

FIELD PROJECT REPORTS

By

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(MAE- FETP Scholar 2004-2005)



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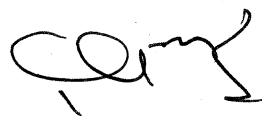
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CERTIFICATION

This is to certify that all the field projects submitted in this Bound Volume are original work carried out by **Dr Subhasish Saha** during the 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 by him in part or whole for any other (Publication or degree) purpose.

Date



Director

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Date

Dr. Subhasish Saha

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SECTION - 1

FIRST

FIELD POSTING

1.1. Health Situation Analysis South 24- Parganas district, West Bengal, 2004

1.1.1. Introduction

I was working as Deputy Assistant Director of Health Services (Planning and Development), in the Directorate of Health Services, Government of West Bengal prior to joining MAE-FETP course at National Institute of Epidemiology, Chennai. I possessed a Diploma in Public Health and was handling public health affairs, I joined MAE-FETP course to acquire greater skill in epidemiology relevant to public health practice.

After completing three months of contact session at NIE Chennai, I shall work as medical officer on training reserve under the Government of West Bengal during MAE-FETP course and shall be placed under the Chief Medical Officer of Health, South 24 Parganas, West Bengal, for doing my field epidemiology training in terms of doing projects to be assigned time to time by the National Institute of Epidemiology, Chennai. In this field posting I am entrusted to do the following projects: (1) Situation analysis, (2) Secondary data analysis, (3) Description and Evaluation of surveillance system and (4) Journal critique.

Objectives

1. To know the general description and population of South 24 Parganas
2. To know the laboratory resources of South 24 Parganas
3. To know the major public health priorities and Organization of the health system in South 24 Parganas
4. To know the progress of public health in terms of Indicators towards the millennium development goals

1.1.2. Methods

Data source

This report is based on the secondary data collected from district health set up which includes, data collected from the registers and records in Government health facilities including South 24 Parganas Zilla Parishad, interviews of Health /Medical Officers at the District, Sub-division as well as Block Primary Health Centre (BPHC) level and in Primary Health Centre (PHC), interviews with laboratory personnel at the District, Sub-division and at the PHC level, interviews of senior personnel in health related sectors like animal husbandry, social welfare and discussion with State and District level officers for health and

other health related departments to know major public health priorities and progress of public health in terms of Indicators towards the millennium development goals of South 24 Parganas and state..

Data collection

One health personnel each from each of the following health care institutions were interviewed: Block Primary Health Centre, Primary Health Centre, Rural hospital (RH)/Community Health Centre (CHC), Subcentre (SC), Health Posts at the Zilla Parishad level, Government hospital, district and state health office.

1.1.3. Results

Description of the field posting location

Location

With one international frontier, Bangladesh on the west, South 24 Parganas is one of the eighteen districts of West Bengal, located between 22deg 33' 45"N latitude in the North and 21deg.29"N latitude in the South and 89 deg. 4'50"E longitude in the East and 88 deg.3'45"E in the West. It is surrounded on the north by the Metro city, Kolkata; on the east is the river Ganges separating the district from Hooghly district and East Midnapur district and on the south is the Bay of Bengal.

The district has 29 blocks, of which 13 falls in the Sundarbans region. The Sundarbans region constitutes the southern fringe of South 24 Parganas where the land gradually disappears into the sea. Being a delta, it is criss-crossed by numerous rivers such as the Ichamati, Kalindi, Raimangal, Herobhanga, Bidya, Gosaba, Matla, Thakuran, Saptamukhi and the Muriganga all flowing into the Bay of Bengal. All the estuaries, rivers and creeks carry saline water due to daily tidal inflow and outflow. An intricate mesh of channels connects them with one another, so that the whole tract presents a tangled network of waterways. The periphery of the islands is a swampy mass, covered with dense low forests and scrub wood jungles.

Area

South 24 Parganas is one of the most densely populated districts of the Indian Union, with more than 694 persons per sq km. Total land area, according to West Bengal Government Land Survey, is 9960 sq kms.

Climate

The district has three main seasons- hot dry, from March to June, hot wet, from July to September and cool from October to February. The South–West monsoon determines the weather and rainfall on which the harvest cycle partly depends.

Natural resources

The soil of the district is almost ideal for vegetable cultivation. Sal and Mahogany trees abound in all parts. Paddy, wheat, sugarcane and pulse grains are among the cash crops. According to District Land Revenue Office, South 24 Parganas net cropped area is 3,98,070 hectares and according to State Forest Department the area under forest is 4,26,300 hectares (Source: Directorate of Agriculture, Govt. of West Bengal.).

Agriculture

Majority of the people living in rural areas rely for their livelihood on agriculture. The agriculture sector is characterized by the predominance of small marginal farmers who operate more than 68% of the total operated areas of the state.

Breakup of population by rural and urban area

In South 24 Parganas there are 58,19,285 persons living in the rural areas, of which 29,94,870 are males and 28,24,415 are females. 10,89,730 persons are living in the urban areas, of which 5,69,371 are males and 5,20,359 are females.

Socio-demographic characteristics of the local population

Population

Inhabited by several ethnic and religious groups, South 24 Parganas is a district characterized by religious harmony, racial and linguistic tolerance and regional amity. All sections of the society including scheduled castes, scheduled tribes and backward classes live here with dignity and honour, alike. The total population of South 24 Parganas, according to 2001 census, was 69, 09,015 and of this total 35,92,688 (52%) are males. Of the total population 69% are Hindus, 30% are Muslims, 1% Christians and others. About 35 % of the population belongs to scheduled castes while over 1% belongs to various tribal groups (Table 1).

Occupation

As per 1991 Census, 29 % of the total population of the District is classified as workers and the 72 % as non-workers. Of the main workers, 63% are cultivators and 3% agricultural labourers, 1%are engaged in household industries and 32%in other activities.

In South 24 Parganas district 67% people have a monthly income, which is below the poverty line.

Literacy

70 % the total population is literate, males constituting 80 % and females 60%.

Organizational structure of the health system in South 24 Parganas

The Chief Medical Officer of Health is controlling and monitoring officer of the district of South 24 Parganas. He works directly under the Director of Health Services, West Bengal. In the directorate different senior officer work under the leadership of Director of Health services to look after different National Program of health. In the district the Chief Medical Officer of Health supervise and monitor different National Program with the help of different officers like Chief Medical Officer of Health I, II, III, District Maternal and Child Health Officer, District Leprosy officer, Assistant Chief Medical Officer of Health of different subdivision (Figure 3). In the Block medical Officer of Health supervise and monitor all program in the block with the help of Second Medical officer, Block Public Health Nurse, Computer, Block Sanitary Inspector, Malaria Inspector, Sanitary Inspector, Social Welfare Officer, Multipurpose Health Supervisors and Multipurpose Health Worker (Figure 4). M. R. Bangur Hospital, located at Tollygaunje, acts as the district hospital. Except the Sadar subdivision, all the other four subdivisions have a sub divisional hospital. Besides, there are four state general hospitals, nine rural hospitals, 21 block primary health centres and 63 primary health centres. The district hospital, the sub divisional hospitals and the state general hospital together have 1424 beds. The hospitals situated in the rural areas have 906 beds. There is one ESI hospital with 300 beds. Central government runs one hospital in the district, which has 143 beds. Five hospitals under the local bodies have 88 beds and six more hospitals are managed by voluntary organizations, which have 684 beds. Altogether there are 115 health units with 3545 beds. This includes 259 beds for cancer patients, 60 for maternity and 150 for mental patients. Under the District Family Welfare Bureau, South 24 Parganas there are nine post-partum units and 738 sub-centres, out of which 509 are located in backward areas. There is one doctor for 2033 persons and one nurse for 1726 persons in the district during the year 2002. There are 12 State Ayurvedic Dispensaries and 27 State Homoeopathic Dispensaries functioning in the district. The government spent Rs 147 per capita on health and about Rs 23 per capita on family welfare during 2000-01 (Figure 2).

National Health/Disease Control Programme in South 24 Parganas District

The district is providing promotive, preventive, curative and rehabilitative health services to people. Specific public health problems are being managed through implementations of national health programmes, which are (1) Reproductive and child health programme, (2) National Aids control programme, (3) National Kala-azar programme, (4) National Leprosy control programme, (5) National programme for prevention of Blindness, (6) National anti-Malaria programme, (7) National Iodine deficiency disorders programme, (8) School health services programme, (9) Revised National Tuberculosis Control Programme, (10) National Filariasis Control Programme, (11) National Cancer Control Programme, (12) National Mental Health Programme and (13) National Diarrhoeal Disease Control Programme.

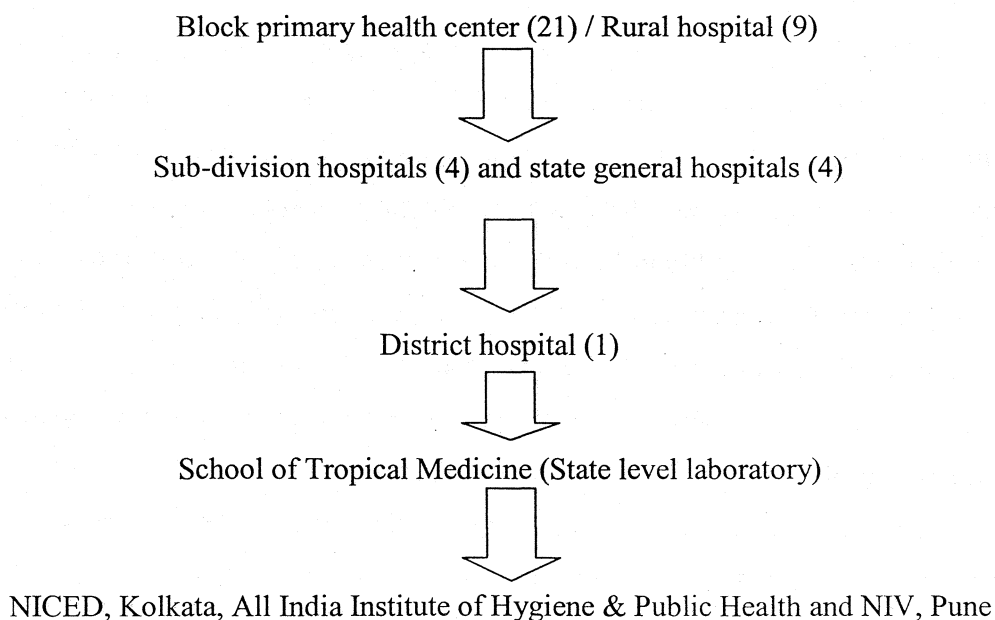
Integrated Child Development Scheme

The state is covered under ICDS scheme providing the defined package of services to children and pregnant women through 51528 Anganwadi workers. The projects have contributed immensely in improving the health of the beneficiaries, women and children.

Description of the local laboratory resources

Graded laboratory services are available at block primary health centers, State General, Sub-Divisional and District hospitals. State Health System Development Project II provided funds to expand the laboratory facilities at five block primary health centers at Sundarbans area and at all the twelve Rural Hospitals, four State General hospitals, four Sub-Division hospitals and the District Hospital both in terms of manpower and material input.

Flow chart of Government Laboratories facilities



District Hospital (DH) level

Routine hematological, urine & stool, semen and aspirated fluid analysis tests are carried out at this level. But histopathology, Pap smear, Fine needle aspiration cytology, sputum cytology, bone marrow, Immuno-hematology, coagulation disorder, sickle cell disease, thallasaemia, microbiology, culture sensitivity blood sugar, blood urea nitrogen, cerebrospinal fluid analysis, GTT, Blood gas analysis, estimation of CPK, CPK-MB, serum electrolytes, acid phosphatase, alkaline phosphatase, lithium carbonate level in blood were planned but these tests are not done at this level. There are two pathologists and six laboratory technicians posted at this level.

Sub-Divisional / State General hospital level

Routine hematological, urine & stool, semen analysis tests are carried out at this level. Tests like blood urea nitrogen, creatinine, cerebro spinal fluid analysis, liver function test, cholesterol, GTT, lipid profile, Blood gas analysis, estimation of CPK, CPK-MB, serum electrolytes, acid phosphatase, alkaline phosphatase, lithium carbonate level in blood are planned but not done now. One pathologist and three technicians are in place at all the sub-divisional hospitals.

Rural Hospital and Block Primary Health Centre level (BPHC)

The laboratory service at BPHC level is actually limited to examination of malaria slides and sputum microscopy for acid-fast bacillus in most of the institutions. Routine blood test, urine and stool analysis were done. Only one technician is in place at most of the centers doing the malaria surveillance work only.

Primary Health Centre (PHC) and Sub-Centre

There are no laboratory services at the PHC and the sub-centers but active and passive blood slides are collected from all fever cases for examination of Malaria parasite. In some PHCs in the Sundarbans area blood samples are collected from suspected Kala-azar patients in Whatman filter paper for Direct Agglutination test. Morbidity profile of major diseases of the district for the year 2001 include water and food born diseases, respiratory diseases, kala-azar, skin diseases, injuries and wounds and cerebrovascular / cardiovascular diseases.

Involvement of laboratories in disease surveillance and in outbreak situation

In the BPHCs and Rural hospitals, laboratories are routinely utilized for only malaria and tuberculosis passive surveillance. This is applicable for higher tier hospitals also. None of these laboratories were involved in the laboratory investigations of public health

emergencies. The district hospital has facility for water testing which other institutions have rarely utilized. All these facilities can support in surveillance activity and during epidemic emergencies by laboratory back up of different level.

Malaria laboratories

There was facility of examining malaria slides at ACMOH offices at different sub-divisions, but one malaria clinic is functioning at ACMOH office, Diamond Harbour.

Involvement of laboratories in private sector

There are 235 Nursing Homes, 489 Laboratories and other clinical establishments (X-ray, Ultra Sonography, Physiotherapy clinics etc.) licensed to function in this district as per clinical establishment act. Most of the private laboratories are located at Baruipur and Diamond Harbour sub-divisions. However, necessary investigations suggested that none of the private laboratories has been involved in the disease surveillance and during investigation of the outbreaks. Rather they were unaware of this. There is no decision at the policy makers' level for involving them.

District level Public Health laboratory

The district level public health laboratory was not functioning properly. Some material input had been given. Arrangements for bacteriological testing of water, diagnosing facilities of Kala-azar and malaria, preparation of transport media for stool culture have been made. But unfortunately, it was not functioning properly.

Description of the local public health priorities

Diarrhoeal diseases

This is the largest cause of morbidity in the district. Natural water bodies like rivers; khads, nallahs, lakes and ponds etc. are used as sources of drinking water. They are frequently exposed to contamination through pollutants during rainy seasons. There were 144,411 cases (incidence: 21 per 1000 population) and 21 deaths (case fatality rate: 0.03%) due to diarrhoea in the district in 2003.

Acute Poliomyelitis

Polio cases were regularly detected in this district during the last five years. Seven, two, three, twenty and one case was identified during the calendar year of 2000, 2001, 2002, 2003 and 2004 respectively. Since then no new case has been detected.

Kala-azar

The annual reported number of cases and deaths are increasing during the last five years in South 24 Parganas district. There were 116, 151, 179, 145 and 797 kala-azar cases during 2000, 2001, 2002, 2003 and 2004 respectively. The four blocks of Canning sub-division has been declared a high-risk area for Kala-azar. Basanti block is the epicenter of the district. It seems that population movement introduced the disease from high endemic adjoining areas of Bihar and Bangladesh.

Respiratory disease

Respiratory diseases, including tonsillitis, acute and chronic bronchitis, form one of the major causes of morbidity. High population density leading to clustering of people in small rooms favors the transmission of respiratory diseases infection that usually spreads in the form of aerosols. Moreover people in the villages still depend on wood as a fuel for cooking. 90% of the population is residing in the rural areas. The smoke emanating from the firewood may be another risk factor for morbidity of respiratory diseases.

Cerebrovascular / Cardiovascular diseases

This is the major cause of mortality recorded in the District Hospital. Life style changes, hypertension, diabetes, depression, smoking, obesity, alcoholism, etc. are the major risk factors for Cerebrovascular / Cardiovascular diseases.

