) and tried to convince the villagers to test their water source for arsenic contamination.

Only half of the villages were covered by IEC, but arsenic clinics were held regularly. As much as water sources were tested they were confirmed safe. Some suspected cases were detected during the survey. Level of awareness on prevention from arsenicosis was low. The survey also indicated good networking for water testing, poor knowledge about arsenicosis and all referred cases were treated in arsenic clinic.

The immediate need is to isolate water sources high in arsenic content and simultaneously provide alternate options to access safe sources of water for drinking and cooking. This will necessarily involve informing and educating the population at risk about the hazards and providing safe water options. It is also necessary to train doctors and paramedics for early identification of patients and to develop a decentralized system of treatment at arsenic clinic located at Jhumjhumi BPHC inside the block. We contacted 'Anandaniketan', who was assigned for water analysis, for estimation of arsenic in water sources. We also made aware the population surveyed about prevention of arsenicosis and motivated them, who had skin lesions, to attend the arsenic clinic.

Sensitization was developed through training, seminars and workshops on following subjects:

i) Capacity building of partners in water quality surveillance.
ii) Developing technical guidelines and protocols for water testing activities by GOWB.
iii) Developing a system for health surveillance and treatment of patients.
iv) Demonstrating and promoting alternate water supply systems.
v) Development of a multi-media, multi-level communication strategy and package.
vi) Fostering partnerships and collaboration.

One of the potential biases of our study was interviewer bias. To minimize the possible interviewer biases, team members were carefully selected to avoid exchange of members. Further, team members reviewed records and interviewed in pair rather than individually. Some information provided by health workers and community members could have been inaccurate due to recall bias. Consistency between reports and records of the programme were based on manual calculation by evaluation teams, human error in calculation could not be ruled out.

Shyampur II was identified as arsenic contaminated block and arsenicosis mitigation programme had been launched under 'Joint Plan Of Action'. But considering all indicators of different components of the programme we came to the conclusion that the programme here was not running in full fledge. We thought there was scope of lot of improvement of the programme.

On the basis of the result of evaluation of arsenic mitigation programme we recommended to: (1) fill up the sub-centre and block level vacancies of key posts, (2) arrange capacity building and updated

training on surveillance, reporting, data analysis, interpretation and management of arsenicosis with sensitization of mitigation programme for the remaining Health Personnel at block level (3) arrange written guidelines for them as per 'Joint Plan Of Action' on arsenic mitigation programme (4) arrange estimation of arsenic content from water samples of private sources and rest of the government installed tube wells, at least 25% per year (5) introduce regular IEC activities with prior information and (6) networking of water testing is to be extended in remaining villages. An extensive study is necessary to know the prevalence of the disease.

Table 1: Logical frame on evaluation of arsenic mitigation programme, Shyampur II Block, district Hoara, West Bengal, India, 2005

	Indicators
Input	Proportion of medical officers trained in arsenic mitigation programme
	Proportion of health personnel trained in arsenic mitigation programme
	Proportion of health facilities used 90% fund from arsenic mitigation programme
Process	Proportion of water sources tested for arsenic contamination were done during 2004
	Proportion of village where information, education and communication activities were done during 2004
	Number of arsenic clinics planned to be held
Output	Proportion of water sources identified arsenic contaminated during 2004
	Proportion of suspected arsenocosis case patients among total case patients attended in the clinic
Outcome	Proportion of villages having network of water testing facilities
	Proportion of villagers having the knowledge of drinking safe water
Impact	Prevalence of arsenicosis
	Proportion of water source contain arsenic below permissible limit

Table 2: Evaluation indicators of arsenic mitigation programme, Shyampur II Block, district Hoara, West Bengal, India, 2005

Indicators		No. /total	%
Input	Proportion of medical officers trained in arsenic mitigation programme	4 /5	80
	Proportion of health personnel trained in arsenic mitigation programme	26 /40	65
	Proportion of health facilities used 90% fund from arsenic mitigation programme	3 /3	100
Process	Proportion of water sources tested for arsenic contamination during 2004	11 /75	15
	Proportion of village where information, education and communication activities were performed during 2004	44 /30	46
	Number of arsenic clinics planned to be held	47 /52	90
Output	Proportion of water sources out of total sources tested, were found arsenic contaminated during 2004	0 /11	0
	Proportion of suspected arsenocosis case patients out of total case patients attended in the arsenic clinic	11/210	5
Outcome	Proportion of villages having network of water testing facilities	27 /30	90
	Proportion of villagers having the knowledge of drinking safe water	65 /210	31
Impact	Prevalence of arsenicosis	8 /210	4
	Proportion of water sources containing arsenic above permissible limit	0 /75	0

Figure 1: Frequency distribution of water sources used for drinking and cooking purpose among households (n =47)

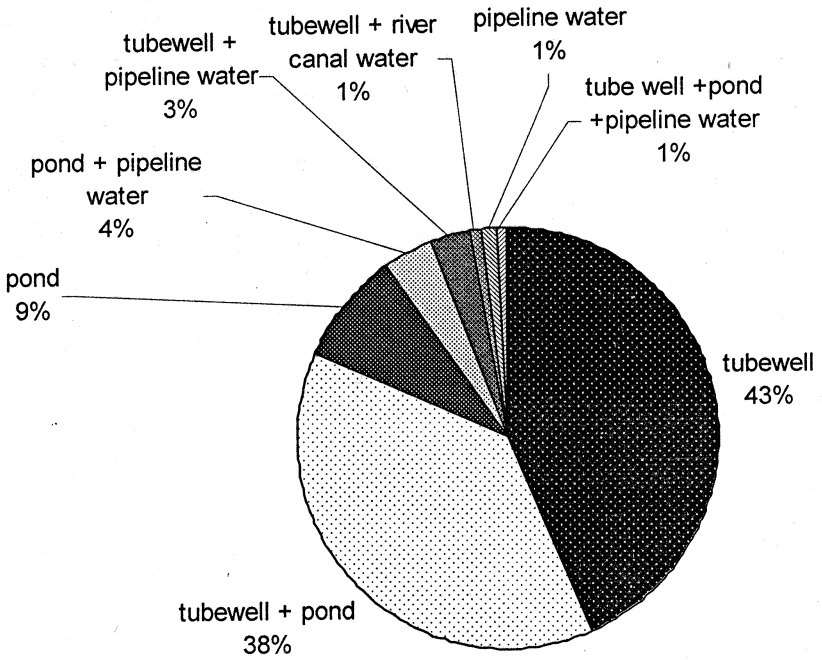

Table 3: Water sources by arsenic level* in arsenic mitigation programme, Shyampur II Block Hoara district, West Bengal, India, 2005 (n=75)

Level	No.	%
Below detection level	65	87
Detected but < 0.01 mg /L	10	13
0.01 – 0.05 mg /L	0	0
> 0.05 mg /L	0	0

*Contamination level is > 0.05 mg /L

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SECTION 3:

OUTBREAK INVESTGATIONS

3.1 Investigation of an outbreak of diarrhoea at village Uttar Sonatala, district Haora, West Bengal, India, 2004

1. Introduction

Globally 4.6 million children are dying each year due to dehydration caused by diarrhoea. In the tropical region, 15 to 40 % of all deaths among children under five years are diarrhoea related. In developing countries an estimated 1.8 billion of episodes of diarrhoea occur each year and three million children under the age of five years die due to diarrhoea..

In India, diarrhoeal diseases are major public health problems among children under the age of five years. West Bengal is highly endemic for diarrhoeal diseases. In district Haora, in the year 2004, 12469 diarrhoeal cases were documented. Case fatality rate was 0.53%.

On 29 September 2004, the Chief Medical Officer of Health, Haora, informed us that on 23rd an outbreak of diarrhoea, with a one death, occurred at Uttar Sonatala village, about 70 k.m. from district head quarters.

We conducted an investigation on the same date with objectives to: (1) determine the cause of the outbreak and (2) propose recommendations for control.

2. Methods

We first determined the outbreak, clinically diagnosed the cases and defined the cases. We used WHO clinical case definition for cholera. According to WHO definition, cholera is defined as acute watery diarrhoea with or without vomiting in a patient five years or more, in an area of cholera epidemic.

2.1 Descriptive epidemiology

We actively searched case-patients by house-to-house visit and line-listed them. We prepared a spot map and an epidemic curve and characterized the epidemic by time, place and person. We determined

age and case specific attack rates and case fatality rate. Then we interpreted the epidemic curve and attack rates to generate a hypothesis.

2.2 Analytical epidemiology

We conducted retrospective cohort study. We formulated a schedule and interviewed the villagers. We considered the number of villagers attacked, the number of villagers partook post funeral feast and the number of villagers, as well as households, used water sources as parameters of our study. We also considered the list of food items served in the feast, use of different pond water and different use of pond water as possible exposures of our study. Then we analysed the data and estimated relative risks of suspected causes with 95% confidence interval.

2.3 Laboratory confirmation

We sent water samples to the laboratory of National Institute of Cholera and Enteric Diseases (NICED), Kolkata for confirmation of diagnosis. We did not collect stool sample because case patients were given antibiotics.

2.4 Initiation of control measure

We visited the hospital where the case patients were admitted. We assessed their conditions and consulted with attending doctors regarding case management. We also consulted with concerned health personnel about the control measure in the affected village.

2.5 Assessment of the environment

We assessed the environment of Malikpara of village Uttar Sonatala to identify the source of contamination.

3.Results

3.1 Descriptive epidemiology

We discussed with the block medical officer of health and other health personnel concerned and also reviewed records. Outbreak of cholera is common in this area. We observed that on and average five to six diarrhoeal cases occurred per month at Malikpara. This number usually increased at the time of outbreak particularly in summer and post-monsoon seasons. In August 2004 five cases occurred in a household at Malikpara. This time from 23 to 28 September 11 cases occurred with a death. Acute watery diarrhoea followed by severe dehydration was suggestive of cholera.

We observed that on 22 September 2004 evening, 201 villagers partook in a post-funeral feast of a deceased old woman who died on 9 September due to cerebro-vascular accident. Nine villagers who partook in the feast were reported profuse watery diarrhoea followed by severe dehydration, from 23 to 25 September. Eight of them had to be admitted in a near by hospital run by a non-government organization. We observed that the adjacent pond water (Shown in figure – 3 as $Pond_2$) was used for hand, mouth and utensil washing on that occasion. Most of the cases were clustered around that pond ($Pond_2$).

We also observed two preceding cases, one on 12 September and other on 19 September. The first case was a young woman who took roasted almond from a vendor from outside the village. She was hospitalized and later discharged on request on 14 September. The second case, a five year boy, contracted the disease on 19 September and died on 20 September morning when he was being taken to the hospital. The first case resided very near to the second case and used to take care the second case. Both were resided in adjacent to the $pond_2$ (figure – 3). The grand mother of the second case took care of him in the disease state, served food in the post-funeral feast and cooked in nine neighbouring households in between the death of the second case and the occurrence of the outbreak.

Epidemic curve (figure – 2) showed outbreak of sudden onset of profuse watery diarrhoea followed by dehydration from 23 September night causing casualties of four cases on 23rd, four cases on 24th, one cases on 25th and two cases on 28th with two preceding cases, was suggestive of cholera.

Overall attack rate (Table – 1) was 5.67%, case fatality rate was 7.69%, attack rate in males was 5.66% and in females was 5.69%. Attack rate is highest in 0 to 5 years age group (9.09%) followed by 45 to 60 years age group (8.33%).

3.2 Analytical epidemiology

We calculated the relative risks of selected food items served in the post-funeral feast. 201 villagers participated in the feast. But the relative risks of food items served in the feast did not indicate any statistical significance (Table – 2). Relative risks of selected exposures (Table –3) showed that contact with grand mother of second case [RR: 18.82 (4.72<<75), p value: 0.0^6]; using $pond_2$ water by 17 houses [RR: 4.67 (1.38<<15.82), p value: 0.0102] and using $pond_2$ water by 77 villagers [RR: 3.63 (1.23<<10.69), p value 0.0125] had statistical significance.

3.3 Laboratory Confirmation

Analysis of water samples, taken from four ponds and one tube well, revealed presence of vibrio cholerae non 01 non 0139 strain in $pond_2$ water.

3.5 Initiation of control measure

The case-patients were treated in a near by hospitals and had been recovering. The local health authority started control measure by means of disinfection of sources from 24 September. We also conducted 'Information, Education and Communication (IEC)' about prevention and management of diarrhoeal diseases while interviewing villagers and at the time of follow-up surveillance visits.

3.6 Assessment of the environment

Poor agricultural labourers and small farmers from backward community inhabit in 57 congested hutments at Malikpara under village Uttar Sonatala. Population of Malikpara was 229. It is a low-lying area in the alluvial land in between two rivers, Rupnarayan and Damodar. Heavy rainfall and flood

cause water logging. The hutments were surrounded by four stagnant ponds, which were encircled by low-lying water-logged paddy fields. Dirty cow and goat sheds and chicken and duck population were attached with the hutments. Four ponds were soiled by human and animal excreta and wastes. Pond water were usually used for washing, bathing, cloth washing and utensil washing, but some times used for cooking, cattle bathing and for other domestic purposes. As diarrhoeal diseases are transmitted from faeco-oral route, therefore these stagnated contaminated ponds were real threat for occurrence of diseases. There was only one tube well for drinking water, which had concrete basement but it was located adjacent to a pond ($Pond_3$ in figure –3). Only three houses had sanitary latrines.

3.7 Initiation of follow-up surveillance

We visited the Malikpara on 29 and 30 September; 1, 6 and 28 October 2004 and there after periodically. We initiated follow up surveillance. Further outbreak did not occur till December 2005. The family who had lost a boy in the last outbreak had given birth a male baby in 2005.

4. Discussion

We were notified about the diarrhoeal outbreak at Malikpara, village Uttar Sonatala. We conducted investigation. We confirmed the outbreak. Outbreak of acute profuse watery diarrhoea followed by severe dehydration was suggestive of cholera according to WHO clinical case definition. Out of 13 cases two were index cases and two were secondary cases. Case fatality rate was high.

Most of the cases were clustered around $pond_2$ and the post-funeral feast on 22 September took place in a hut adjacent to $pond_2$. We observed that relative risk was highest on exposure to 'contact with grandmother of the second case'. Next was 'using $pond_2$ water'used by 17 households, then the use of the same pond water by 77 persons. There might be association between these three exposures with the outbreak of diarrhoea. We could not conduct stool examination of the case-patients because they were applied wide range of powerful antibiotics like metronidazole, nalidixic acid, norfloxacilin, ciprofloxacilin and gatifloxacilin. But analysis of water samples from $pond_2$ identified presence of vibrio cholerae, non 01 non 0139 strain.