Wound & Injuries

Road traffic accidents are high all over West Bengal including South 24 Parganas. This is probably due to poor road conditions, dense population and heavy traffic. Clashes among supporters of political parties are common. At the villages feud between peasants and the landlords lead to injuries. West Bengal, being industrialized state occupational injuries is common.

Skin diseases

People usually do not practice personal hygiene. Self-medication, traditional beliefs and taboos also favour the spread of the skin diseases. Lack of specialized care at the block and sub-divisional level also contribute to the prevalence of skin diseases.

Indicators towards the millennium development goals

Table 2 indicates present health status related to indicators towards the millennium development goals in South 24 Parganas district, West Bengal, India. It also reflects a comparison related to state and country.

1.1.4. Discussions

Situated in the Southern part of the state West Bengal, South 24 Parganas district has moderate climate and heavy rainfall. It is one of the most densely populated districts of the Indian Union. About 36% of the population belongs to scheduled castes and scheduled tribes. Two third of its population has an income below the poverty line. The district has 13 blocks (60% of the total area), which falls, in the Sundarbans region. The saline water carried by the estuaries, rivers and creeks from the tidal inflow of Bay of Bengal affects the agriculture of the non-industry based district and in turn the economy of the people. Poor economy, little literacy (particularly female literacy) and inadequate infrastructure support reflected to high prevalence of public health problems related to almost all public health diseases. Indicators of millennium development goals are far away from target demands special attention and specific micro plan.

The sub tropical climate with heavy precipitation makes the district flood prone. This results in dominancy of waterborne and vector borne diseases in the district particularly in post monsoon. Poor economic reflects in results of high prevalence of diarrhoea, tuberculosis and kala-azar in the district.

Poliomyelitis is the public health priorities in the district as a part of international eradication. The continuance of identification of polio cases during the last five years is a matter of great concern nationally and internationally. Though the district is free from poliomyelitis since August 2004 existence of case to adjacent districts demands high quality acute flaccid paralysis surveillance, in addition to other eradication activities including routine immunization. Diarrhoeal disease is the second public health priorities for high incidence rate and case fatality rate particularly in Diamond Harbour sub-division of the district. Kala-azar is endemic in the Canning sub-division of the district. There is a steady increase of case reporting during the last five years, especially during 2004.

South 24 Parganas has a good health care delivery system up to the village level. It follows the recommendation of the Bhore Committee for comprehensive health care. But the distribution of the health units is not even. Most of the hospitals are located in the urban areas. Remote villages of the Sundarbans of South 24 Parganas are still devoid of primary care. There is also uneven distribution of health manpower. Some of the health units remain without prescribed number of medical officers and supporting staff. Institutions located in comfortable areas are better staffed than those in rural and remote areas. This results in undue referrals and delayed treatment. The existing primary health care facilities are under

utilized because of ill-defined referral system. The secondary and tertiary care centres, as a result are over crowded. This dilutes their effectiveness, as they have to perform the dual role of primary, secondary or tertiary level health care. Moreover, there is no urban primary health care setup in the district resulting in over-crowding in zonal, district and sub-divisional hospitals.

Private sector involvement in health care is confined to some focal areas of the district. There is a need to establish a mechanism by way of which non-government health institutions deliver a quality health care of desired level. Need is to have memorandum of understanding between the private and public health sector so that duplication of efforts and wastage of resources is reduced. NGOs and voluntary organizations are still in infancy in the district.

The laboratories at district, sub-divisional and state general hospitals have good infrastructure but are not doing many of the investigations, which they are supposed to do. Number of technicians at most of the centers was found to be sufficient. Supply of consumables and reagents were found satisfactory. Equipments were found to be sub-standard as per the opinion of the doctors and staff and there was no effective system of maintenance. If its full resources and infrastructure are utilized, it can act as a reference laboratory for different tests necessary for surveillance of diseases of public health importance and during outbreak situation. The district needs a full-fledged functioning public health laboratory for proper discharge of disease surveillance and outbreak control.

At present private laboratories play little role in disease surveillance but they diagnose many diseases first. By informing any unusual occurrence to the appropriate authority, they can 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.

Some health related millennium goals indicators are not available in the district like under five mortality rate per 1000 children, HIV prevalence among 15 – 24 years of all women, condom use rate of the contraceptive prevalence rate, number of children orphaned by HIV / AIDS to comments. Target of Goal 4 is to reduce the under-five mortality rate by two-thirds, which is two third of 123 per 1000 between 1990 and 2015 but 1999 no data are available pertaining to this indicator. However West Bengal had under-five mortality rate in district and state is much less than national level in the year 2003. Goal 5 target is to reduce by three-quarters, between 1990 and 2015, the maternal mortality ratio. The district level figure is 288 per 100000 live births that are higher than the state level figure but better than

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the national level figure. Death rate and prevalence of Tuberculosis both are less in the district and in the state in comparison to the national level. Proportion of tuberculosis cases detected and cured under DOTS is also higher in the district as well as in the in comparison to the national level.

In the district level some data are regularly generated but some data pertaining to the indicators of millennium development goals are not being generated and for this, some modifications are required in the forms (data collection instruments). In addition to this, analysis of the raw data are to be done at the level of block and district also so that the officer concerned can take appropriate measures at their own level as per the result of analysis.

Conclusions

Health situation analysis of South 24 Parganas district provides me a unique opportunity to understand the local health related priorities of the district. Though the district has a good health infrastructure extending upto the village level, many communicable and non-communicable diseases are still endemic. Morbidity and mortality due to acute diarrhoeal disease is a major public health problem in the district of South 24 Parganas. Though sudden rise of incidence rate of Kala Azar in the year 2004 was due to political demand but occurrence of cases in South 24 Parganas, is definitely an alarming situation. District level figure of Maternal Mortality rate is very low in comparison to the State and National level.

Recommendations

Conduct a secondary data analysis on acute diarrhoeal disease.

Evaluate the surveillance system existing in the district for acute diarrhoea during the second field posting.

Evaluate the Kala-azar control programme functioning in south 24 Parganas district to know whether the problem comes from a failure to apply the proposed programme strategies or from its limitations.

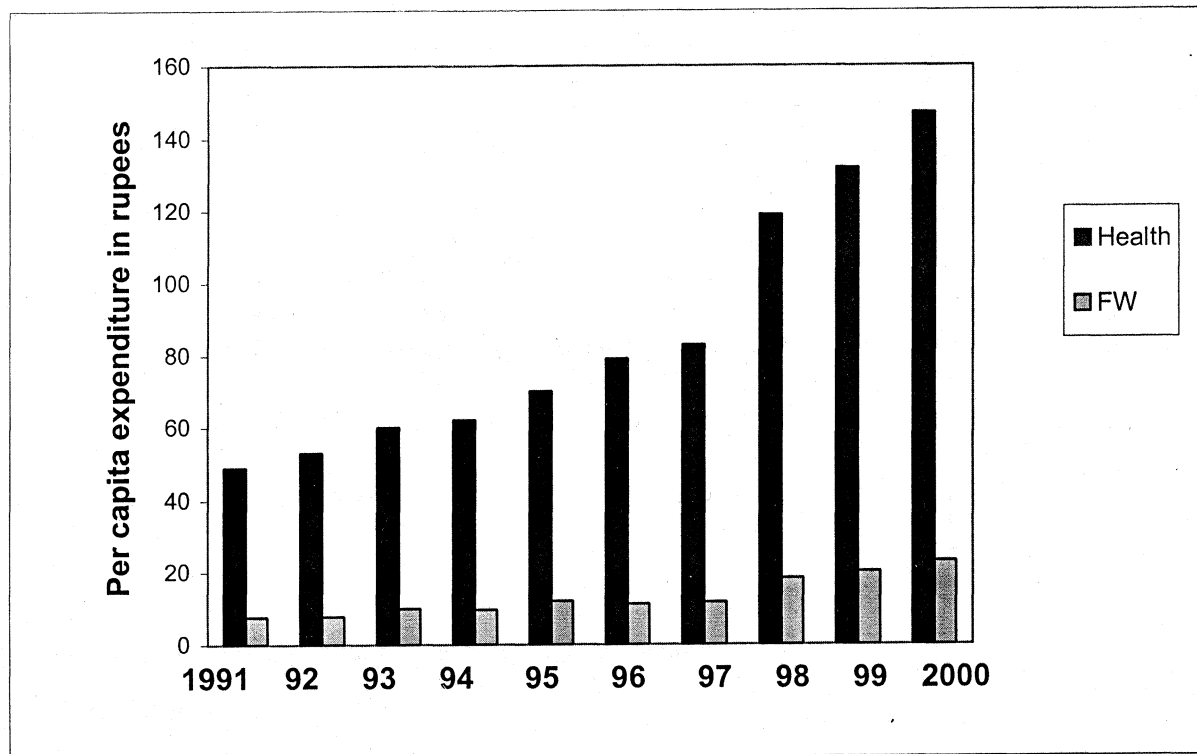
Reference

1. Health on the march West Bengal 2002-03.
2. District Statistical Hand Book 1999 and 2000 (Combined).
3. Strengthening of Secondary Level Hospital Services in West Bengal – Project Proposal.
4. Census of India 2001.
5. Economic Review; 2002-2003, Government of West Bengal.
6. Sample Registration System, 1998.

Table 1. Demographic characteristics of the population of South 24 Parganas district, West Bengal, India, 2001.

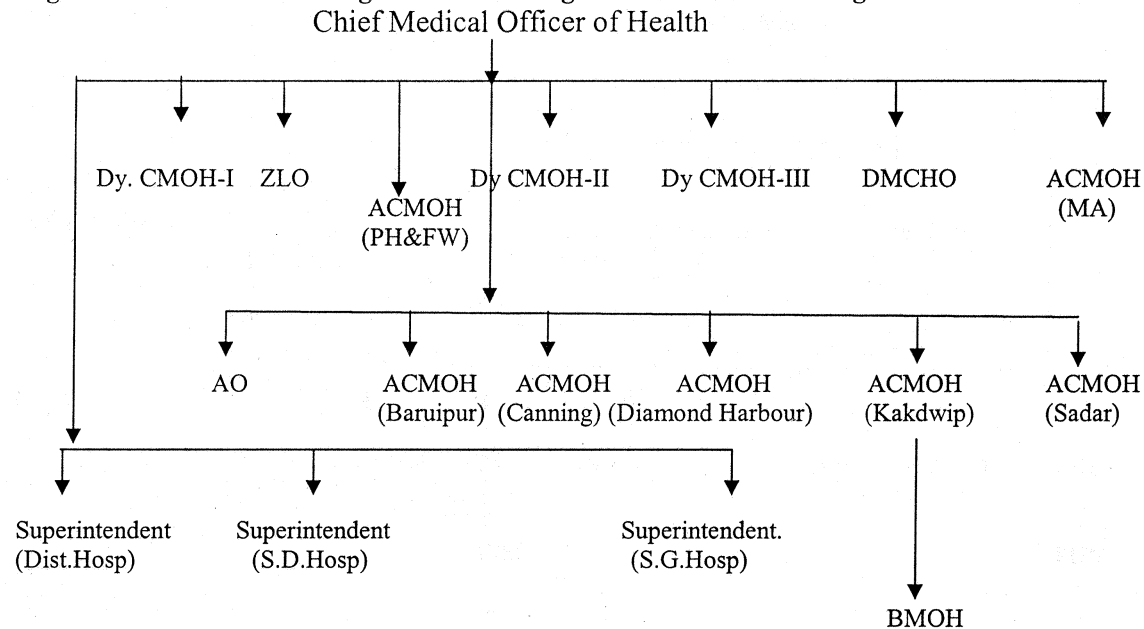
Characteristics		n = 69,09,015	%
Age	0 – 1 years	1,45,089	2.1
	1 – 4 years	9,18,899	13.3
	5 – 14 years	14,71,621	21.3
	15 – 44 years	32,05,783	46.4
	45 – 60 years	7,18,537	10.4
	60 + years	4,49,086	6.5
Gender	Males	35,92,688	52.0
	Females	33,16,327	48.0
Religions	Hindus	47,74,129	69.1
	Christians	62,181	0.9
	Muslims	20,65,796	29.9
	Others	6,909	0.1
Community	Schedule Caste	23,49,065	34.0
	Schedule Tribe	82,908	1.2
	Other Backward Class		
	Other Caste		
Household monthly income	< Poverty line	46,35,258	67.0
Literacy rate		41,28,545	70.2

Figure: 2. Per capita expenditure on Health and Family Welfare in South 24 Parganas, West Bengal, 1991-2000



District Level Organization Chart- South 24 Parganas

Figure 3. Flow chart showing district level organization-South 24 Parganas



Note

Dy.CMOH – Deputy Chief Medical Officer of Health

ZLO – Zonal Leprosy Officer

DMCHO – District Maternal and Child Health Officer

ACMOH – Assistant Chief Medical Officer of Health

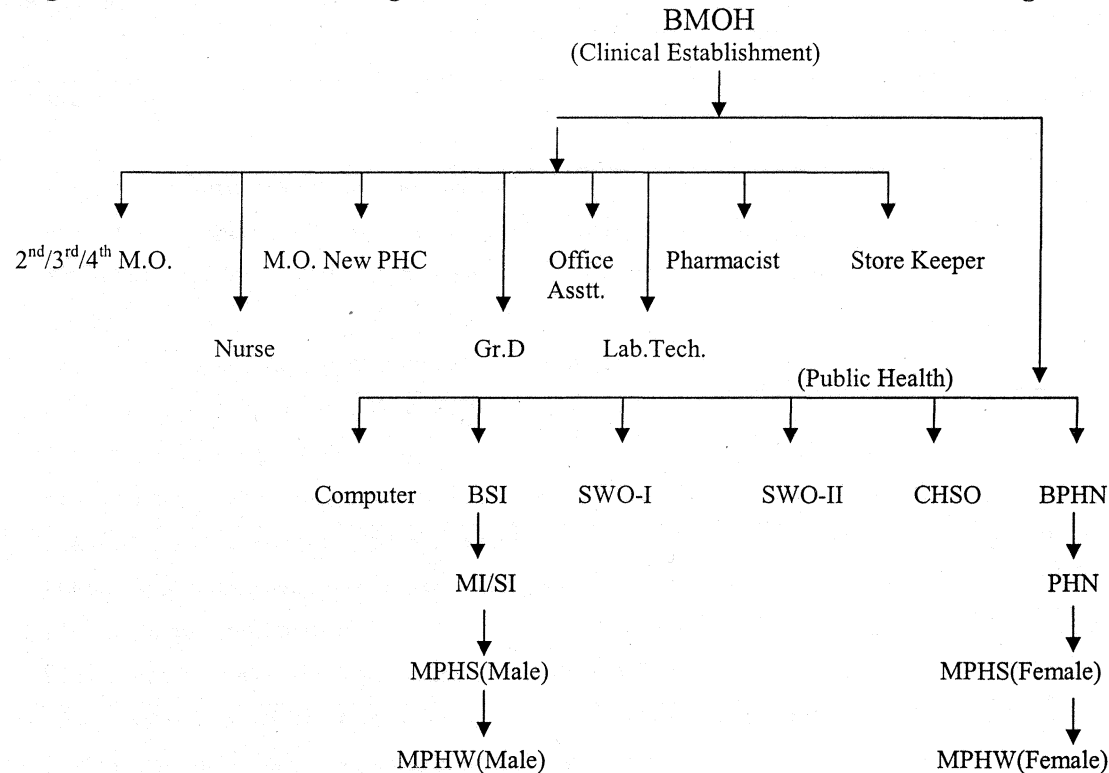
PH&FW – Public Health and Family Welfare

MA – Medical Administration

BMOH - Block Medical Officer of Health

Block level health administration

Figure 4. Flow chart showing block level health administration-South 24 Parganas



Note

M.O.– Medical Officer

Gr.D – Group D staff

SWO – Social Welfare Officer

MI – Malaria Inspector

MPHS – Multipurpose Public Health Supervisor

PHC – Primary Health Centre

Lab. Tech. – Laboratory Technician

CHSO – Community Health Supervising Officer

SI - Sanitary Inspector

MPHW - Multipurpose Public Health Worker

Asstt. – Assistant

BSI – Block Sanitary Inspector

BPHN – Block Public Health Nurse

PHN - Public Health Nurse

Table 4. Indicators of progress for the health related millennium development goals, South 24 Parganas, West Bengal, India, 2003