Primarily we suspected the post-funeral feast as the source of outbreak. But analytical epidemiological study rejected the feast hypothesis. It showed association between occurrence of the disease with exposure to 'contact with grandmother of the second case' and 'using $pond_2$ water'. The first case brought the infection in the community from outside. This suggested that she might be the index $case_1$.

She returned from the hospital with discharge on request without completing full course of antibiotics. She might act as convalescent carrier who took care of the little boy, the second case or index $case_2$. Index $case_2$ contracted the disease from index $case_1$. The grand mother of index $case_2$ took care of him and washed his clothes in $pond_2$. She then cooked in nine neighbouring households. She might act as contact carrier. From her or from the contaminated $pond_2$ water the infection might contract to the other case-patients.

Case-patients were given heavy doses of several antibiotics without determining the causal organisms and their dose-response sensitivities. We suggested for laboratory diagnosis, rationality on using antibiotics. Till now, tetracycline is identified the drug of choice in cholera along with rehydration therapy. We suggested the villagers to improve personal and environmental hygiene, to wash hands after defaecation and before meal and to avoid contaminated pond water for drinking, cooking and mouth washing.

We suggested to the health personnel to disinfect the tube well and ponds properly and regularly, to conduct IEC on prevention and management of diarrhoea and to initiate follow-up surveillance. We reported to the block and district health authorities about our investigation. We requested the panchayet and general administration to arrange more safe water sources and low cost sanitary latrines.

However the source of infection and mode of spread of the outbreak could not be clearly identified without proper laboratory diagnosis. Stool sample from the suspected old woman was not taken for examination. The use of $pond_2$ water was not clearly known.

5. Conclusion

Outbreak of acute profuse watery diarrhoea followed by severe dehydration was suggestive of cholera. Most of the cases were clustered around $pond_2$ used for domestic purposes. The contact carrier and / or contaminated $pond_2$ water might be the source of infection. Laboratory report showed vibrio cholerae, non 01 non 0139 strain in $pond_2$ water. However laboratory support was not enough to conclude any decision.

6. Recommendations

On the basis of findings we proposed a number of recommendations. We recommended the health department to

- Organize rapid laboratory testing, including stool examination through rectal swabs, in case of future outbreaks of diarrhoea.
- Investigate the role of various domestic uses of pond water in similar outbreak in future.
- Educate the villagers not to use pond water for drinking and cooking.

Figure –1. Location of outbreak, Uttar Sonatala, district Haora, West Bengal, 2004

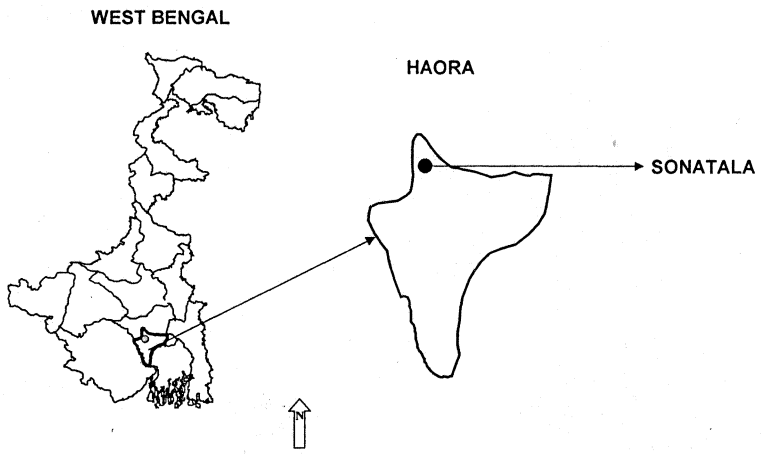

Figure – 2. Cases of diarrhoea by date of onset, Uttar sonatala, district Haora, West Bengal, 2004

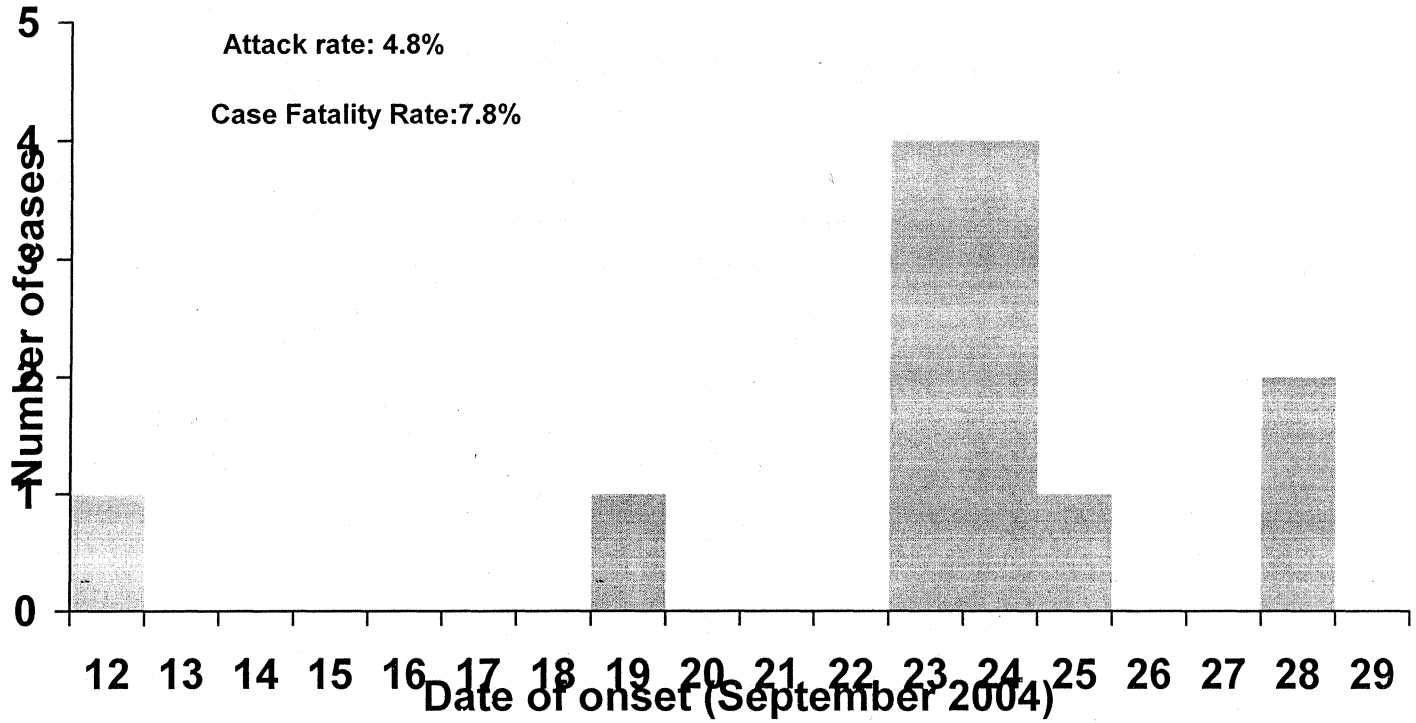

Figure – 3. Distribution of cases of acute gastroenteritis by households, Uttar Sonatala, Haora,West Bengal, India, 2004