Goal	Indicator	Value of the indicator		
		In South 24 Parganas (Year)	In West Bengal (Year)	In India (Year)
Goal 1	Percent of children under three years underweight	NA	48.7 ⁶ (1998)	47.0 ⁶ (1998)
	Proportion of population below minimum level of dietary energy consumption	NA	NA	NA
	Percentage of children 12-59 month of age who received one dose of vitamin A in the past six months	NA	43.4 ⁶ (1999)	29.7 ⁶ (1999)
	Percent of children under age 0-3 months on exclusively breast fed	NA	48.8 ⁶ (1999)	55.2 ⁶ (1999)
Goal 4	Under-five mortality rate per 1000 children	NA	67.6 ⁶ (1999)	87.0 ¹⁰ (2003)
	Infant mortality rate per 1000 live birth	51 ⁵ (2002)	49 ⁴ (2002)	63 ⁴ (2002)
	Measles immunization among children under one	86 ⁹ (2004)	75.49 ⁷ (2003)	67.0 ¹⁰ (2002)
Goal 5	Maternal mortality ratio per 1,00,000 live birth	39 ⁹ (2004)	266 ⁷ (1998)	540 ¹⁰ (2001)
	Proportion of births attended by skilled health personnel	73 ⁹ (2004)	44.2 ⁶ (98-99)	42.5 ¹⁰ (2001)
	Eligible Couple protection rate i	47 ⁷ (98-99)	47.00 ⁷ (98-99)	47 ¹⁰ (2000)
	Percentage of women receiving antenatal care ii (three ANC)	63 ⁷ (03 – 04)	58.6 ⁷ (03 – 04)	41.3 ⁶ (98 – 99)
Goal 6	HIV prevalence among 15-24 yrs old pregnant women iii (15 – 24 yrs women)	NA	NA	0.7 ¹⁰ (2001)
(HIV)	Condom use rate of the contraceptive prevalence rate	NA	7.1 ⁶ (98 – 99)	7.2 ⁶ (98 – 99)
	Number of children orphaned by HIV/AIDS	NA	NA	NA
	Percentage of people using a condom during most recent higher risk sexual encounter	NA	NA	49.3
	Percentage of STI clients who are diagnosed and treated according to guidelines (in Family Health Awareness Campaign 2003)	82 % ⁸ (2003)	86% ⁷ (2003)	89 % ¹¹ (2003)

**Table 4 (contd.). Indicators of progress for health related millennium development goals, South 24 Parganas,
West Bengal, India, 2003**

Goal	Indicator	Value of the indicator		
		In [location] (Year)	In the state (Year)	In India (Year)
HIV	Percentage of HIV-positive women receiving anti-retroviral treatment during pregnancy to prevent mother to child transmission of HIV- January 2003 to June 2004	NA	NA	84.5 % ¹¹ 2003
Goal 6 (Malaria) iv	Malaria death rate v	0 ⁸ (2004)	0.004 ⁷ (2004)	0.003 ¹⁴ (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	NA	NA	NA
	Percentage of pregnant women who have taken chemoprophylaxis or drug treatment for malaria	NA	NA	NA
	The proportion of households having at least one insecticide treated bed nets	NA	NA	NA
Goal 6 (TB)	Prevalence and death rate associated with tuberculosis	Prevalence =0.04 Death rate = 0.0002 ⁷ (2004)	Prevalence =0.1 Death rate =0.002 ⁷ (2004)	Prevalence =0.06 Death rate =0.005 (2003)
	Proportion of tuberculosis cases detected and cured under DOTS	1.15 ⁷ (2004)	1.2 ⁷ (2004)	0.1 ¹² (2003)
	Percentage of estimated new smear-positive tuberculosis cases registered under the DOTS approach	38 % ⁸ (2003)	58 % ⁷ (2003)	47% ¹³ (2003)
Goal 7	Proportion of population with sustainable access to an improved water source, vi urban and rural	99 ¹ (2001)	89.3 ⁶ (1999)	77.9 ⁶ (1999)
	Proportion of urban population with access to improved sanitation vii	11 ¹ (2001)	55 ⁶ (1999)	64 ⁶ (1999)
Goal 8	Proportion of population with access to affordable essential drugs on a sustainable basis viii	NA	NA	NA

1.2. Secondary Data Analysis on acute diarrhoeal disease epidemiology – South 24- Parganas district, West Bengal, 2004

1.2.1. Introduction

Though acute diarrhoea is preventable, treatable and curable, it is considered as an exceptionally complex disease. Analysis of diarrhoeal situation is the essential basis and mandatory for planning anti diarrhoea action based upon the epidemiological characteristics. A complete analysis would include a description of distribution of the disease (infection) and its consequences (morbidity, mortality and economic losses) and an explanation of that distribution in terms of its causal factors (geographical, physical, environmental, biological, social, political and economic) ¹. It is clear that in reality complete analysis is practically impossible, and therefore diarrhoeal disease control will often have to be planned with imperfect knowledge. However, an important component of any plan should be to collect the additional, valid information necessary for replanning purposes, thereby improving the programme as it progresses. Many factors contribute to the epidemiology of diarrhoeal diseases, such as distribution and relative prevalence of agent and their response to drugs, the economic and geographic characteristics of different areas, socio-economical conditions of the populations, climatic and meteorological factors, which are not uniformly similar through out the national territory. Based upon the analysis of diarrhoeal disease situation, certain key decisions need to be made. These include the relative importance of diarrhoea in the politico-socio-economic context warranting action; opportunistic resources for anti diarrhoea action; the magnitude of planning process necessary for diarrhoea control (which part of the area are more involved, what are the organization and agencies should be involved, how can resource be mobilized); the budgetary resources and limitations: and the extend of investment in infrastructures development.

Acute diarrhoeal disease is major public health problem in developing countries. An estimated 1.8 billion episodes of diarrhoea occur each year and 3 million children under the age of 5 years die of diarrhoea ². In India diarrhoeal disease is a major public health problem among children under the age of five years. In health institutions up to a third of total paediatric admissions are due to diarrhoeal diseases and up to 17 percent of all deaths in indoor paediatric patients are diarrhoea related ³. The household survey conducted during

1994 shows that the morbidity rate in terms of diarrhoea episodes per year per child under five years is about 1.7⁴.

Acute diarrhoeal disease is one of the public health priorities of the district of South 24 Parganas since higher episodes of diarrhea had occurred in under five children in this district (0.2 episodes per year per child under five years) in the year 2003 in comparison to the state of West Bengal (0.05 episodes per year per child under five years) and 50 % of all death of communicable disease was due to acute diarrhoeal disease^{5,6}.

Objectives

1. To describe the pattern of acute diarrhoeal disease in under five years children over a period of time, place and person in the South 24 Parganas, West Bengal, India.
2. To generate hypothesis for further studies pertaining to the acute diarrhoeal disease.

1.2.2. Methods

Study design

We conducted a cross sectional descriptive study based on secondary data

Study population

Our study population was the population South 24 Parganas district of West Bengal, India.

Study Period

We conducted our study between May 2004 and June 2004 and our reference period of study was between January 1999 and December 2003.

Operational definitions

The surveillance system of diarrhoeal diseases operating in South 24 Parganas define diarrhea as the passage of loose, liquid or watery stools. These liquid stools are usually passed more than three times a day⁵.

Data Sources

Records and reports from the Office of the Deputy Chief Medical Officer of Health III, South 24 Parganas and State Bureau of Health Intelligence, Directorate of Health, West Bengal, Swasthwa Bhawan, Kolkata

Data Type

We collected surveillance data

Sampling procedure

We include all available secondary data from 1999 to 2003 of the twenty block primary health centers along with the district and state head quarter.

Data collection procedure

We collected data on demographic characteristics, various diarrhoeal diseases in under five years children. We visited the Office of the Deputy Chief Medical Officer of Health II and Deputy Chief Medical Officer of Health III, South 24 Parganas, to collect data from the records and reports. We explained the purpose of the exercise to respective offices and got a verbal permission, and then we proceeded with the data collection. For the data at community block level we collected it from the office of block medical officer of health (n=20). For the denominators we used data available in the District Statistical Cell, South 24 Parganas, State Bureau of Health Intelligence, West Bengal and Demography & evaluation cell of Health department, Govt. of West Bengal, Swasthwa Bhawan, Kolkata.

Analysis plan

We measured the annual incidence and case fatality ratios of diarrhoeal diseases in all age groups in South 24 Parganas district from 1999 to 2003. We compared diarrhoeal diseases in under five years children cases in South 24 Parganas in comparison in the state of West Bengal. We calculated annual incidence of diarrhoea in South 24 Parganas from 1999 to 2003. In calculation of incidence rates, I have used the estimated population of the state and districts as denominator and number of episodes as numerator, for the case fatality rate the number of attack as denominator and number of death as numerator. We drew seasonal trend of incidence of diarrhoeal disease episodes from month wise epidemiological data from 1999 to 2003 and compared trend. We calculated the trend value by using the method of three years moving averages⁷. We identified endemic geographical areas (community block) of diarrhoea.

1.2.3. Results

Distribution by time

The annual incidence of diarrhoeal diseases for all ages in South 24 Parganas district during the last five years indicates a marginal decrease from 23.9 per thousand populations in 1999 to 20.9 per thousand populations in 2003. The district reached to its peak annual incidence of diarrhoea to 33.6 per thousand populations during 2001 (Figure 1). Three types of diarrhea have been described under diarrhoeal diseases they include simple diarrhea, severe diarrhea and bloody diarrhea.

The case fatality rate for acute diarrhoeal disease declined from 1999 (0.017%) until 2001 (0.007%) and then it showed a rising during 2002 (0.02%) and 2003 (0.033%) (Figure: 2).

The episodes per child under five years of acute diarrhoeal diseases were more in South 24 Parganas than West Bengal for the year 1999 and 2000 but almost same during 2001, 2002, and 2003. The case fatality ratio of acute diarrhoeal diseases in child under five years was less in South 24 Parganas than West Bengal between 1999 and 2003 (Table 1).

Trend

Trend value of episodes in child under five years of acute diarrhoeal diseases in West Bengal were 0.06, 0.08 and 0.09 and trend value of case fatality ratio were 0.07, 0.07, 0.08 for the year 2001, 2002 and 2003 respectively. Trend values of episodes and case fatality ratio of acute diarrhoeal diseases in child under five years in South 24 Parganas remained constant at 0.1 and 0.01 respectively during the years 2001 to 2003 (Table 1).

Seasonality

The trend of incidence of diarrhoeal diseases among under five year children during the last five years (1999 to 2003) indicates perennial transmission with a seasonal variation. The reported episodes of diarrhoea in South 24 Parganas district were high during monsoon season (July – September). During 2001 reports of diarrhoeal diseases under five year children did not indicate much change (figure 3).

Distribution by place

The surveillance data of 2003, shows a range of 3 to 5 / 1000 episodes of acute diarrhoeal diseases per year per child below five years of age in different blocks, median being 17/ 1000 episodes. Sagar block is having lowest (3/1000 episodes) and Canning II is having highest (5/1000 episodes) episodes of acute diarrhoeal diseases per year per child below five years of age. Blocks are categorized by the quartile and shown in figure 4.

Blocks with high endemicity

Blocks having higher incidence of episodes of acute diarrhoeal diseases per year per child below five years of age are: Joynagar (24/1000 episodes), Gosaba (25/1000 episodes) and Joynagar II (25/ 1000 episodes), Magrahat I (28/ 1000 episodes), Falta (40/1000 episodes), and Canning II (50/1000 episodes) (Figure 4).

Blocks with low endemicity

Blocks with lower incidence of episodes of acute diarrhoeal diseases per year per child below five years of age are: Sagar (3/1000 episodes), Bhangore II (6/1000 episodes), Magrahat II (8/1000 episodes), Mandir Bazar (8/1000 episodes), Sonarpur (9/1000 episodes), Budge Budge I (9/1000 episodes), Budge Budge II (9/ 1000 episodes) and Diamond Harbour I (10/ 1000 episodes) (Figure 4).

Distribution by person

While reporting episodes of diarrhoeal diseases, the health workers did not reported the age and gender of the cases in their reporting forms. The health worker sends two monthly-reports regarding diarrhoeal diseases occurring in their sub-centre area. One he sends to deputy chief medical officer II, containing reports of all ages. He sends another report to deputy chief medical officer III, containing reports of under five children. Episodes of diarrhoeal diseases under five were 64%, 71%, 77%, 78% and 68% of the total episodes among all age groups in the year 1999, 2000, 2001, 2002 and 2003 respectively (Table 1).

1.2.4. Discussion

The overall moderate to high incidence rate, higher incidence among children particularly under five children, perennial transmission and low mortality indicates South 24 Parganas district is endemic to malaria. The incidence was highest in 2001. This may be due to overall poor implementation of the diarrhoeal disease control program. Episodes of acute diarrhoeal diseases in child below five years were higher in each year from 1999 to 2003 in South 24 Parganas in comparison to the West Bengal but case fatality ratio is much lower than West Bengal in every year. This may be due to under reporting of death cases. In every year the episodes of acute diarrhoeal diseases in children below five years of age reach the peak of in the months of July to September in the district. Preventive measures can be taken in the month of May every year to bring down the peak. Sagar block reports lowest number of diarrhoea episodes and Canning II reports highest incidence of episodes of acute diarrhoeal diseases per year per child below five years of age during the year 2003. Raw data collected from various health units in the district were not recorded by age and gender distribution.

In South 24 Parganas, various water sources of drinking water include rivers, streams, springs, tube wells, percolation wells, and hand pumps. These sources makes the district

vulnerable to epidemics of water borne diseases because of unsafe drinking water supply due to open air defecation, poor hygienic condition, lack of health education, social customs, superstitious ideas, illiteracy, poverty and influx of migratory laborers into the state. In the district, diarrhoeal diseases are on the rise but mortality has decreased. It shows better health care or better health seeking behavior of the people. Diarrhoea is responsible for large number of infant deaths. National Family Health Survey-2 has estimated the prevalence of diarrhoea for the state to be 31% amongst children under three years of age. The secondary data analysis invites for a comprehensive evaluation of the surveillance system for acute (watery) diarrhoeal diseases in South 24-Parganas district.

Since the peak episodes of the acute diarrhoeal diseases reaches in the month of July to September every year, the preventive action can be augmented from the month of May / June every year and can be sustained up to the month of October. By this measure the episodes of the acute diarrhoeal diseases and case fatality rate can be reduced.

The blocks reporting episodes below median value per child per year, may be implementing the program successfully or they may be underreporting. Other blocks are to be looked after giving special attention to reduce the episodes.

Limitations

The weekly / monthly report of diarrhoeal diseases mainly covers the PHC /district OPD data, hence cannot be considered as complete data. The data collected by health worker in the field is not included in the monthly morbidity report. Non-reporting / under-reporting units in any one-week may lead to serious problems in understanding the disease pattern in the non-reporting units. The study was purely based on the raw data available with the block and district health administrations. This did not examine the completeness of the data, functioning of existing surveillance system, operational issues related to diarrhoeal disease control programme and quality control mechanism. So it may or may not simulate with the actual situation in terms of distribution and magnitude of diarrhoeal disease related morbidity or mortality.

Conclusions

To conclude we can say that secondary data analysis does give a picture of disease burden in the district and gives leads and suggestions for improvement. It helps in prioritizing the resources allocation in the health sector and draws attention towards the limitation of the available data. Primary Health centre, Block Primary Health centre and District level did not analyze data in terms of detection of early signals of epidemic, estimating trend and

estimating straight-line trends. This exercise can help to control the outbreaks, and for planning and budgeting.