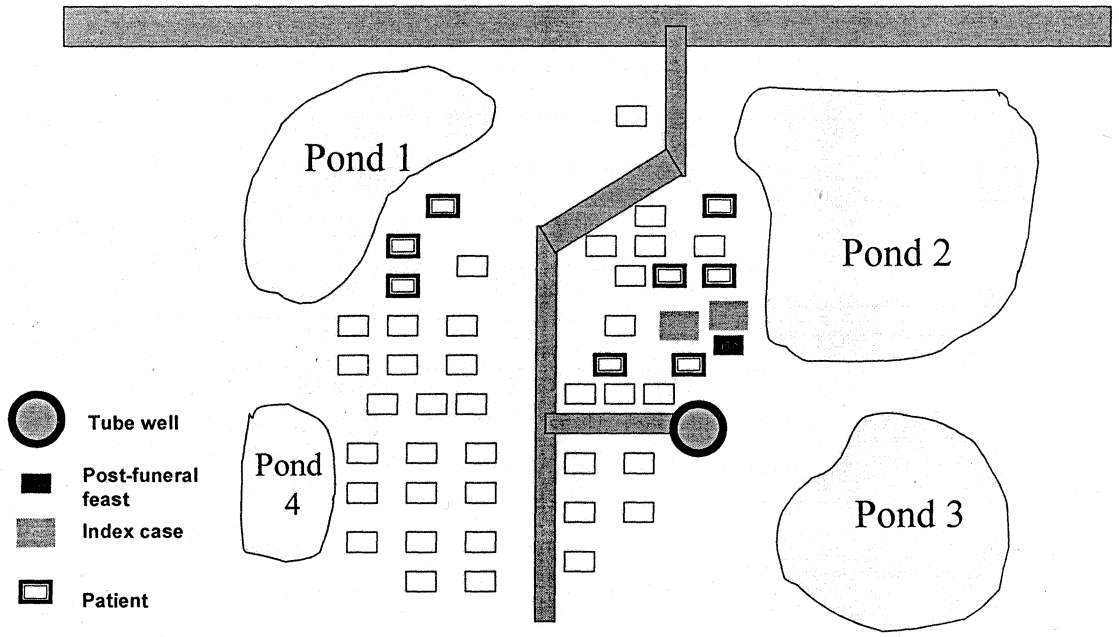

Table 1. Attack rates by age and sex, Uttar Sonatala outbreak, district Haora, West Bengal, 2004

Age group	Years	Cases	Population	Attack rate (%)
	0 to 5	3	33	9.09
	6 to 14	1	34	2.94
	15 to 45	6	123	4.87
	46 to 60	2	24	8.33
	> 60	1	15	6.67
	Total	13	229	5.67
Sex	Male	6	106	5.66
	Female	7	123	5.69
	Total	13	229	5.67

Table –2. Attack rates by sselected food items served in the post-funeral feast at Uttar Sonatala, district Haora, West Bengal, on 22 September, 2004

Food items	Attack rate		Relative risk	95% Confidence interval	P value
	Among exposed (%)	Among unexposed (%)			
Puri	5.15	9.09	0.52	0.15-1.79	0.3928
Pulse	5.62	5.88	0.96	0.27-3.34	1.0000
Vegetable roast	5.64	5.71	0.99	0.34-2.85	0.7917
Vegetable curry	4.79	8.06	0.59	0.20-1.75	0.3458
Sauce	4.57	10.20	0.49	0.17-1.45	0.1927
Sweet	5.43	5.55	0.98	0.30-3.22	0.9969
Mouth fresher	4.54	8.00	0.57	0.20-1.63	0.3623

Table – 3. Attack rates to selected exposures at Household level, Uttar Sonatala outbreak, district Haora, West Bengal, 2004

Exposures	Attack rate		Relative risk	95% Confidence interval	P value
	Among exposed (%)	Among unexposed (%)			
Contact carrier (cooked in nine houses)	81.8	4.4	18.82	4.72-75	<0.0001
$Pond_2$ (used by 17 houses)	70.0	8.8	4.67	1.38-15.82	0.01
$Pond_2$ (used by 77 persons)	10.4	3.3	3.63	1.23-10.69	0.01
Contact with index case $_1$	11.1	5.0	2.21	0.32-15.33	0.42
$Pond_1$ (used by 66 persons)	8.2	4.9	1.54	0.52-4.55	0.43

7. References

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SECTION 4:

CRITIQUING OF SCIENTIFIC LITERATURE

4.1 Mian A et al. Vulnerability to homicide in Karachi: political activity as a risk factor. Int J Epid. 2002; 31: 581-585.

Objective:

To identify the strength and weakness of a research publication so as to ensure that patients or community receive assessment and treatment or intervention based on the best available evidence [1].

Critical evaluation of Name and Abstract of the published research:

It was a very interesting topic evolved from the new subject, **'Violence Epidemiology '**[2], which became very relevant in the contemporary world.

The name was suitable with the abstract and the abstract was nicely written.

The subject was properly designed and proper analyses were used. But instead of January 1994 to January 1997 if time period was selected from late eighties or early nineties, which was the peak period of ethnic and political violence and homicides in Karachi, it would have been appropriate [3]. Besides, after invasion of Afghanistan by the then USSR army and armed resistance from different US, Pakistan and Iran backed Afghan groups, Peshawar became the new epicentre of ethnic and political violence amongst different rival Afghan groups.

According to official report 1770 people were killed in ethnic and political violence in 1995 in Karachi. It excluded other unconfirmed deaths, unidentified deaths, abduction and 'disappearance' cases (4). Unfortunately only families of 35 homicide cases from January'94 to January'97 were interviewed and only from Orangi settlement area.

Therefore it was appropriate to write the name **'Vulnerability to homicide in Orangi settlement area, Karachi, Pakistan.'**

Sample size should have been increased and collected from different spots of violence, not from a particular segment.

In pursuance of the abstract the result was statistically significant and was corroborated with the conclusion.

Introduction:

A brief critical review of relevant literature was not mentioned. Need of the study was properly mentioned. Purposes of the study: (1) to confirm findings of recent studies and (2) to investigate a previously unstudied phenomenon were mentioned. The research hypothesis was corroborated with the title of the research. Definition of the Mohajir would be "Urdu-speaking Muslims, who migrated to Pakistan, mainly in Karachi and Hyderabad, during and after partition of British India in 1947, and their descendents" [5].An important point 'ethnicity' was omitted. Actually it was a complicated social, economic, ethnical and political problem [6]. The Mohajirs (Refugees) settled in large number mainly in Karachi. Karachi is the largest, most cosmopolitan and most densely populated city in Pakistan. Karachi, the provincial capital of Sind, is the main gateway, main port and main commercial centre of Pakistan. From the beginning there was rift in between Sindhis and Mohajirs. Sindhis thought outsider Mohajirs would share their resources and create problems. Mohajirs thought Sindhis deprived and dishonoured them. In spite of that they initially fought together to prevent influx of Punjabis and Pathans in Karachi [7].