Recommendations

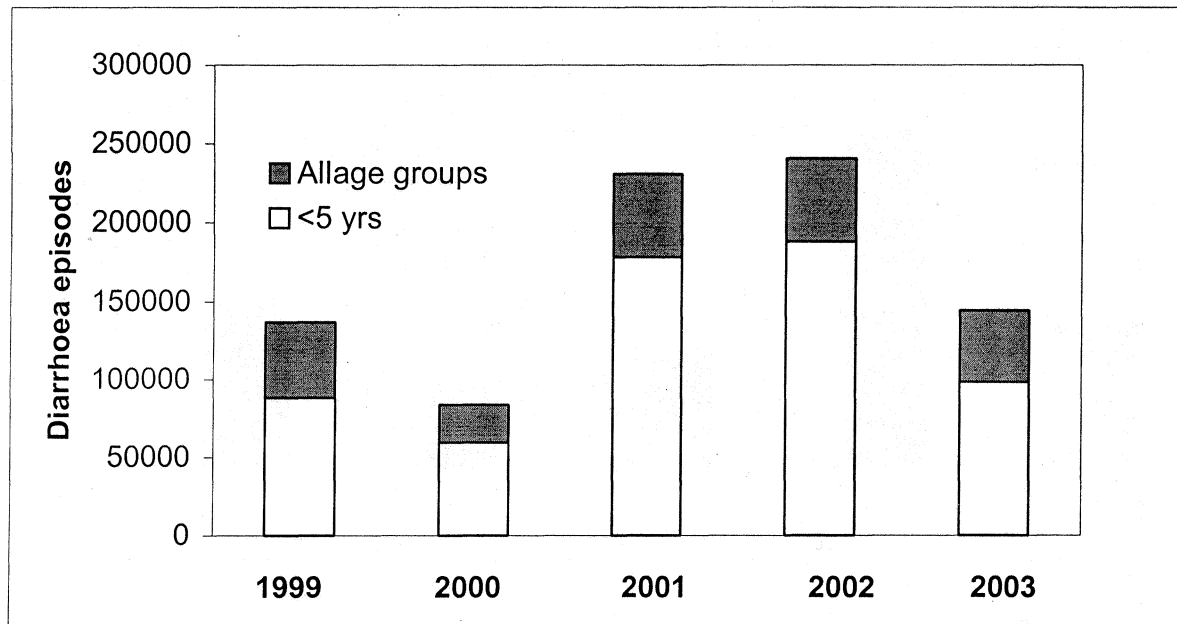
Analyze data in terms of detection of early signals of epidemic, estimating trend and estimating straight line trends in all levels, including primary health centre, block primary health centre, district and state head quarter with their local area data for taking immediate action.

In order to validate secondary data analysis report we recommended conducting an evaluation of surveillance system of acute diarrhoeal diseases and acute diarrhoeal diseases control programme operating in South 24 Parganas district.

Reference

1. Steven M. Teutsch and R.Elliot Churchill, Principles and Practice of Public Health Surveillance, Second edition, Oxford University Press
2. Mata, L. (1986) World Health April 1986
3. Health on March 1999 - 2004, Report published by, Department of health & family welfare, Government of West Bengal
4. Park'S Text Book of Preventive and Social Medicine, 18th edition,
5. Monthly report, Office of the Deputy Chief Medical Officer of Health III, South 24 Parganas
6. Monthly report of State demography and evaluation department, Swasthwa Bhawan, Kol-91
7. Dr. Prasanta Kumar Giri, Jiban Banerjee, Introduction to statistics, Fourth edition, Academic Publishers, Kolkata - 700073

Figure 1. Diarrhoeal diseases of all age groups and under five years age group, South 24 Parganas, West Bengal, 1999 to 2003



Chi square trend: 8.2

Degree of freedom: 1

p-value: 0.084

Figure 2. Deaths due to diarrhoeal diseases of all age groups, South 24 Parganas, West Bengal, 1999 to 2003

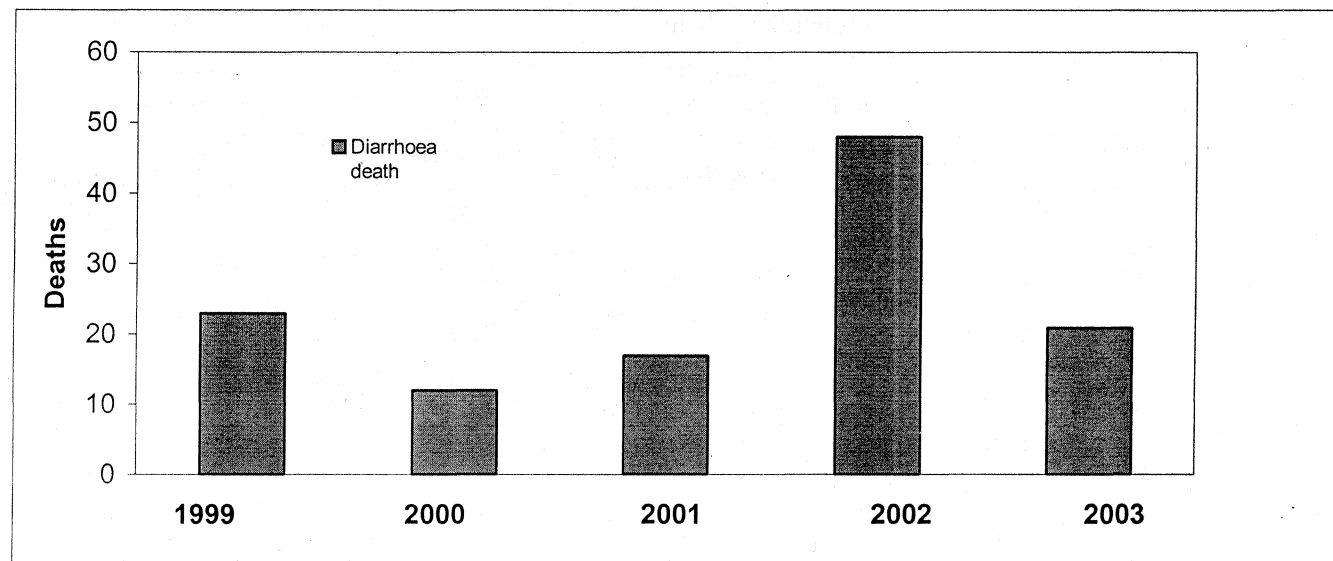


Table1. Diarrhoeal diseases of under five children by episodes, case fatality ratio and trend value, 1999 to 2003, West Bengal and South 24 Parganas, India

WEST BENGAL				South 24 Parganas				
Year	Episodes per under five children	Trend value	Case fatality ratio (%)	Trend value	Episodes per under five children	Trend value	Case fatality ratio (%)	Trend value
1999	0.04		0.05		0.1		0.009	
2000	0.05	0.06	0.06	0.07	0.1	0.1	0.012	0.011
2001	0.09	0.08	0.09	0.07	0.09	0.1	0.012	0.012
2002	0.09	0.09	0.07	0.08	0.1	0.1	0.014	0.014
2003	0.1		0.07		0.1		0.017	

Figure 3. Episodes of acute diarrhoeal diseases in child under five years, South 24 Parganas, 1999 - 2003.

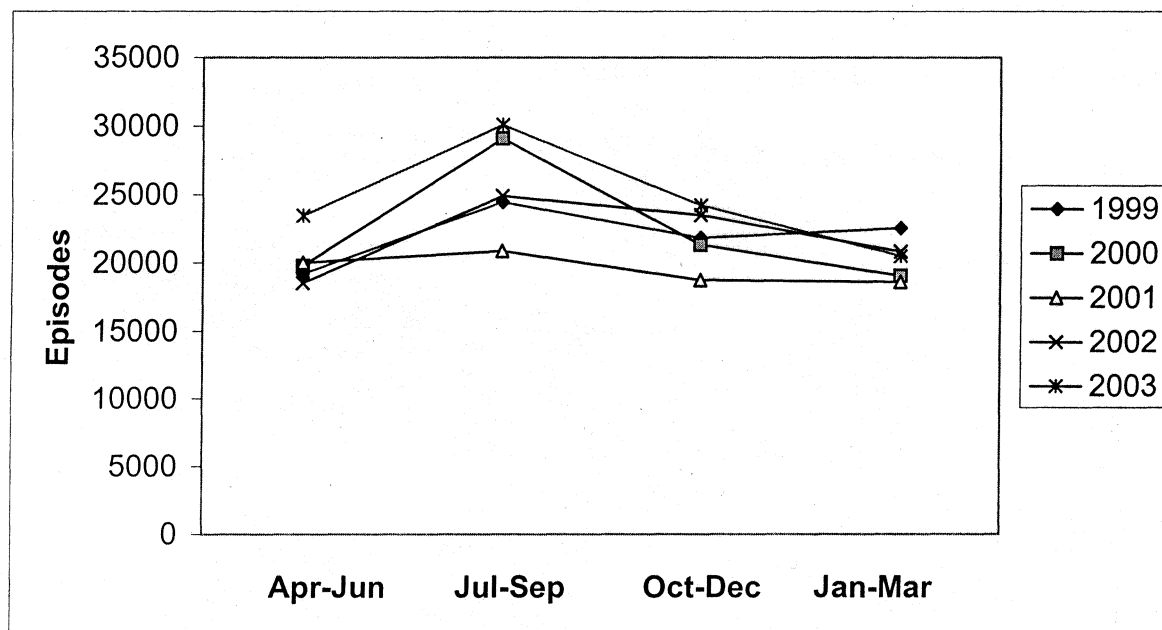
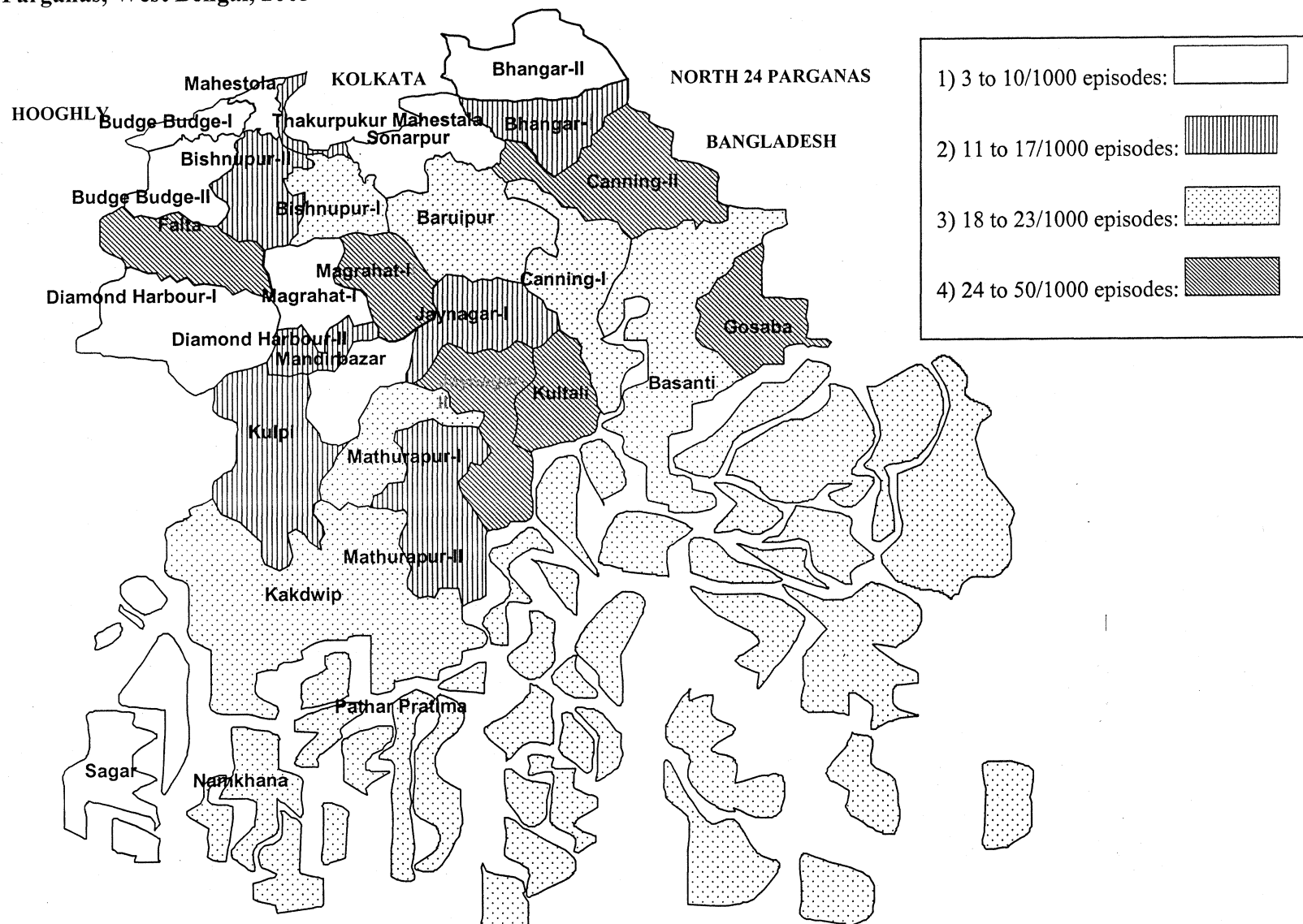


Figure 4. Geographical distribution of acute diarrhoeal diseases episodes per year per child below five years of age, South 24 Parganas, West Bengal, 2003



1.3. Critical Review of Vulnerability to Homicide in Karachi: Political Activity as a risk factor.

1.3.1. Introduction

Mian *et al* and others had done a case control study on political violence. They conducted the study to identify risk factors for becoming a homicidal victim in a high violence area of Karachi. This is a useful contribution to an under-explored field. While numerous publications concerning epidemiology and public health and war, refugees, exile and asylum, have emerged in the two decades, reflecting the increased attention being devoted to humanitarian issues, debate on state violence and of the risks by those challenging the policies of undemocratic states is often neglected. This reflects, in part, the risks faces by both researchers and their informants in such politically charged environments.

The authors in their study, interviewed families of 35cases, individuals intentionally killed through acts of violence between January 1994 and January 1997, and 85 community-based controls, frequency matched by sex, from Orangi, a high violence area of Karachi. Thus providing evidence in support that homicide victims were at greatest risk of becoming homicide victim. Title of the study suggests that it is a highly interesting study dealing a very sensitive issue. Objective of the study is understood and it is clearly specified in the document.

A. Description of evidence

Exposure

In this study, the exposure was the experience of organized political violence among politically active people in a high violence, low socio-economic area of Karachi.

The author and his team had interviewed families of 35 cases, individuals, intentionally killed through acts of violence between January 1994 and January 1997. Eighty-five controls were recruited from a sub-set of households enrolled in a related study conducted at the same time in the same 15 neighborhoods.

Same exposure status, ie, the experience of organized political violence was assessed in 85 community based controls. The frequency was matched with the case subjects for sex.

To deal with age as a confounder (the age differences between cases and controls), a separate analysis was done with 35 cases and 85 controls.

Outcome

The outcome under investigation was political violence leading to homicide.

The initial hypothesis of the study was that homicide in the high violence, low socio-economic areas of Karachi, was a result of organized political violence and so people who were politically active would be at risk of homicide.

The major outcome of the study was:-

- 1) Individuals who were killed were 13 times more likely to be an active member of a political party (Odds Ratio: 13; 95% CI: 2.9 – 62.9; $P < 0.001$).
- 2) People who were killed in Orangi were 34 times more likely to have frequently attended political processions, 19 times more likely to have attended political meetings and 17 times more likely to have hold an important position in a political party.
- 3) People who were killed in Orangi were six times more likely to have previously arrested than controls (65% versus 35%; Odds Ratio: 6.0; 95% CI: 1.8 – 21; $P < 0.001$).
- 4) Cases were 12 times more likely to come from families in which another family member had been arrested (80 % versus 20%; Odds Ratio: 0.42; 95% CI: 2.2 – 91; $P < 0.001$)
- 5) Among people who were politically active, those who were killed were no more likely to be arrested than controls (45% versus 66 %; OR: 0.42; 95% CI: 0.1 – 9.7; $P < 0.52$).
- 6) Among those who were not politically active, people who were killed were much more likely to have been arrested (25% versus 5%; Odds Ratio: 6.5; 95% CI: 1.4 – 31.7; $P: 0.003$).

1.3.2. Method

Design

It was a case control study.

Study population

Case

A case was defined as an individual who lived in Orangi and was killed in Orangi between January 1994 and January 1997, due to intentional violence by firearms, sharp or blunt trauma.

Control

Controls were 'neighborhood controls', recruited from a subset of households enrolled in a related study, ie, 'The Burden of Violence Study', conducted at the same time in the same 15 neighborhoods. Orangi instead of Korangi (the area with highest number of violent injuries) was chosen for the study because the 'Orangi Pilot Project', a trusted community-based non-government organization, was willing to co-operate with the project.

Karachi municipal government divides Orangi into 103 neighborhoods. The study was focused on identifying cases in the 15 neighborhoods within Orangi, which Orangi Pilot

Project workers identified as the highest violence neighborhoods in the area. Field workers from the Orangi Pilot Project directly identified households within these neighborhoods where they knew someone had been killed. In a few cases they also contacted other social organizations in the community to help identify homicide victims they were aware of in the community. Members of the Orangi Pilot Project or other community-based organizations introduced the study team to each household, which had suffered a homicide. Of the 37 cases identified by community organizations in high violence areas of Orangi, 35 (95%) agreed to participate in the study.

The interview team designated any individual in the 18 to 60 – year age group in the household as a control, provided there were no other family members that fitted the case definition. They enrolled one female control for every nine male controls because previous studies suggested that males were nine times more likely to be victims of violence than females. When there was more than one potential control in the same family, the interview team chose the head of the family or the eldest child depending on who was in the 20 to 40 – year-old age category. There were 85 controls. All the 85 households agreed to be interviewed as control households for the case-control study. All the cases and controls were enrolled between November 1996 and January 1997.

1.3.3. Results

Table 1.socioeconomic status of homicide victims versus controls in Orangi, Karachi, Pakistan, 1995- 1997

	Homicide victims (n=35)	Controls (n=85)	P –value *
Mean age	27	32	<0.001
Average years of education	7	8	0.2
Mean family size	9	8	0.2
Mean number of sons in family	2	1.5	<0.001
Occupation			
Unskilled laborers	6 (18%)	10 (12%)	0.5
Tailors/ embroiderers	6 (18%)	8 (9%)	
Weavers	1 (3%)	8 (9%)	
Other	6 (18%)	23 (27%)	
Unemployed	5 (15%)	13 (15%)	
No response	11 (32%)	23 (27%)	
Average income	Rs2924 (US\$62)	Rs2839 (US\$61)	0.9
Frequency of wages received			
Daily	10 (35%)	11 (16%)	0.3
Monthly	11 (38%)	37 954%)	

Table2 Involvement in political activities as a risk factor for homicide in Orangi, Karachi, Pakistan, 1995-1997

Political activity	No.(%) of cases involved N=35	No.(%) of controls involved N=85	Odds Ratio (95%CI)	Age-adjusted Odds Ratio (95%CI)
Frequently attended processions	10 (29)	1 (1)	34 (4 -749)	32 (4 -1544)
Attended meetings	11 (31)	2 (2)	19 (4 -136)	19 (3 -203)
Held meetings at home	1 (3)	0 (0)	Undefined	Undefined
Considered a community leader	5 (14)	1 (1)	14 (2 -336)	21 (2 -1178)
Held an important position in the party	10 (29)	2 (2)	17 (3 -120)	12 (2 -122)
Involved in conflicts	2 (6)	0 (0)	Undefined	Undefined

1.3.4. Discussion

B Non- causal explanation

Bias

The authors identified the key limitations of their research. These relate to the potential for both selection and information biases. The cases were victims of homicide identified through local community organizations. These cases could have been selected because they were politically active, hence revealing. As a result of this bias, a much greater relative risk of political involvement may have been measured. It is difficult to assess the potential magnitude of such a bias, although the authors tried 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.

The authors identified a risk of information bias. In particular, information elicited from the families of the controls. They were live members of the same communities from which the homicide victims had been identified and may 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 may arise in any situation of political instability and victimization, in which family members would have sought to protect their live family members by denying any involvement in politics, while the opposite may be true among family members of those who had died, about whom there may have been greater willingness to reveal evidence of political involvement. This bias would have served to increased the relative risk in the analytical study.

The authors also mentioned of another limitation of the study. This study was focused on a single area of Karachi and the dynamics of homicide in this area may not be representative of the causes of violence throughout the city. This may lead to selection bias and may have diminished the external validity of the study.

Interviewer bias may have resulted as some of the contractors, who helped the study team identify homicide cases, likely had strong political sentiments and may have been particularly aware of politically active people who were murdered, and so these may have been over-represented among cases.

All information for the case's homicide was collected from family members. Family members were often not eye witnesses and the people supplying information of families may have been biased in reporting events, especially in the identification of the perpetrators of the homicide resulting in information bias and also selection bias and thereby distorting the results during analytical studies.

The selection of cases and controls for the study was decided on the knowledge of the volunteers of the Orangi Pilot Project. The exercise was very much subjective. There was no available objective method to identify all homicide victims in Karachi and this methodology might have led to selection, detection and ascertainment bias.

Confounding

The authors of the study considered two important confounding factors, namely sex and age. Since the controls were not enrolled as pairs with the cases, they conducted a non-pair matched analysis for sex. To evaluate if the associations between political involvement and homicide were a result of confounding by age, they calculated an age-adjusted Odds Ratio by stratifying the analysis for people above and below the median age of the study population (30 years), and calculating a maximum likelihood estimate summary Odds Ratio and exact Confidential Interval. However, different lifestyle factors like smoking, drug habit, alcoholism, physical activity profile, education, ethnicity and socio-economic status might be the other confounders in this study, which had not been taken into account.

In this case control study, data was analyzed and Odds Ratio and Confidence Interval were calculated for understanding association. On the whole, these data is worthy for analysis. History of migration, religion and poverty were the potential confounders in this study. Nothing was mentioned to neutralize the effect of these confounders.

C. Positive features of causation

Internal validity

Time relationship

It was observed in the study that the subjects included as cases had exposure, ie, the experience of political violence among politically active persons had preceded the outcome, ie, homicide. In this context, it could be concluded that the exposure had an appropriate temporal relationship with the outcome.

Strength

At the inception of the study, it was hypothesized that homicide in the high violence, low socio-economic areas of Karachi, was a result of organized political violence and so people who were politically active would be at risk of homicide. Outcome of the study showed that individuals who were killed were 13 times more likely to be an active member of a political party; 34 times more likely to have attended political procession; 19 times more likely to have attended political meeting and 17 times more likely to have hold an important position in a political party than those who were not killed. After adjustment for the confounders, the adjusted Odds Ratio showed similar results. The results were statistically significant.

Dose response

In this study, no mention was made on the duration of political activities of the individuals. So the dose response relationship could not be established.

Consistency

The authors have mentioned only the study of Zwi and Ugalde, Who described a cycle of political violence where repressive violence was directed by the state at people living within it. It is difficult to make any comment on the consistency of this study, as the authors had not mentioned much report of earlier studies.

Specificity

In this study the causal factor, ie the political activities leading to political violence do not only lead to homicide and also homicides are not always caused by political violence. This refutes the establishment of specificity of the study.

Summary of internal validity

All the features of causation showed that in this case control study showed that political activity is a risk factor to vulnerability to homicide in Karachi.

However, dose response relationship, consistency and specificity were not fully established. It had definite possibility of being confounded by different life style factors.

External validity

To the eligible population

This study was focused on a single area of Karachi and the dynamics of homicide in this area may not be representative of the causes of violence throughout the city. The selection of both cases and controls for the study were decided on the knowledge of the volunteers of the Orangi Pilot Project. The exercise was very much subjective leading to selection bias. Due to these limitations, the study lacked validity to some extent among the eligible population.

To the source population

Population on whom the study could be generalized was not specified in this study. However, people who are politically active and are vulnerable to homicide in Karachi might be the population on whom the study might be generalized. However, during the study, there was not much diversity in ethnicity and socio-economic status found in the neighborhoods throughout Karachi. But there was substantial variation in socio-economic status within Orangi. No difference in income, occupation or education among cases and control was found. The lifestyle factors like alcoholism; drug intake, physical activity, education poverty ethnicity and religion are some important risk factors. Unfortunately, the present study had not dealt with these factors. So, further study on the effect of these factors might be needed to infer about the replicability of this study in the source population.

Other evidences

Consistency

There was absence of adequate reference of other studies by the authors to test the consistency of the present study with full satisfaction. Only one study by Zwi and Ugalde was referred without giving any adequate detail. Evidence from human rights organizations confirms that the group identified in the study is at increased risk of political violence. They were also widely targeted by State Security Forces in Pakistan in the mid-1990s.

Plausibility

In this study the question of biological plausibility could not be considered.

Coherence

There is no mention in this paper, which can establish that the assessed causal relationship is not in conflict or in contradiction with information from experimental study, clinical or pathological source of knowledge.

Summary of external validity

The present study had lacked in external validity to some extent as it focused on a single area of Karachi. There were some methodological limitations in the work. The lifestyle factors, religion, ethnicity and access to political power are powerful confounders, which may have affected the outcome of the study.

Ethical aspects of the study

Consent to participate was formally taken from both the cases and controls at the beginning of the study. But there were no mention of the other ethical issues in the document. The study being provocative, one could highlight a potential ethical question here as this insensitive approach may lead to an under-identification of risks to the health of the communities, especially worrying where these risks are imposed by others, such as the state and its associated security forces as in this case. Though it was a case control study and ethical aspects are not as stringent as in an experimental study, there should have been brief mention about this in the present paper.

Limitations of the study

The authors mentioned the important limitations to this study, which might have some influence on the outcome of the study. The effect of ethnicity, religious identity, access to political power and socio-economic status in both the case subjects and the control posed serious limitations in establishing validity of the study.

On the inference of the study

This study is valuable and more like it are to be encouraged: placing experience from the micro-level into the public domain serves a purpose in allowing such material to be contested and debated. A particularly worrying feature of the study presented here was the involvement of the police and other security forces, groups which under normal circumstances should be charged with protecting the security of the community, not threatening it. There remain immense challenges in how health related organizations can work with human rights groups to promote a safer and more secure environment: more accurate identification of problems and abuses. Epidemiology and public health must engage in the study of political violence, of its effect and responding to it.

1.4. Critical Review of a Prospective Study on the Effect of Home-based Neonatal Care and Management of Sepsis on Neonatal Mortality

1.4.1. Introduction

Abhay T Bang and others had done a study on the effect of home-based neonatal care and management of sepsis on neonatal mortality through a field trial in rural India. The study was done in 86 villages of Gadchiroli district in Maharashtra, India during 1993 to 1998. Baseline data had been collected for two years from 1993 to 1995 in the study area. The proper interventions took place in 39 villages in phased manner from 1995 to 1998; where as 47 villages in the same area had been taken as control villages.

A. Description of evidences

Exposure

In this study, exposure or intervention was a package of home-based neonatal care applied to the neonates of 39 intervention villages of Gadchiroli district in Maharashtra in a phased manner over a period of 3 years (April, 1995 to March, 1998). According to the package the village health workers trained in neonatal care made home visits and managed birth asphyxia, premature birth or low birth weight, hypothermia, and breast feeding problems. They diagnosed and treated neonatal sepsis. Assistance by trained traditional birth attendants, health education, and fortnightly supervisory visits were also provided.

In the first year (1995-96), female village health workers listed pregnant women in the village, collected data by home visits in the third trimester, observed labor and neonates at birth, visited the home on days 1, 2, 3, 5, 7, 14, 21, 28 and on any other day if the family called, to take history and examine mother and child, weighted the child each week, and managed minor illnesses and pneumonia in the neonates. They followed up the neonates for 28 days after birth, until the mother left the village, or until the neonate died, whichever was earlier.

In the second year (1996-97), after a survey of 280 parents, the female workers were trained in home-based management of neonatal illnesses. They used to diagnose sepsis on the basis of certain laid down criteria described in the paper and offered at home after written consent Injection Gentamycin twice daily in doses according to body weight for 7 to 10 days and Syrup cotrimoxazole twice daily for 7 days. They gave such care from April 1996 and managed neonatal sepsis from September 1996, in addition to earlier tasks.

In the third year (1997-98), health education of mothers and grandmothers about care of pregnant women and of neonates was added to the programme.

Outcome

The outcome under investigation was neonatal mortality rate of the intervention and control villages. The initial hypothesis of the study was that the intervention would reduce the neonatal mortality rate by at least 25% in 3 years. Primary outcome was reduction in Neonatal Mortality Rate and secondary outcome was reduction in Infant mortality Rate and Perinatal Mortality Rate.

In the third year, 913/979 (93.3 %) of neonates received home-based care. Neonatal, Infant and Perinatal mortality rates in the intervention area (net percentage reduction) compared with the control area after 3 years were 25.5 (62.2%), 38.8 (45.7%) and 47.8 (71.0%) respectively ($p < 0.001$). Case fatality in neonatal sepsis declined from 16.6% (27 deaths out of 163 cases) before treatment to 2.8% (2 deaths out of 71 cases) after treatment ($p < 0.001$). In 1997-98 such care averted one death (fetal or neonatal) per 18 neonates cared for. Of the 280 parents interviewed, 273 (97.5%) preferred care for ill neonates from the female village health workers, because of availability within the village, good training, and because the care was free of cost. Home-based neonatal care cost US\$ 5.3 per neonate.

1.4.2. Method

Design

It was a non-randomized controlled community field trial.

Study Population

Neonates of 39 intervention and 47 control villages of Gadchiroli district in Maharashtra state of India during April, 1995 to March, 1998 are the study population. This is an extremely underdeveloped district where specialized health care for the neonates is inaccessible and costly.

1.4.3. Results

Table 1: Effect of intervention on mortality rates

Indicators	Intervention Area				Control Area			
	Baseline (1993-95)	Year 1 (1995-96)	Year 2 (1996-97)	Year 3 (1997-98)	Baseline (1993-95)	Year 1 (1995-96)	Year 2 (1996-97)	Year 3 (1997-98)
Crude Birth rate*	25.4	25.3	19.8	23.7	26.6	24.5	21.1	24.4
Still Birth Rate [#]	32.0	32.4	34.8	25.9	23.6	41.1	36.9	44.0
Early Neonatal mortality rate [@]	37.5	32.5	31.1	22.5	42.3	51.2	33.0	49.6
Late Neonatal mortality rate [@]	24.5	18.7	5.0	3.1	15.4	14.0	17.0	9.9
Neonatal mortality rate [@]	52.0	51.2	36.1	25.5	57.7	65.2	50.0	59.6
Infant mortality rate [@]	161	74	38	38	175	96	64	83
Perinatal mortality rate [@]	68.3	63.8	64.8	47.8	64.9	90.2	68.7	91.5

Data are number except * per 1000 population, [#] per 1000 births, [@] per 1000 live births

Table 2: Change in case fatality by birth weight and maturity in Intervention Area

	CF (%) 1995-96	CF (%) 1996-97	CF (%) 1997-98	% Change in CF (1995-96 to 1997-98)	p
Birth weight (g)					
<1500	69.2 (9/13)	46.2 (6/13)	25.0 (4/16)	-63.9	0.045
1500-1999	29.5 (18/61)	8.5 (4/47)	10.6 (5/47)	-64.1	0.033
2000-2499	3.7 (9/246)	1.6 (4/243)	1.6 (4/258)	-56.8	0.230
≥2500	0.2 (1/417)	0.5 (2/365)	0.9 (5/574)	+350.0	0.395
Unknown	11.5 (3/26)	0 (0/17)	22.2 (4/18)	-	
Gestation (Wks)					
<34	51.7 (15/29)	12.5 (3/24)	33.3 (7/21)	-35.6	0.315
35-37	21.7 (10/46)	5.7 (3/53)	2.8 (2/72)	-87.1	0.003
>37	2.1 (14/673)	1.7 (10/597)	1.4 (11/801)	-33.3	0.398
Unknown	6.7 (1/15)	0 (0/11)	10.5 (2/19)	-	
Total	5.2 (40/763)	2.3 (16/685)	2.4 (22/913)	-53.8	0.003

**Table 3: Change in cause specific neonatal mortality rate in the intervention area
(1995-96 to 1997-98)**

Cause of death	Neonatal mortality rates*		Absolute change in rate	Change (%)
	1995-96	1997-98		
Prematurity	7.9	6.6	-1.3	-16.5
Birth asphyxia	10.5	5.5	-5.0	-47.6
Neonatal sepsis	27.5	6.6	-20.9	-76.0#
Other	1.3	1.1	-0.2	-15.4
Not known	5.2	4.4	-0.8	-15.4

* Per 1000 live births, # p = < .005

Table 4: Neonatal Mortality Rate and Relative Risk in Intervention and Control Area, 1995 to 1998

Study Area / RR	Neonatal Mortality Rate			
	1995-96	1996-97	1997-98	1995-98
Intervention Area	51.2	36.1	25.5	37.8
Control Area	65.2	50.0	59.6	58.6
Relative Risk	0.8	0.7	0.4	0.6

Basic descriptive tables given by the authors did not show causes of death in the control area, so it could not be compared with that of intervention area.