In 1978, Mohajirs formed 'All Pakistan Mohajir Students' Organisation (APMSO) led by Altaf Hussein, which culminated in a powerful political organization, Mohajir Quami Movement (MQM). Shrewd military dictator, General Zia-ul Haque (1977-1988) tactfully utilized MQM against his erst mentor turned enemy Bhutto's 'Pakistan People's Party (PPP) in Sind. Violence erupted in Sind particularly in Karachi. After assassination of Zia in 1988, in next election, PPP made pact with MQM and won rural constituencies in Sind as well as in national assembly. On the other hand MQM won urban constituencies and urban local bodies in Sind. But within two years, in 1990, rift resurfaced in between PPP and MQM. MQM became ally of 'Pakistan Muslim League (PML)'. PPP government started crackdown on MQM. Military and secret police with the help of breakaway faction of MQM, MQM (H) started raids on MQM strongholds in Karachi and other areas. Number of protests, street-fighting, arson, looting, rape, torture, killing, abduction, 'disappearance' escalated [8].

Large number of homicides due to Shia-Sunni conflict, conflict among tribal groups, attack on religious minorities by fundamentalists, killing by criminal groups and mafia gang-war were not mentioned [9].

Methods:

a) Description of Study Population

Sample size was small. They were chosen with the help of a NGO working in the community. Control group, were selected by Systematic Sampling.. Only selected from Orangi settlement, not from more violent Korangi or other Mohajir settlements.

b) Description of Study Design

Case-control study was used. Data sources: Questionnaires. Limitation: Neither direct evidence was available, nor any eye-witness was interviewed. Only family members particularly the head of the family and wives of the assassins were interviewed. Therefore chance of biases could not be overruled.

The cases were victims of homicide identified through local community organization. Could these cases had been selected because they were politically active, hence revealing, as a result of this bias, a much greater relative risk of political involvement, however measured? It was difficult to assess the magnitude of such a bias, although the authors sought to reassure us that the community organizations involved were not politically active per se and would not have had any motive for selectively identifying cases with greater degrees of political involvement [10].

Secondly, the authors identified a risk of **information bias**. In particular, information elicited from families of the controls. They were live members of the same communities, from which the homicide victims had been identified and might have been much more reluctant to reveal details of political leadership and participation than the equivalent family informants of the cases, who had been killed earlier. Such an information bias might arise in any situation of political instability and victimization, in which family members would have sought to protect their lives by denying any involvement, especially at an organization level. Both the biases would have served to increase assessment of whether homicide victims in Pakistan in the period concerned were more likely to have been politically active than general members of their communities [10].

Again, to highlight the political and ethnic violence the methods adopted could underestimate another basic as well as potential ethical question, that was health of the communities, who had been facing a protracted oppression, insecurity, forced migration, poverty, malnutrition, unemployment, inadequate housing and improper education. Ethical question of democracy, human rights and interest of

minorities should also be considered when there were serious complaints against lawmakers, law-ensurers and law-restorers.

Like any dynamic and developing science, **Applied Epidemiology,** should push a bit to accommodate the all pervading violence against an individual or a minority group or a oppressed nationality, otherwise we could not really enter into the health problems of people at large from Iraq to DPR Korea, from Columbia to Indian subcontinent.

The work of Mian et al should be praised as it highlighted the importance of understanding the context within which violence occurred in a community, but by the same time it is to be suggested to consider the interfacing public health and epidemiology with anthropology, political science, history, economy, sociology and psychology, among others.

Chances of biases were discussed earlier, again ethnicity, as distinct from political activity, and poverty might be considered **confounding factors** for homicide.

c) Description of procedure

It was a qualitative study based on mainly observation. Here scope of participation was limited. It was confined to questionnaires to the families of victims of violence.

Quantitative field research involves the data obtained consists of measurements which can be statistically treated. On the contrary, **Qualitative field research** involves the investigation of specific individuals. The investigator sought to understand the thoughts, feelings and experiences of individuals, focusing on direct, face-to-face knowledge of patients as human beings coping with their conditions and treatments in a natural social setting. The use of evidence from in-depth case studies has been traditionally a fundamental source of knowledge in the clinical sciences. Often, the initial step of discovering and describing diseases has been the careful and detailed study of individual patients rather than large group of patients [1].

Qualitative field research strategies include data collection strategies such as participant observation, direct observation and case studies. Rather than generating numerical data supporting and refuting clear-cut hypotheses, field research aims to produce accurate descriptions based on face-to–face knowledge of individuals or social groups in their natural settings. The role of the observer in this context is crucial, and ranges from the complete participant to the complete observer. Data collection involves objective and accurate reporting of the activities and appearances of persons in their natural environments [1].

d) Description of statistical analyses

Description of statistical analyses, as much depicted in the research, corroborated with research question.

Results:

Results presented directly related to the research question. Summary data like mean, range, percentage, odds ratio, confidence interval and probability value were mentioned, but standard deduction was not mentioned. Two tables were attached. More tables and graphs would enrich the research. Similarity of groups on baseline characteristics, were not examined before comparisons.

Discussion:

Consistency with questions posed in the beginning and the data presented in the result section was established. Extrapolation beyond the data was not attempted. Limitations were clearly mentioned.

First, this study focused on a single area of Karachi and the dynamics of homicide in this area might not be representative of the causes of violence throughout the city. Indeed socio-economic and other status inside Orangi was also not homogenous. The second limitation was that Orangi was a politically charged community with emotional and biased view. More over there was no available objective method to identify all homicide victims in Karachi except the clues of a NGO working there.

A third limitation of the study was that all information for the homicide cases was collected from family members. Family members were often not eyewitness and the people supplying information to families might have been biased in reporting events. A fourth limitation was that the families who contained the individuals killed, might have been over or less threatened by reporting than families with living people.

The study was conducted from January 1994 to 1997 and published in 2002. In fact number of homicide in Karachi peaked in 1998 and reportedly decreased 10 folds after military junta seized power in October 1999 after toppling an elected civilian government. These phenomenon should be counted and analysed.

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4. 2 Helle Kieler et al . Sinistrality—a side effect of prenatal sonography: A comparative study of young men. Epidemiology 2001;12 (6): 618-623

(1) Introduction:

Non-invasive diagnostic techniques became popular because not only they do not require any incision in the body or any prick of a needle, but also they do not need any recovery period and have no chance of contamination of pathogens in blood vessels.

Though there are some misuse in cases of sex-determination, followed by female foetal abortion by some couples and communities, otherwise, non-invasive ultrasonography (USG) has several advantages in prenatal diagnoses of diseases.

In spite of the fact that doubt remains about its absolute benefit, in health facilities of developed countries and in advanced hospitals of new world USG examination is routinely performed in 18-20 weeks of pregnancy.

In first trimester, either transabdominal (TAS) or transvaginal (TVS) USG scanis done to detect (1) early pregnancy, (2) accurate EDD, (3) number of fetuses, (4) gross fetal anomalies and (5) any uterine or adnexal pathology. In 18-20 weeks it is done for (1) to detailed fetal anatomy survey particular to detect any structural anomalies (cardiac, neural etc.) and (2) placental localization [1].

When prenatal USG is in vogue, then it is also essential to know whether routine prenatal USG causes any harm to pregnant women and their fetuses. In this respect, work of Helle Kieler et al was definitely commendable.

(2) Objective:

To identify the strengths and weaknesses of the published research so as to ensure that patients or community receive assessment and treatment or intervention based on the best available evidence.