1.4.4. Discussion

B. Non-causal Explanations

Observation bias

The study is a non-randomized control trial. It was done with the help of a NGO – Society for Education, Action and Research in Community Health (SEARCH). The field research area was already under care of SEARCH. It comprised of an action area of 53 villages and an adjacent control area of 47 villages.

The methodology of choosing the action and control area has not been mentioned. There is a possibility of selection bias as the villages were selected in a non-random manner.

Inclusion and exclusion criteria were not specified clearly. Intervention area was the action area of that NGO and exclusion of villages from the intervention area was done on the basis of low population and non-availability of suitable female health worker. It was rather a non-probability sampling, convenient in nature. The villages were chosen considering administrative convenience. So the methodology may have introduced selection bias in the study.

However, the baseline data collected from the intervention area (39 villages), control area (47 villages) and the excluded villages (14 villages) from the intervention area did not show any appreciable difference.

Impact of refusals and lost to follow up cases on the study were not described in detail.

The possibility of further observation bias was taken care of in the study design by clearly defining live births, neonatal deaths and infant deaths according to International classification of diseases.

The female health workers were trained from October 1994 to March 1995 to take histories of pregnant women, observe the process of labor, and examine the neonates as well as record findings. They were also trained to detect and manage a case of pneumonia among children including neonates.

However, there could be measurement bias as information collected by village women of 5-10 years school education. Variation in educational level may affect the quality of data collection. Possibly, due to this inter-observer variation, health workers missed some cases of sepsis, which might have increased the death rate due to sepsis.

The mean agreement between the data recorded by village health workers and the physician on 47 variables was 92.3% (SD 7.4).

Confounding

Probable confounders might be characteristics related to socio-economic conditions, access to existing health facilities, antenatal care, and period of gestation and birth weight. Other possible confounders could be ethnicity, religion, cultural differences if any, educational status of mother, gravida status before delivery, history of previous still birth or loss of baby etc.

During baseline survey it had been found that the socio-economic characteristics in the intervention and control area were more or less similar. It was unlikely that those had changed so radically between the two components of the study population during the study period of 3 years that it influenced the mortality rates. However, no information in this regard had been furnished.

The same argument may be applied on the issue of access to existing health facilities.

There is no information whether there was any ongoing program of awareness generation activity on MCH care by the general health system in the study area and whether there was any disparity between the dissemination of such messages between intervention and control area. It is important as it might influence the mortality rates.

It was also observed that during the 3 years of study number of neonates below 1500 grams were more or less same, whereas % change in CF in this group during the same period was significantly lowered by 63.9% ($p = .045$). In the birth weight group of 1500-1999 grams, the number of neonates reduced considerably from 1st year (61 in 1st year, 47 in 2nd & 3rd years). It can be applied to the subsequent groups. So, it can be concluded that during these 3 years, proportion of LBW babies had not changed significantly, where as case fatality of LBW babies had changed significantly at least up to 2000 gram of birth weight. In this context, it is unlikely to act as confounders in those weight groups.

However, the number of neonates with normal birth weight increased a good deal in the last year (417/763 (54.6%) in 1st year, 365/685 (53.3%) in 2nd year & 574/913 (62.9%) in 3rd year). It may influence the NMR in a positive way confounding the role of home based neonatal care.

So far as period of gestation is concerned, the absolute numbers of neonates born under 34 weeks of gestation in the study period were not widely different and % change in CF was also not statistically significant. In 35-37 weeks group, absolute numbers of neonates had increased every year and % change in CF was also statistically significant. The proportion of neonates born after 37 weeks of gestation varied between 87% and 89% from 1st year to 3rd year. The change in CF was not statistically significant. In this context, it may be concluded that period of gestation can be a confounder in this study.

Data on other possible confounders e.g. cultural differences, religion, educational status, antenatal care received, gravida status of mother before delivery, H/O of previous stillbirth or loss of baby etc. most possibly had not been collected and so their effects could not be assessed.

C. Positive features of causation

Time relationship

It was observed during 3 years study period, the status of NMR, IMR in intervention villages decreased considerably with the passage of time in comparison with the baseline level, where as in the control villages most of the indicators deteriorated during the same time period. In this context, it can be said that specific intervention of neonatal home based care, which preceded such change in the intervention villages had an appropriate temporal relationship with the outcome achieved.

Strength

At the inception of the study, it was hypothesized that the intervention would reduce the NMR in the intervention villages at least by 25%. The sample size had been calculated with that understanding. At the end of the study, the result in the 3rd year showed that it had decreased by around 50%. It established the robustness of the intervention. Percentage changes in the NMR, IMR and PMR in the intervention villages in comparison to the control villages were statistically significant.

Moreover, the year wise relative risks of neonatal mortality in the intervention area in comparison to the control area showed that it had steadily decreased from 0.8 in the 1st year to 0.7 in the second year and finally 0.4 in the 3rd year. The RR was 0.6 if whole of the study period was taken into account. It established without doubt the profound beneficial effect of the home-based neonatal care in reducing the NMR in the study area.

Dose response

The intervention was done in a phased manner in the action area as described earlier. It was observed that with the increase in the level of intervention in successive years, the NMR (51.2, 36.1, and 25.5), IMR (74, 38, and 38) and PMR (63.8, 64.8 and 47.8) had improved more and more in the intervention villages.

Consistency

As mentioned by the authors, there are very few studies on home-based neonatal care available to compare the results of this study. Two preliminary reports of similar studies from Guatemala and Slums of New Delhi showed similar results. The authors did another study in the same district. They managed the neonatal sepsis by Cotrimoxazole and injection Gentamycin. The study showed considerable decrease in the case fatality. An uncontrolled field study near Pune, India of detection of high-risk neonates and home-based management of pre-term babies (not management of sepsis) showed decrease in case fatality by 25.1%.

Moreover, it has been presumed that by this intervention the reduction of NMR in the action area would be by at least 25%. At the end of the study, it was found to be around 50%, much in excess than what had been presumed.

All these supported the view that the present study had adequate consistency in relation to internal and external validity.

Specificity

The intervention was designed in three phases – in the first year by observing labor and neonates at births, home visits at regular interval examining mother and child, recording weight and treating minor illnesses, in the second year by home-based management of neonatal illnesses including sepsis and in the third year by health education to mothers and grand mothers about the care to pregnant mothers and neonates. Though most of the socio-economic factors including female literacy were more or less similar between intervention and control villages, there was no mention about the level of environmental hygiene and the knowledge of the parents (mother, in particular) about the need of cleanliness and asepsis in neonatal care between the intervention and control villages. These factors could influence the NMR and IMR. Reduction of NMR and IMR depends on many factors along with improvement of neonatal care.

To conclude, specificity of the intervention had not been fully established in this study.

Summary of internal validity

All the features of causation showed that most likely the intervention as done in this field trial had a causal relation in reduction of NMR, however, it had certain possibility of confounding by birth weight and other factors and lacked specificity.

External validity

To the eligible population

The coverage by the interventions was 75.1% in the 1st year, 85.2% in the 2nd year and 93.3% in the 3rd year with very few losses to follow up. However, impact of refuses and loss to follow up cases were not described in detail.

In spite of these weaknesses, the study indicated that it had considerable validity among the eligible population.

To the source population

Weakness in selection of the study population had introduced selection bias in the study and had raised doubts about its representativeness. The general information showed that the related indicators of the study area were more or less similar to those of the country as a whole. However, it mostly represented the underprivileged section of the society. The findings of this study had a good chance of replicability among this section of the society. Whether the outcome would be similar among the better privileged could not be ascertained from this study.

Other evidences

Consistency

Not an adequate number of studies had been found to test the consistency of this study with full satisfaction. However, the available limited studies showed results consistent with the findings of the present study.

Specificity

One to one causal relationship could not be fully established. However, it was evident that there was a causal relationship between the intervention and the outcome in this study.

Plausibility

Neonatal sepsis is one of the major causes of neonatal death in our country. The management of the neonatal sepsis as done in this study is according to scientific principle. Apart from the active management of sepsis since 2nd year, intervention in the 1st year by close monitoring, taking weight of the neonates and in the 3rd year by imparting health education to mothers and grand mothers have a rational basis in the process of reduction of neonatal mortality.

So, it can be concluded that the outcome due to interventions as done in this field trial had adequate biological plausibility.

Coherence

There is no mention in this paper, which can establish that the assessed causal relationship is not in conflict or in contradiction with information from experimental study, clinical or pathological source of knowledge.

Summary of external validity

As the results of the study showed that it had a high validity among the neonates hailing particularly from the lower socio-economic group, it is likely to apply to the neonates of the general population having the same socio-economic characteristics. Biases due to weakness in methodology introduced doubts in its application to the general population as a whole.

Ethical aspects of the study

Ethical aspects were not mentioned in detail in the document. It being an important area particularly in respect to a non-randomized control trial should have been described in detail.

Limitations of the study

Authors did not mention limitations of the study in the document under review and so could not be assessed.

On the inference of the study

Authors intended to generalize their findings for all developing countries. Probably this cannot be done as a number of factors are involved in it, like variability in accessibility of health care and acceptability of intervention done, variability in cultural differences, literacy and awareness status, economic factors. The perspective of diagnosing sepsis (septicemia, pneumonia and meningitis) by the health workers having primary and secondary educational level and treating them in the field condition for 7-10 days with multidose injectable antibiotic need to be considered with utmost care before being implemented in the community.

An injectable drug like Gentamycin might be used (not a single dose regimen) as an intervention to control sepsis in field condition for a specified population for a specified time. But, most possibly it could not be implemented in a mass program that would be implemented throughout the country. Use of Cotrimoxazole between 0 and 2 months raises the question of rational use of drug and safety of the neonates. Authors concluded that this intervention is cost effective and so can be replicated in other developing countries. It needs to be evaluated further.

1.5. Critical Review of a Retrospective Cohort Study on Sinistrality – a side effect of prenatal sonography: A comparative study of young men.

1.5.1. Introduction

Helle Kieler and colleagues had done a cohort study on the effect of ultrasound in utero in causing sinistrality. They undertook a comparative study of young men born in Sweden from 1973 to 1978, who enrolled for military service. Eligible for the study were 6858 men born at a hospital that included ultrasound scanning in standard antenatal care (exposed) and 172537 men born in hospitals without ultrasound scanning programs (unexposed). They concluded that ultrasound exposure in fetal life increases the risk of left-handedness in men, suggesting that prenatal ultrasound affects the fetal brain.

The title of the study suggests that it is a highly interesting study and the curious findings raise several important questions. Is the finding real? Is it important? What should be done about it?

A. Description of evidences

Inclusion criteria

All male singletons, born between 1973 and 1978 at hospitals, with reliable information about ultrasound scanning during the 1970s.

Exposed group

Men born at the University hospital in Malmo that included ultrasound scanning as part of the standard antenatal care. 90% of all pregnant women who were seen for antenatal care in Malmo were scanned. The ultrasound examination was initially performed at about 28 weeks of gestation, but was gradually changed to the 19th week during 1974-1975. From October 1976, two examinations at 19th and 32nd week were performed, and from April 1978, the first examination was performed at the 17th week. Real-time ultrasound machines with a sound velocity of 1540 m/s were used. Each examination was scheduled for 15 minutes.

Unexposed group

Men, born in hospitals, without ultrasound scanning programme. 48 hospitals in Sweden did not practice ultrasound scanning (routine or selectively) before 1980 were included in the unexposed group.

Outcome

The outcome under investigation was left- handedness among all men, in Sweden, to be tested for military service, generally at the age of 18. The initial hypothesis of the study was that ultrasound exposure in fetal life increases the risk of left- handedness in men.

The major outcome of the study was:

1. The proportion of left-handed enrollees was slightly higher among men born at Malmo University Hospital compared with those born at other hospitals (10.9% vs. 9.6%)
2. For men born between 1973 and 1975 and enrolled at the southern enrollment center, there was practically no difference in left-handedness (Odds ratio = 1.04, 95% CI = 0.95 - 1.18) between men prenatally exposed to ultrasound and unexposed men.
3. For men born between 1976 and 1978, those exposed to ultrasound had a higher risk for left-handedness (Odds ratio = 1.32, 95% CI = 1.16 - 1.51).

1.5.2. Methods

Design

It was a retrospective cohort study.

Study population

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

Males born at the University Hospital in Malmo to mothers registered as citizens in Malmo were included as exposed to ultrasound.

Males born at one of the hospitals without ultrasound scanning to mothers not registered as citizens of Malmo were included as unexposed.

6858 men fulfilled the criteria for final inclusion as exposed and 172537 men fulfilled the criteria for inclusion in the unexposed group.

1.5.3. Results

Table 1. Maternal and Infant Characteristics and Prevalence of Left-handedness According to Ultrasound Exposure of Men Enrolled at the Southern Enrollment Center

	Ultrasound					
	Exposed			Unexposed		
	N	%	Left- Handed %	N	%	Left- Handed %
Maternal age (years)						
<=19	445	6.9	12.1	1637	6.7	8.9
20 to 34	5656	87.8	10.7	21173	87.3	9.7
>=35	339	5.3	12.4	1445	6.0	9.5
Parity						
0	3596	55.8	107	10347	42.7	9.6
>=1	2844	44.2	11.1	13908	57.3	9.6
Pregnancy length (weeks)						
<=36	442	6.9	10.6	1274	5.3	10.5
37 to 41	5056	78.5	11.0	19787	81.6	9.5
>=42	939	14.6	10.4	3096	12.8	10.1
Missing	3	0.0		98	0.4	
Birth weight ratio						
<0.75	213	3.3	14.6	672	2.8	11.8
0.75 to 0.90	1365	21.2	10.8	4576	18.9	9.5
0.90 to 1.10	3659	56.8	10.5	13808	56.9	9.9
>1.10	1190	18.5	11.7	5095	21.0	8.5
Missing	13	0.2		104	0.4	
Apgar score at five minutes						
0 - 6	46	0.7	4.4	237	1.0	84
7 - 10	6058	94.1	11.0	23810	98.2	9.6
Missing	336	5.2		208	0.9	
Mothers country of birth						
Nordic	6319	98.1	10.9	24143	99.5	9.6
Non-Nordic	121	1.9	10.7	112	0.5	8.9
Total	6440	100.0	10.9	24255	100.0	9.6

Table 2. Relative Risk of Left- Handedness, According to Ultrasound Exposure by Hospital and Time of Birth for Men Enrolled at the Southern Enrollment Center (N = 30050)

	Birth cohort 1973-75		Birth cohort 1976-78	
	Odds Ratio	95% CI	Odds Ratio	95% CI
Model-I Malmo vs. other hospital	1.04	0.91-1.18	1.32	1.16-1.51
Model-II Malmo vs. other hospital	1.03	0.91-1.17	1.32	1.16-1.51

Table 3. Relative Risk of Left-Handedness, According to Ultrasound Exposure by hospital and Time of Birth for Men Enrolled at Different Enrollment Centers in Sweden (N=175935)

	Birth cohort 1973-75		Birth cohort 1976-78	
	Odds Ratio	95% CI	Odds Ratio	95% CI
Model - I				
Malmo	1.04	0.92-1.17	1.29	1.13-1.46
Model - II				
Malmo	1.03	0.91-1.17	1.28	1.13-1.46
Akademiska	0.87	0.76-1.00	0.93	0.80-1.08
Danderyd	0.96	0.84-1.11	0.97	0.84-1.12
Karolinska	0.99	0.85-1.15	0.82	0.73-1.02
South hospital Stockholm	0.91	0.78-1.07	0.86	0.73-1.02
Sahlgrenska	1.02	0.89-1.18	1.01	0.87-1.17
Orebro	0.96	0.83-1.11	0.90	0.78-1.05
umea	1.02	0.83-1.25	1.09	0.91-1.31

Table 4. Relative Risk of Left-Handedness before the Introduction of Ultrasound Scanning in Sweden

	Birth cohort 1969-1972	
	Odds Ratio	95% CI
Malmo	0.98	0.90-1.07
Stockholm	1.03	0.95-1.10
Gothenburg	1.04	0.96-1.13
The rest of Sweden	1.00	

B. Non-causal Explanation

Observation bias

The study is a retrospective cohort study. Helle Keiler and others did it. This work included only males because handedness was determined as part of eligibility testing for military

service. The inclusion criteria restrict the study population and there is a possibility of selection bias.

The rough method of assigning ultrasound exposure may have misclassified some of the people in the study. To what extent could such misclassification of ultrasound exposure be related to the handedness of the offspring in a question to be answered?

In certain countries, attempts have been made to force left handed children to use their right hands. This could have resulted in differential misclassification that has affected the results. It is also not known how many of the apparently left-handed men in the study group were ambidextrous.

However, to see if the increased risk of left-handedness was biased by type of hospital or municipality, the model was expanded to include enrollees at all enrollment centers. The total study population was analyzed with control for enrollment center. The relative risk of left-handedness by prenatal ultrasound exposure was, however, essentially the same as when only enrollees from the southern enrollment center were included. 11.5% of the Exposed group and 10% of the unexposed group were lost to follow-up. This may have resulted in non-participant bias. No assessment of the effect of non-participant bias was made.

Confounding

Several possible confounding factors were recorded in the study. These included maternal age, parity, gestational age, intrauterine growth and neonatal asphyxia (Apgar score < 7 at 5 minutes). The possible confounders were considered and were controlled for in logistic regression analyses. However low birth weight is related to handedness. It theoretically possible that women in Malmo, the site of the exposed cohort, deliver a greater proportion of their babies with a low birth weight. Keiler *et al* had information available on birth, however, and found that controlling for differences in birth weight had little effect on the estimates in their study. Nor does any confounding factor explain the admittedly modest association in their data between ultrasound and handedness.

Socio-economic status might be a confounder in this study. Since Malmo University hospital is one of the eleven hospitals, which introduced ultrasound scanning before 1980, it may be a sophisticated hospital for the elite society.

There may be differences in test procedures for identifying handedness at different enrollment centers. There is no information in this regard and this may be another possible factor.

In this cohort study, data analyses shown in table 3 and table 4 show Odds ratio and Confidence Interval were calculated for understanding association, but for this type of study Relative Risk should have been calculated for analytical study. The unadjusted Odds ratio for Model –I was 1.04 (CI : 0.91 – 1.18) for birth cohort 1973 – 75 and 1.32 (CI : 1.16 – 1.51) for birth cohort 1976 – 78. Controlling for possible confounders did not change these estimates.

The estimates remained unchanged after adjustment also in case of Model- II.

C. Positive features of causation

Internal validity

Time relationship

It was observed in the study that the subjects who were affected by left-handedness were exposed to ultrasound during their foetal life in utero.

In this context it could be concluded that exposure to ultrasound preceded the outcome i.e. Development of sinistrality, had an appropriate temporal relationship with the outcome.

Strength

The estimated effect is about 30% increase in the “risk” of being left-handed for men who were exposed to ultrasound in utero.

For men born 1976 to 1978, those exposed to ultrasound had a higher risk for left-handedness (Odds Ratio =1.32, 95% CI = 1.16 – 1.51). Controlling for confounders did not change these estimates. Odds Ratio for left-handedness in other University hospitals did not deviate from the standard risk of left-handedness.

An association between the full-scale ultrasound program and the risk for left-handedness was shown.

Dose response

Birth cohort 1973 – 75 and enrolled at the southern enrollment center, the ultrasound examination was initially performed once. For these men, there was practically no difference in left-handedness (Odds Ratio = 1.04, 95% CI = 1.16 – 1.18) between men prenatally exposed to ultrasound and unexposed men.

For men born 1976 – 1978, those exposed to ultrasound twice prenatally had a higher risk for left-handedness (Odds Ratio =1.32, 95% CI = 1.16 – 1.51)

It is not known whether the increased prevalence was an effect of the second trimester scans.

Consistency

Two trials (Salvesan K. and others and Kieler H. and group) had reported an association between prenatal ultrasound exposure and increased risk of non right-handedness among boys aged 8 to 9 years. These trials were criticized for not using objective tests for handedness, and for finding excess only in non right-handedness and not in left-handedness. The meta-analysis of the two controlled trials concluded that "left-handers are no different from right-handers" and that "a positive association between ultrasound during pregnancy and sinistrality among boys should cause harm to the developing brain in male fetuses.

The authors mentioned the Finnish and the RADIUS trials, which could not demonstrate significant difference in ultrasound, induced left or non right-handedness.

So there is lack of enough evidence to prove the consistency of the causal explanation for the finding.

Specificity

The study suggests that prenatal ultrasound affects the fetal brain. Although it has been shown that ultrasound is capable of damaging brain tissue, few epidemiological studies have addressed possible adverse effects of ultrasound. Other factors like maternal age, preterm birth, low birth weight, birth stress, parity, gestational age and neonatal asphyxia have been found to correlate with an increased risk of left-handedness. To conclude, specificity had not been fully established in this study.

Summary of internal validity

All the features of causation showed that there is no obvious non-causal explanation for the finding; its novelty will certainly fuel skepticism.

However, dose response relationship, consistency and specificity were not fully established. Misclassification of ultrasound exposure may have altered the findings of the study.

External validity

To the eligible population

Information on place of birth was obtained through record linkage between the National Service Register and Statistics, Sweden's birth register. Of the entire birth cohort of 306995 singletons, live born males, 6858 men fulfilled the well-defined inclusion criteria in the exposed group and 172537 fulfilled the criteria for inclusion in the unexposed group. Being

a retrospective cohort study, the loss during follow up was 11.5% among the exposed group and 10% among the unexposed group. The effect of non-participation bias was not assessed. So, the study lacked validity to some extent among the eligible population due to non-consideration of the above-mentioned factor.

To the source population

The men included in the study were born as singletons, from 1973 through 1978. Of the study population, 99% were examined at one of the six enrollment centers (Southern Enrollment Center) before reaching 21 years of age. So the study cannot be generalized. Further study on the effect might be needed to infer about the replicability of this study in the source population.

Other evidence

Consistency

There was absence of adequate reference of other studies by the authors to test the consistency of the present study with full satisfaction.

Specificity

One to one causal relationship could not be fully established. However, it was evident from the study that as many as 1 in 50 male fetuses prenatally exposed to ultrasound are affected.

Plausibility

In the second trimester, the 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. It is therefore conceivable that the increase in left-handedness was caused by second trimester scan.

Coherence

There is no mention in this paper, which can establish that the assessed causal relationship is not in conflict or in contradiction with information from experimental study, clinical or pathological source of knowledge.

Summary of external validity

The present study had lacked in external validity to some extent as it dealt only with men born as singletons from 1973 through 1978 and enrolled at the Southern Enrollment Center of Sweden.

Ethical aspect of the study

Ethical aspects were not mentioned in the document. Though it was a cohort study and ethical aspects are not so stringent as in experimental study, there should have been brief mention about this aspect in the present paper.

Limitations of the study

Authors did not mention limitations of the study in the document under review and so could not be assessed.

On the inference of the study

The estimated effect of prenatal ultrasound on fetal brain is about 30% increase in the "risk" of being left-handed, which corresponds to an extra three left-handers among one hundred births. This effect in itself hardly constitutes a public-health problem. If this effect is causal, however, it raises the worrisome possibility that ultrasound exposure is also affecting the central nervous system in other ways that are less evident. An effect on the brain of three offspring in every one hundred would be a huge population effect, a potentially important public-health problem that could not be dismissed out of hand. The possibility, however remote, of iatrogenic effects on the central nervous system is a prospect that merits serious attention.

An effect of ultrasound on left-handedness would elude the most astute clinician. If the effect is real, it will be a tribute to epidemiologic research. If it is wrong, it will provide further ammunition to the critics of epidemiology.

SECTION-2

SECOND

FIELD POSTING

2.1. Evaluation of the surveillance system for acute (watery) diarrhoea in South 24 Parganas district, West Bengal, 2005.

2.1. Introduction

WHO estimated 1.8 billion episodes of diarrhoea occurred each year, globally². Three million children under the age of five years die of diarrhoea and 80% of these deaths affect children under the age of two years². Diarrhoeal diseases are associated with unsafe water, poor sanitation, poor food handling practices and bottle-feeding of infants during the first six months of life⁶. Improving the sanitation and potable water can prevent diarrhoea. Early recognition of the diseases allows better management with oral rehydration therapy that can prevent the death. Early detection of outbreaks allows prevention measures.

India alone accounts for one-third global deaths due to diarrhoea⁷. WHO estimates that in the year 1998, there were about 0.71 million deaths and 22 million DALYs lost due to diarrhoea in India⁴. Household surveys, carried out during 1994-1995, indicate that the median incidence rate of diarrhoeal diseases ranged from 1.0 to 4.7 episodes per child per year in India⁵. In slum areas of major cities, incidences as high as 10.5 episodes per child per year were also reported in the countries of the South-East Asia Region⁵.

In West Bengal, in 2004, 1,989,136 cases of acute diarrhoeal diseases (attack rate: 25 per 1000) and 1,770 deaths (case fatality rate: 0.09) were reported. In that state every year, the South 24 Parganas district experiences sporadic outbreaks of acute diarrhoea. The surveillance system for acute diarrhea in South 24 Parganas aims to investigate outbreaks in a timely way and apply control measures. As the Integrated Disease Surveillance Programme (IDSP) will be implemented in West Bengal in 2006-07, we conducted an evaluation of the surveillance system of acute (watery) diarrhoea in the Baruipur block of the South 24 Parganas district. This evaluation would enable us a better understanding of the system. The objectives of this evaluation were to describe the acute watery diarrhoeal disease surveillance system, to determine whether the surveillance system meets its objectives, to identify existing gaps and factors contributing to the gaps and to suggest improvement.

2.1.2. Methods

Study Design

We designed a cross-sectional study to evaluate the existing surveillance system of acute (watery) diarrhoea in the Baruipur block of the South 24 Parganas district.

Study population and sampling design

We chose Baruipur block purposively as it is endemic for acute watery diarrhoea. Its population is 355,932 (2004) with 48 sub-centres under nineteen gram panchayats. We selected randomly nineteen sub-centres, one from each gram panchayat; we then interviewed the female health assistant attached to the sub-centre and all the three laboratory technicians in the block. We also interviewed eight medical officers working in the Baruipur block.

Data collection

Data collected

We collected primary and secondary data on reported cases, deaths, timeliness, and completeness and control measures undertaken.

Data collection procedure

We designed the data collection instruments, trained the team and field-tested the questionnaires.

Description of the surveillance system

We interviewed the medical officers and the multi purpose health workers involved with the system. We checked the descriptions they made of the system against direct observations. The description includes case definition, report, transmission, entry, analysis and feedback. Interviews with stakeholders clarified the real and actual objectives of the surveillance system. We obtained the case definitions used by reviewing of programme manuals published by government of India. We determined whether the system was passive, stimulated passive or active through a review of the reporting system and the report forms

Attributes of the surveillance system

We assessed simplicity through a review and an analysis of the flow chart to look for possibilities of obtaining in the same outcome in an easier way. We assessed data quality by examining the percentage of "unknown" or "blank" responses to items on the surveillance forms. We assessed acceptability through interviews of health care workers and calculated proportion of response. We conducted a community survey and estimated the sensitivity of the surveillance system through estimating the proportion of acute watery diarrhea cases that were seen in the community that had been reported at the block primary health centre. We also estimated the proportion of outbreaks detected at each level. We assessed the specificity through a qualitative discussion among the health care providers of Baruipur block to appreciate their knowledge of the case definition. To assess representativeness we verified

through record review whether population subgroups were systematically excluded from the surveillance system. We reviewed surveillance records to estimate the timeline for reporting. We estimated the proportion of surveillance forms submitted by the sub-centres to the block in time. We qualitatively assessed the ability of the surveillance system to add newer components and the ability to be operational when it is needed (flexibility). This overall assessment of the attributes of the system provided element that allowed evaluating the usefulness of the system.

Data analysis

We analyzed the data using computer- EPI 6 package.

2.1.3. Results

Description of the existing system

Objectives

The objectives of the surveillance system included identifying acute diarrhoeal diseases, estimating the disease burden, suggesting the trends of the disease, detecting outbreaks for early intervention, analysis, feedback and taking appropriate action.

Type

The acute (watery) diarrhoeal disease surveillance includes both active and passive surveillance of the entire population.

Type of data

It analyses both individual and aggregated data.

Case definition

The system used the WHO-recommended case definition, i.e., three or more loose or watery stools with or without vomiting, with or without dehydration in the past 24 hours.

Of the eight medical officers interviewed six (75%) had not been trained for surveillance and only signed the report prepared by health supervisor to send it to the district. Their knowledge of surveillance was poor (Table 3). The medical officer reported diarrhoea cases to the district. But, they failed to register age, sex and residence. They sent these data to the district every month. The district maintained the acute diarrhoeal disease and other diarrhoeal diseases reporting register, a rumor and an outbreak register. The district authorities send the reports (including zero case report) to state authorities. They analyzed only disease load at district and primary health centre levels. In 2004, 136,772 cases (attack rate 20 per 1000) and 23 deaths reported from the entire district, out of which 5467 cases (attack rate 15 per 1000) and no death were reported from Baruipur block. Between January

and December 2004, 14 outbreaks were reported from Baruipur block to the district, of which one was investigated. The private nursing homes and general practitioners at Baruipur were not aware of the surveillance system and did not participate.

Data collection and transmission

In West Bengal, field level workers at sub-centre level visit each village at least twice a month. The female worker mostly concentrates on vaccine preventive diseases and acute diarrhoeal disease cases in general and under five children in particular. The male worker, similarly, collects the information regarding acute diarrhoeal disease particulars and other diseases. They reported their findings during weekly review meeting verbally. The health workers report their collected data on acute diarrhoeal diseases through sub-centre monthly reporting forms to the block. The block primary health centre sent a consolidated report to the district in the first week of every month. In case of outbreak the daily report is sent. The district consolidates the data to send a report to the state every month.

Indicators

For reporting aggregated data, it will report the number of cases by geographical area, the number of deaths by geographical area and the number of hospitalizations if appropriate.

Data collection instruments

At the district, staff entered data into a register and transmits reports to the next higher level. They used rapid mode of communication (e.g., telephone, telegraph and fax, police wireless or special messenger) to transmit the immediate report during emergencies. Verbal reports were usually followed by a written report.

Data compilation

One health staff compiled data at the block. At the district, the district inspector of health statistics and his team compiled data by manually entering data into the registers, the monthly reporting surveillance forms and look for incompleteness and inconsistencies.

Analysis

No data analysis was done at the sub-centre. The block primary health centre analyzed reports. At block level the weekly trend of diseases were not systematically examined by calculating rates. Deaths were not routinely investigated. No analysis of the reports was done at the district. Computer was available at the district public health office but the health staffs compiling the data did not have the capacity to analyze data. Out of eight medical officers interviewed two (25%) had the knowledge and skills for data analysis. The state bureau of health intelligence of the directorate of West Bengal health services At the state

headquarters the data was analyzed by. The reports were analyzed on a quarterly basis. They provide information of district-wise disease burden, incidence rates, cases fatality rates and trend of acute diarrhoeal disease for the last 12 months and also the trend for the last three years.