(3) **Abstract**

In an abridged form the excerpt of the publication is reflected in the abstract. A prospective cohort study was conducted in Sweden among men born from 1973 to 1978. 6858 men born in hospital having USG exposure at the time of prenatal screening and 172537 men born in hospital without USG were studied using logistic regression analysis. The study had two inferences:

(1) From 1973 to 1975 there was no difference in left-handedness between USG exposed and unexposed and (2) From 1976 to1978 the risk of left-handedness was higher among those exposed to USG compared with those unexposed concluding that USG exposure in fetal life increases the risk of left-handedness in men suggesting that prenatal ultrasound affects the fetal brain.

But here the reason behind the difference in incidences in between 1973-75 and 1976-78 was not clear. One explanation was given that 1973-75 was introduction phase and in 1976-78 USG was offered more widely. But fetal brains were damaged at the time of more widely used USG (not more widely used in each case, but used in more number of cases) is not accepted.

(4) **Introduction**

"Ultrasound scanning in pregnancy is widely used throughout the developed world. An extended number of scans, longer and more advanced examinations, higher output levels, and weaker regulations for ultrasound machines contribute to increased fetal ultrasound exposure during recent decades. Although it has been shown that ultrasound is capable of damaging tissue, few epidemiologic studies have addressed possible adverse effects of ultrasound. Nevertheless, an association between prenatal ultrasound exposure and non-righthandedness among boys has been reported in two randomized, controlled trials."

It was a very interesting revelation of effect of USG in fetus as well as very important study on USG adverse effects.

Except the familial preponderance of 8 to 9% left-handedness and ambo-dexterity (both handedness), rest of the left-handedness and ambo-dexterity due to other causes are called "pathological non-right handedness" which may occur up to 6th year of life as brain continues to develop throughout fetal life contrary to other organs. Left side of the brain controls right sided limbs and as left hemisphere is more vulnerable then a disturbance of migration of neurons to cortical regions in the left hemisphere of a developing fetal brain favours growth of regions on the right side or ambidexterity. Again it is found that male brain matures later than that of female, so male are more susceptible. All these were very elaborately studied. But explanation of the peculiar "non-right handedness" phenomenon in stead of palsy or growth retardation or distorted growth or retarded movement or distorted movement, which are usually occurred in brain injury or brain lesion, was simply absent [2,3,4,5,6 & 7].

"This cohort study was undertaken to evaluate the association between ultrasound exposure in fetal life and left-handedness among young men enrolling for military service." But it is unusual

that in a highly developed, industrialized, rich, sparsely-populated and citizen-friendly Scandinavian country like Sweden, prevalence of "non right-handedness" had been unnoticed in routine health check-up, health check-up in schools, high school entrance examinations and other activities for 22 years and more (1973-78: Prospective cohort study period and 2000: Submission of research paper).

(5) Methods

"The Swedish Medical Birth Register, established in 1973, contains prospectively collected information more than 99% of all births in Sweden. Eligible for inclusion in the study population were all male singletons born between 1973 and 1978 at hospitals with reliable information about ultrasound scanning during the 1970s." A table was produced in support (table 1).

In the table incorrect civil registration number of exposed and unexposed babies were produced, but it was not clear whether males born in 1973-78, written in the first column, had correct civil registration number.

In the 6th column the criteria of matching with enrollment register were not clear. In the 9th column, why the specific numbers were taken in the study population not clarified. In columns 11 and 12, maximum number of babies were enrolled from Southern part of the country. The reason was not explained.

Definition of exposed and unexposed groups in respect to fetal ultrasound:

"The Department of Obstetrics and Gynaecology at the University Hospital in Malmo was the first department to introduce ultrasound scanning as part of the standard antenatal care. The use of ultrasound in Malmo from this period is well documented. Since October '72, all pregnant women who were seen for antenatal care in Malmo were offered an ultrasound scan, and 90% were scanned." Different gradation of exposures was described. In 1972-73 USG examinations were performed in 28 weeks of gestation, in 1974-75 at 19th week, from October'76 at 19th and 32th week. From April 1978 the first examination was performed at the 17th week. Different USG machines, which were used, were elaborated. But in tables and in analyses in the following chapters age-specific, machine-specific and frequency-specific comparative studies were not taken into account.

Definition of Left-handedness:

Left-handedness was determined by military service enrolment test at age 18 years, where a replica gun of a gun used in Swidish army only by right-handed shooters, was used to determine left-handedness. Then the left-handed enrollees were registered in National Service Register. From there one could collect the statistics of left-handedness.

But there were some fallacies:

1. All persons aging 18 years particularly females did not participate in the said enrolment.
2. Data only up to April 1997 were available; as before1998, the particular gun was discarded from the army.
3. Data after 1997 up to 2000 was not available.
4. Suppose a baby was exposed to USG in utero in, 1973 in the first batch for USG screening in pregnant women. He or she would only attain age 18 in 1991. So that, the data of only 7 years could be available if all of them appeared in the army enrolment.

Study Population:

"The men included in the study were born as singletons, from 1973 through 1978. Of the study population (Table 1), 99% were examined at one of the six enrollment centers before reaching 21 years of age. The majority was enrolled from 1991 to 1996.

We assumed that women registered as citizens in Malmo and giving birth at the University Hospital in Malmo had attended antenatal care in Malmo, and thereby participated in the ultrasound-scanning programme. Thus, males born at the University Hospital in Malmo to mothers registered as citizens in Malmo were included as exposed to ultrasound.

We also assumed that women giving birth at one of the 48 hospitals without ultrasound scanning before 1980 and not living in Malmo or its surrounding municipalities were not scanned during pregnancy. Thus, males born at one of the hospitals without ultrasound scanning to mothers not registered as citizens of Malmo were included as unexposed to ultrasound."

It is unfortunate that the researchers depend on too much assumptions in stead of definite statistics and it is also surprising that all statistics were non available even in highly developed and highly accredited Swedish state and society.

Statistical Analyses:

"...Owing to the varying frequency of a positive left-handedness test by year and enrollment center, we analysed the southern enrollment center separately after controlling for year of enrollment. Most of

the exposed men were enrolled in the enrollment center. For analyses of the total population we adjusted for center and year of enrollment."

Due to varying frequency of a positive left-handedness test by year and enrolment centre, southern and other enrolment centers were analysed separately (table 4). It was extrapolated to analyse the total population.

"We assessed the risk for left-handedness after dividing the enrollees into two sub-cohorts born 1973 to 1995 and 1976 to 1978, respectively. These two time periods coincide approximately with the introduction phase and full-scale phase of the ultrasound scanning programme in Malmo."

In Karolinska, South Hospital Stockholm, Sahlgrenska and Orebro in Model-2, O.R. had decreased. In Model-1, Malmo and in Model-2, Malmo, Denderyd and Umea, O.R. had increased. Therefore it was difficult to prove from birth cohort 1973-75 (introduction phase) to birth cohort 1976-78 (full-scale phase) that sinistrality was the side effect of prenatal sonography.

"Maternal age, pre-term birth, low birth weight, and birth stress have been found to correlate with an increased risk of left-handedness."

They were treated as possible confounders and were controlled for logistic regression analyses (Table 2). Actually the above said each condition was very important singleton cause and they should be treated beyond confounders and to be studied thoroughly.

(6) **Results**

Primo-parity, pre- and post-term birth and IUGR, which were considered possible confounders in previous chapter, were more common among births at Malmo university hospital, where USG scanning was part of the standard antenatal care, than other hospitals, having without USG scanning programme.(table 2) Again of all maternal and infantile characteristics, a LBW ratio seemed to have the strongest association with left-handedness(14.6% in table 2). If percentage of left-handedness after exposure of USG was tabled then it could be compared which had more association on left-handedness-----LBW or USG.

Increased risk of sinistrality in USG exposed cases of 1975-78 than 1973-75 was written. But the reason was not clarified.

To prevent biasness the researchers expanded the model to include enrollees at all enrolment centers of the country (table 4) and thus they justified their result. But the same researchers expressed earlier

that most cases were from southern district mainly from Malmao and complete register was not available. One could understand that most of the people used to leave in the more developed, well-communicated and better weathered southern portion of the country, from capital Stockholm in east, to Gothenberg in the west to Malmao in the south. Malmao is a major city, port, industrial and commercial centre just opposite to Copenhagen, the capital of Denmark, in between a channel of Baltic Sea is flowing [8 & 9].

Unfortunately it was not found how the research was possible amidst such a wide regional disparity and it could be solved.

(7) **Discussion**

The main theme of the discussion was: "In this study we found an increased risk of left-handedness in young men exposed to ultrasound in fetal life, suggesting that prenatal ultrasound influences the development of the fetal brain."

The researchers mentioned two previous objective trials, which were criticized for not using objective tests for handedness, and found an excess only in non right-handedness and not in left-handedness. For this reason in this study, preferred hands were determined by researchers objectively, by handing replica rifle to the enrollee.

Researchers stated that prevalence was not possible to trace ultrasound exposure for each individual, instead they took reports of more than 90% of women attending antenatal care in Malmao having prenatal ultrasound scan from 1973 and onwards. They also stated the possibilities of alpha- and beta-errors.

It was stated that prevalence of left-handedness to USG exposed fetus from 1973 to 1978 was slight high (9.6%) than normal (8-9%). LBW and difference in test procedures were identified as main two confounders. The majority of men born and living in Malmao were enrolled in the same centre in the south of Sweden, which performed the test for handedness more frequently than other centers. The rise in prevalence of left-handedness during the study period was found only in Malmao and not among males born in other university/regional level hospital without ultrasound scanning indicating that socio-demographic factors had negligible effects on results. But beside the university hospital in Malmao 11 other hospitals introduced ultrasound scanning before 1980 though they were not considered in the study due to absence of reliable documentation.

It was identified that number of left-handedness was only increased in the 1976 to 1978 phase when a second trimester scan had been introduced as well as a second scan at 32 weeks. It might be speculated that the increased prevalence of left-handedness was an effect on second trimester scan or the scan regime because fetal brain is presumably more susceptible to external effects, because of the high developmental activity that includes completion of the early migration stages, proliferation and connectivity of the cortex. But it was earlier stated that USG was initially performed at 28th weeks since 1972, then gradually changed to 19th week during 1974-75 and from October 1976 two examinations at 19th and 32nd weeks. Therefore the statements were contradictory.

"In a "meta-analysis" of the two controlled trials, it was concluded that "left-handers are no different from right-handers" that "a positive association between ultrasound during pregnancy and sinistrality among boys should not lead to the conclusion that ultrasound causes harm to the developing brain in male fetuses." It is also been argued that the previous findings of an association between prenatal ultrasound exposure and non right-handedness were weak and of uncertain public health or clinical significance. ..."

This study rejected the previous studies and thus did not corroborate any pathogenicity of fetal brain or any difference in between left- and right-handedness in term of activities.

The later examples of Finnish and South African studies also did not support the research question.

Though it was a very important and sincere study, but it did not corroborate the research question and at the same time different inferences in different chapters were confusing.

Whatever criticism would have it, the importance and sincerity of the study should be highlighted. Moreover this study had explored a new side, that was, adverse effects of noninvasive investigation techniques, which had been advised very commonly with a view that they did not harm the patients.

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4. 3 V. Gajalakhsmi et al. 'Smoking and mortality from tuberculosis and other diseases in India: retrospective study of 43000 adult male deaths and 35000 controls. Lancet 2003; 362: 507–15

To identify the strength and weakness of a research publication so as to ensure that patients or community receive knowledge and assessment for prevention and treatment from smoking related diseases based on the best available evidence.

The title is long and elaborate. Bridging with the conjunction 'and' from the word 'smoking' to rest of the sentence in the title could not clearly explain the main objective of the study. The type of study is also not mentioned specifically in the title. In fact the title fails to bring out the essence of the whole article.

The title may be suggested likewise:

' A case control study on the effect of smoking on mortality from tuberculosis and other diseases in India.'

1. **Abstract**

    a) **Background:**

Actually most adult deaths involving cerebro-vascular diseases are from relatively economically solvent, well-fed or over-fed, sedentary life-leading urban population having stress and strain in home and occupation. Deaths due to sequelae of diabetes mellitus, bronchial asthma, some types of carcinoma, road traffic accident (RTA) etc. are also common to them.

Deaths due to bronchogenic and other carcinomas, bronchial asthma, silicosis, pneumoconiosis, tuberculosis, other respiratory diseases, accidents etc. are common in people residing in industrial and mine areas.

Most of the populace (>70%) of our country are residing in vast rural area where diarrhoeal diseases, malnutrition, anaemia, skin diseases, PU, helminthic diseases, mycosis, ARI, pneumonia, maleria,

filaria, kala-azar, other communicable diseases, dog bite, insect bite, snake bite, acute poisoning by insecticides, some types of cancer etc. are prevalent. Amongst them deaths are mainly due to tuberculosis and respiratory diseases, malnutrition related other chronic diseases and some infectious and communicable diseases which have high case fatality rate.

For women chronic infections related to malnutrition and anaemia, different types of reproductive tract infections, eclampsia and haemorrhages, other diseases associated with pregnancy and parturition, CA breast and CA cervix etc. are to be added.

Emerging diseases like HIV infection and re-emerging diseases like leishmaniasis are also to be included in the list of fatal diseases causing high number of deaths.

Generally our society does not desire female to smoke. However it is not applicable in all places. In toiling classes like landless and/or agricultural labourer families; migrating labourers; labourers in brick kilns, mines, quarries and other places; tea garden workers; construction workers; sex workers etc. and in tribal communities womenfolk shares addiction with male folk and smoking and alcoholism are prevalent among them.

b) Methods:

Number of cases and control in rural men are 16000 and 15000 respectively, which are quite proportionate. But number of cases and control in urban male are 27000 and 20000, which are not satisfactorily proportionate. It would have been better if the number of control in urban male were at least 25000.

A logic is given that few women do smoke so women are excluded from the research. For the sake of debate if it is taken for granted, i.e., women are excluded, yet it cannot be justified why 25-69 years age group of males is selected. According to Indian law adulthood is considered from the age of 18 years and man can marry at the age of 21 years. Almost all anatomical and physiological growths are completed within 18 years of age. Usually people are getting addicted or starting smoking from high-school age or adolescent period and these addiction habits remain up to death. In street children or in child labourers, smoking with other addictions even start from early boyhood.

c) Findings:

Findings are very precisely and conspicuously written. Results speak of extensive research. An additional survey on 2,50,000 urban men have been conducted. But source of any one of the findings is not mentioned.

d) Interpretation:

Here the researchers statistically show the large number of deaths due to vascular diseases, tuberculosis and other respiratory diseases among ever smoker but they are not able to establish a clear-cut relationship between smoking and above said diseases.

2. Introduction

In rural areas not only cheap cigarettes and bidis are smoked by people, they also have other types of tobacco-addiction . In Bengal (both West Bengal and Bangladesh), Assam, Meghalaya, Manipur, Tripura etc. eastern and north-eastern part, besides smoking bidis and cigarettes, people are used to chew 'tamaku' or 'doktapata' which are prepared from tobacco leave mixed with molasses and certain varieties of spices. Smoking tobacco from 'huka' is also common practice in these areas particularly among peasant and fishermen. In Bihar and a large part of eastern UP, eastern MP, Chottisgarh, Jharkhand, Asansol belt in WB people used to take 'khaini' which is a kind of prepared tobacco powder and which is put on gum and under the tongue. In Orissa, people used to brush teeth with 'guraku' or put 'guraku' on gum. 'Guraku' is a semi-liquid preparation of tobacco.

In Jharkhand, Jhargram region of WB, Chottisgarh, wide stretch of Orissa, Gadricholi, Chandrapur etc. eastern districts of Maharastra, Telengana region of Andhra, collection of 'kendupata' is the principal earning of the poor and down trodden tribal population. They are used to smoke hand made 'chuta' which are made of 'kendupata'. Their women and children are largely involved in 'kendupata' collection and 'chuta' smoking is rampant amongst them. In coastal AP, from Srikakulam to Krishna-Godavari delta, people used to smoke the burning end of 'chuta'. In Western UP, Haryana, MP and Rajasthan some people used to smoke from a large variety of 'huka' with a long pipeline. Now some preparation tobacco leave in plastic sachets are in vogue through out the country. These are some of the examples. This wide variety of tobacco-addiction of Indian population has not received due attention to the researchers.

3. Methods

a) Case-control studies in urban and in rural areas among men aged 25 years and older:

It is an extensive study, covering whole of Chennai city and district of Villupuram. Chennai is the fourth biggest metro city in India, largest city in southern India, state capital of Tamilnadu and one of the old and industrial city having a large population. Therefore, selection of Chennai is unquestionable. But question may arise on selection of Villupuram district – why Villupuram? Why not Dharampuri or Tirunelvelli or Coimbatore or Nagapattanam or Karur? Villupuram is a large district adjacent to Pondichery and near to Chennai. With a portion of Villipuram, if, some portions of four districts of four regions were selected then the selection would have been more justified which eventually would have strengthened the research findings.

Again, the study is exclusively done in a city and a rural district of Tamilnadu. Then the result is extrapolated and is shown as result of India. Is it accepted? It would be reasonable if the title of the research can be changed to: **"A case-control study on the effect of smoking on mortality from tuberculosis and other diseases in Tamilnadu "**

(i) Urban case control study and (ii) Rural case control study:

The researchers nicely and clearly described the studies, which they have conducted. But in this study one thing is not clear that why they have studied the urban area in 1995-97 and the rural area in 1997-98, which were separate time period. Again why instead of revised edition of **International Classification of Diseases** or **ICD-10** (1993), ICD -9 was taken, was not explained. Another important problem of the above said method of the research is that the smoking habits of all 43000 adult male deaths are collected from their families. Therefore there is every possibility of **information bias** and **recall bias**, which may even challenge the authenticity of smoking status of the cases.

b) Population surveys in same urban and rural studies area among men aged 35 years and older:

(i) **Urban population survey and (ii) Rural population survey:**

The additional surveys, which have been conducted with random sampling method genuinely validate the perfection of the research. If **blinding** would be applied the research would have been more authentic.

c) **Statistical methods:**

This portion is very meticulously done. If the control would have been **matched** with the cases particularly age-specifically, then the process would have been more superior.

d) **Role of funding source:**

This part is praiseworthy because the researchers have clearly disclosed that the funding agencies do not manipulate any portion or any stage of the research. This also strengthens the transparency of the research.

4. **Results**

a) **Urban male mortality and b) Rural male mortality:**

Both portions are meticulously analyzed though all medical records and medical histories of cases cannot be obtained, particularly the rural cases, which may expose some weaknesses of the research.
Less number of deaths due to vascular and cancerous diseases are found in rural population. The research does not bring light on it whether bidi is less harmful than cigarette or fresh atmosphere, increased physical activities, less intake of protein and fat and more intake of vitamins, antioxidants, roughages and other cause (or causes) are responsible for this situation.

b) **Tuberculosis in middle and old age:**

Tuberculosis among ever smokers, both in rural and urban areas, are high. These are meticulously analyzed and shown in tables. But the mode of diagnosis is not mentioned. Again, in cases of improper documentation verbal autopsy may not authenticate the causes of deaths.

5. **Discussion**

a) **Smoking as a cause of tuberculosis:**

"Thus, smoking is a cause, and an important cause, of death from tuberculosis. Smoking is not, of course, a necessary cause of death from tuberculosis (since some non-smokers die from the disease), nor it is a sufficient cause (since, even if infected with the tubercle bacillus, many smokers do not die from the disease) But, at least in this population, smoking is an important cause of death from tuberculosis ----- " – is the gist of the portion of the research and the result corroborates with it.
But suddenly jumping into the conclusion that it is the picture of whole India is not acceptable.

b) Smoking as a cause of other diseases:

Smoking causes increased deaths in vascular and neoplastic diseases. Though the results corroborates with the research question, yet the researchers have clearly exposed some weaknesses of the research, viz., **insufficient information** from verbal autopsy, **misclassification** of some current or ex-smokers in non- smoker groups etc.

Again, when age group up to 69 years are studied old age as **confounding factor** to be considered.

c) Numbers of deaths from smoking in all India:

The researchers have compared the data with some national level surveys and found similarities. Naturally it proves the authenticity of the study. But it would have been more authentic if the researchers have compared the result with the data of RNTCP, National Cancer Control Programme etc. programmes and studies, which are approved by the Govt. of India and International Health Organizations.

d) Risks for the individual smoker in India:

This is an interesting chapter where researchers have dealt with the risks for the individual smokers in India as well as Chennai citing different statistics.

It is found that large number of smokers are simultaneously addicted with opium, cannabis, by products of opium and cannabis, synthetic preparations and other drugs.

A good number of them share IV syringes and needles and are habituated with high risk sexual practice. Tuberculosis, hepatitis B, HIV infection etc. are prevalent among them. The research would be further enriched if the risks for the high risk group smokers have been discussed.

6. Conclusions

"About a quarter of all persistent smokers of cigarettes or of bidis are killed by tobacco before age 70 years, losing about 20 years of life expectancy. A third of the deaths caused by smoking are from vascular disease and a half are from tuberculosis and other respiratory disease. Mortality from tuberculosis is four times as great among non-smokers. Among Indian male smokers and non-smokers together, smoking causes half of the deaths from tuberculosis and a quarter of all deaths from any disease in middle age-"

It is beyond doubt that in spite of some constraints, limitations and weaknesses it is a very important and very relevant research, where the researchers have undergone an in depth study in Chennai and Villupuram district of Tamilnadu for several years covering a wide range of population.