Feedback

The medical officer gave feedback orally during the monthly meeting at the block level. State headquarter provides quarterly feedbacks to the district. All the 19 health care workers interviewed said that they received feedbacks and support from the block level (table-1). They receive the feedbacks orally during the management information and education system meeting held in the block on the first Saturday of each month. The district held one meeting each month. All the eight medical officers interviewed said that they received feedback from the district meetings. The state headquarters held a review meeting quarterly and these meetings discussed administrative matter, various achievements and surveillance activities. Printed feedback reports were given to the districts.

Action taken

At the block level, the medical officer forms an *ad hoc* team to take control measures during an outbreak. The district response team is responsible for investigating any reported/suspected outbreaks in collaboration with the block level team.

Supervision

Out of 19 health care workers interviewed 17 (89%) said that they were supervised and their activities were reviewed by the block level supervisors at least once during the last six months. All the eight medical officers interviewed said they were supervised from the district at least once in 6 months (table-1). Supervision from the block to the sub-centre was limited and usually given when incomplete or illegible forms were submitted.

Training

All the health care workers and medical officers interviewed were trained in disease surveillance and knew WHO case definition of acute diarrhoea. Out of 19 health workers 10 (53%) and of eight medical officers interviewed six (75%) received training in general epidemiology. All the medical officers said that outbreak investigations become difficult in absence of proper laboratory support for laboratory confirmation of cases in the block and the district (Table-3). Two out eight medical officers and none among the health workers interviewed said that they have a written guideline of the surveillance system.

Analysis of the surveillance system

Simplicity

The diarrhoea surveillance system used the existing infrastructure of the health system, and did not create any confusion. Health care workers of the block felt it was easy to carry out the programme along with other activities. They also expressed that both the system and the reporting forms were simple. Case definitions were easily comprehensible. The procedures of data collection and transmission were simple (Figure 1).

Data quality

In Baruipur, information collection was limited to only case count. Other information like demographics, clinical features and risk factors are not collected. Of the 576 surveillance forms examined, 520 (90.3%) forms had no "unknown" or "blank" responses to items on surveillance forms (table-2).

Acceptability

The health personnel at all levels accept the surveillance system. Of the 27 health care workers interviewed at various levels in Baruipur block, all (100%) answered our questions without reluctance.

Sensitivity

Of 30 cases of diarrhoea identified during the community survey in Dakshin Sitakundu village of Baruipur village, 18 (60%) had been reported to the block. Between January and December 2004 in Baruipur block, the system identified one outbreak out of 14 (7.1%) outbreaks.

Specificity

Out of 19 health care workers interviewed 17 (89.5%) and all the eight medical officers interviewed of Baruipur block knew correctly the case definition for acute diarrhoea.

Timeliness

Out of 576 surveillance forms reviewed, 510 (88.5%) forms were sent within seventh day of the month. From the record review, the outbreak whose date of onset was on 1.7.02 was reported on 6.7.02 after the death of two patients.

Representativeness

We verified through record review that the entire population of 355,932 was covered by the surveillance system in Baruipur block and no population subgroups were systematically excluded. Recent studies indicate that more than 30% of the people are going to private

hospitals and clinics for treatment. In the absence of involvement of the private sector the surveillance will be an incomplete one.

Flexibility

The health care workers, who were interviewed, said the surveillance system could incorporate all the changes in the reporting forms without any difficulty.

Resources

In Baruipur block, there are 22 medical officers, 72 health workers, four supervisors and three laboratory technicians posted. All of them were trained in disease surveillance works. Out of 129 sanctioned posts, 12 (9%) posts were vacant. Only eight (6%) staffs resided in the block. There is no facility for sample collection in proper media and transportation to the designated referral laboratory. Rapid diagnostic kits and laboratory manuals are also not available. There is no laboratory setup at the three primary health centres situated in the block

2.1.4. Discussion

The acute (Watery) diarrhoeal disease surveillance system operational in Baruipur block of South 24 Parganas district is a reflection of the surveillance system operating in other areas of West Bengal. The backbone of the system is its strong infrastructure and trained human resources. The health care workers know the case definition. The system is simple enough to be handled by the existing health personnel at the grass root level and health department infrastructure. The system is acceptable to the health care workers and most of them send completely filled surveillance forms in time. The system is flexible to accept changes and improvements. These strengths make the system sustainable. But the system has weaknesses in data management and analysis. Poor use of surveillance data lead to poor sensitivity of the acute diarrhoeal disease surveillance system.

The acute diarrhoeal disease surveillance system has a robust framework. It reaches upto the village level collecting surveillance data through a sub-centre. There are sufficient staffs working at the sub-centre at the village level in Baruipur block. The system is well documented in the manuals published by government of India. Most of health care workers are trained for surveillance activities. They use the WHO-recommended case definition. There is a rapid response team at the district level. Communicable diseases are reported on a monthly basis using clearly established reporting channels. The system was simple and acceptable to the health workers and the reporting was in time. The data quality was good

and timeliness was maintained. Outbreaks are reported with the help of rumor register. The surveillance system will be integrated with the integrated disease surveillance programme during 2006-07. Training institutes are available at the state and district level.

There was no analysis and interpretation of data at the sub-centre, block and district level. The monthly morbidity report mainly covers the passive surveillance data of the health institutes. The weekly trends of the diseases in individual district are not systematically examined by using population-based rates. Epidemics situations are identified only through direct verbal communications. Health care workers at the village level do not reside at their place of posting. Outbreaks are not recognized early due to late reporting. Absence of written guidelines available to the health workers and inadequate knowledge on outbreak investigations had lead to non-understanding and haphazard approach to control of epidemic situation. There is no facility for laboratory confirmation of the cases in the block and district. Lack of rapid diagnostic kits, facilities for sample collection in proper media and transportation of the same to the designated referral laboratory delayed effective response to the outbreaks.

There are important limitations to this evaluation study. First, this evaluation study focused on a single area of South 24 Parganas district. Baruipur block being the proposed district headquarters is well connected with roads, better water supply and other civic facilities and this area may not be representative of the acute (watery) diarrhoeal disease surveillance conducted throughout the district. The actual picture of the acute (watery) diarrhoeal disease surveillance system in rest of Baruipur district may be worse. Secondly, the interviewers belonged to the health department and the questionnaires were not self-administered. This may have introduced interviewer's bias in the results. Thirdly, we could not analyze the cost of the surveillance system since the functions of the system is an integral part of the multi-purpose health programme. We could not estimate what proportion of the human resources and logistics were involved in the surveillance system. So we could not evaluate the cost effectiveness of the surveillance system.

In South 24 Parganas district in absence of analysis of surveillance data, it has a poor sensitivity and only one acute diarrhoeal disease outbreak was identified by the system. With more logistic and technical and laboratory inputs the system can be the real forerunner for the public health activities in the state.

Recommendations

Make written guidelines available to all field level workers. Arrange refresher-training courses for the health staffs responsible for data compilation in the block and district to increase their capacity to analyze and interpret data. Appoint trained data entry operators at the district level for data analysis, interpretation and storing by computer. Improve laboratory facilities for sample collection in proper media and transportation to the designated referral laboratory for laboratory confirmation of cases. Include private hospitals, public sector hospitals and laboratories in the surveillance system. Integrate all vertical programmes by introducing IDSP. Supply regular and adequate logistic like forms, registers, manuals, and mobility support and contingency fund from district level to the peripheral health institutions. IDSP when implemented is expected to address the limitations of the surveillance system.

References

1. CDC. Guidelines for evaluating surveillance systems. MMWR 2001/Vol.50/No.RR-13.
2. T Jacob John, Reubeen Samuel, Vinohar Balraj, Rohan John: Disease reporting system at District level: a model for developing countries; Lancet 1998; 352: 58-61.
3. WHO, Evidence for health policy: Accessed on 23 Oct 2003.
4. Jane c. Baltazar Evaluation of national control of diarrhoeal diseases programme in the Philippines, 1980-93; Bulletin of the WHO 2002 80(8); 637-743.
5. Kishore J. *et al*, 2002, National Health Programmes of India, 4th edition.
6. Inter-country Consultative Meeting on Epidemiological Reporting system and International Health Regulations, Colombo, December 1998 (WHO SEARO).
7. German RR (CDC Atlanta) Sensitivity and predictive value positive measurements for public health reporting system Epidemiology 2000; 11 (6): 720 – 727.
8. Williamson GD, Weather by Hudson G (CDC Atlanta) A monitoring system for detecting aberrations in public health reporting system reports. Statistical Medicine 1999 Dec 15; 18 (23): 3283 – 3298.
9. Chauvin P, Valleron AJ. Participation of French general practitioners in public health reporting system: a multi-disciplinary approach Journal of Epidemiology and Community Health 1998 Apr; 52: 2S-8 S.

Tables and figures

Figure: 1 -Flow chart for acute (watery) diarrhoeal disease surveillance system

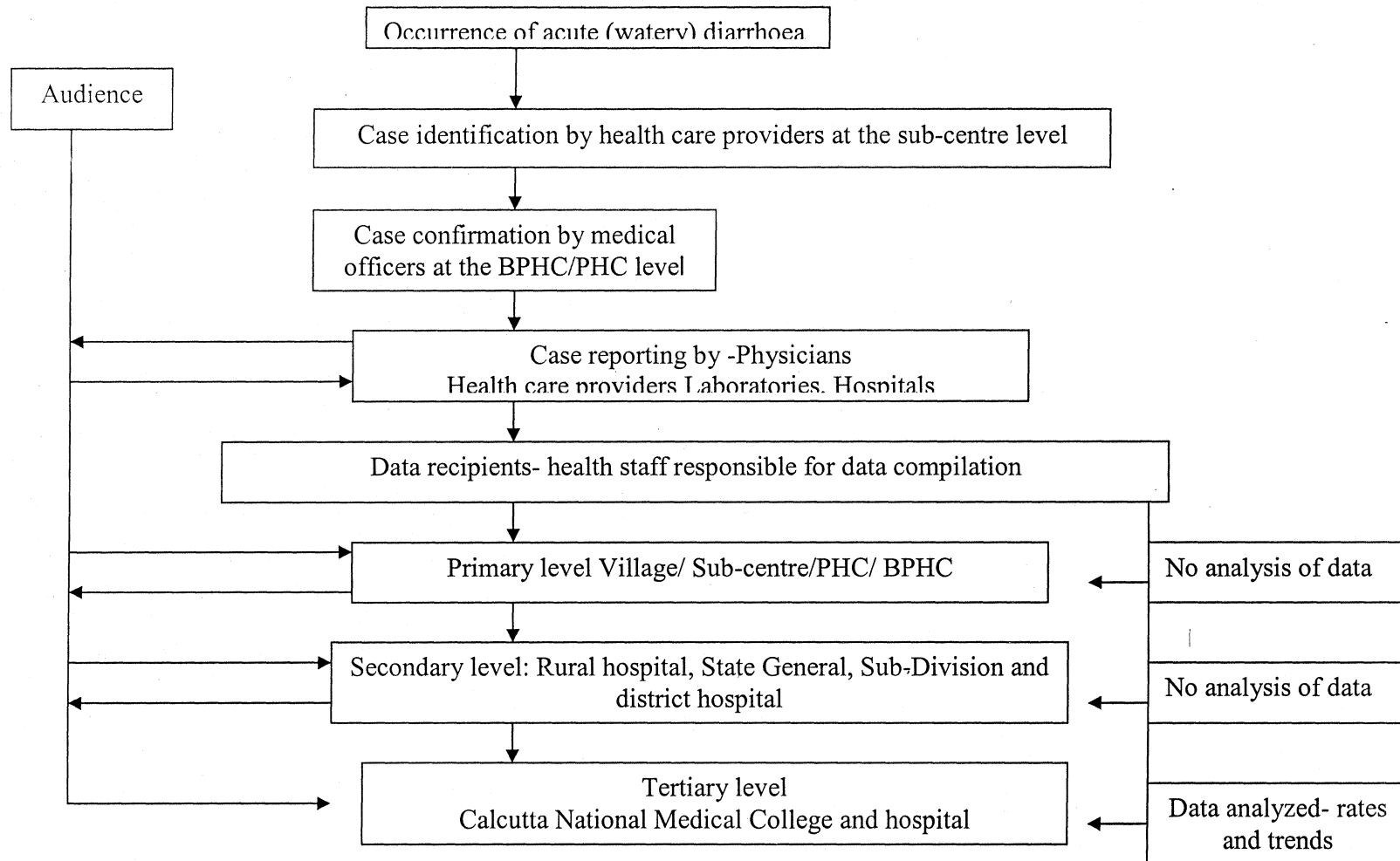


Table 1. Involvement of female health worker in acute diarrhoeal disease surveillance activities at the sub-centre (n=19), Baruipur, South 24 Parganas, West Bengal, India, 2005

Core activity	Yes	%
<i>Detection and registration</i>		
Had an outpatient register/diary	19	100
Had adequate supply of outpatient registers in previous 6 months	19	100
Knowledge about the disease	19	100
Knowledge about the case definition	17	89
Knowledge about the acute diarrhoeal surveillance system	8	42
Written guidelines available (disease surveillance manual)	0	0
<i>Reporting</i>		
Had adequate supply of reporting forms in previous 6 months	17	89
Reporting every month	19	100
Sending./reporting zero report	19	100
<i>Feedback</i>		
Received feedback from higher levels	19	100
Support activity	19	100
<i>Supervision (by PHC level)</i>		
Reporting system activities supervised in 6 months before the assessment	17	89
Reporting system activities reviewed during three prior visits	17	89
Reporting system data reviewed during past year	19	100
Feedback provided on reporting system during past year	17	89
<i>Training</i>		
Received post-basic training in general epidemiology	10	53
Received post-basic training in disease surveillance system	19	100

Table 2. Acute diarrhoeal disease reports from sub-centres (n=48) to Baruipur block, South 24 Parganas, 2004

No units reporting	Jan	Feb.	Mar	April	May	June	July	August	Sep	Oct	Nov	Dec	Total
In time*	40	48	38	42	48	40	42	46	47	28	43	48	510
Completeness#	38	45	41	45	45	43	44	42	45	44	40	48	520
Not received**	2	-	3	-	-	-	-	-	-	4	-	-	9

Source: Office of the CMOH South 24 Parganas

*In time- reports submitted within first week of each month

Completeness- without blanks

** Not received- not submitted within 30 days

Table: 3- Status of acute diarrhoeal disease surveillance activities by the medical officers (N=8),
Baruipur, South 24 Parganas, West Bengal, India, 2005

Knowledge and practice about reporting system by M.O		
	Good	%
Knowledge about the case definition	8	100
Knowledge about the data analysis	2	25
Knowledge about the steps of outbreak investigation	2	25
Written guidelines available (disease surveillance manual)	2	25
Activity at the PHC		
	Yes	
Reporting		
Had adequate supply of reporting forms in previous 6 months	8	100
Found reporting forms easy to use	8	100
Submitted all previously required reports	8	100
Submitted zero reporting	8	100
Analysis		
Analyzed data by person, place and time	2	25
Calculated case fatality rates	0	0
Calculated incidence or prevalence values	0	0
Outbreak investigation		
Conducted or been involved in an outbreak investigation	3	38
Get laboratory support during an outbreak investigation	0	0
Feedback		
Received feedback from a higher level	8	100
Updated health staff on outbreaks or local data	2	25
Supervision		
Supervision (by district level)	8	100
Reporting system activities supervised in 6 months	8	100
Reporting system data reviewed during past year	8	100
Feedback provided on reporting system during past year	8	100
Training		
Received post-basic training in general epidemiology	6	75
Received post-basic training in disease surveillance system	8	100

2.2. Evaluating the Kala-azar control programme in the South 24 Parganas district of West Bengal, India

2.2.1. Introduction

Kala-azar, the visceral form of leishmaniasis, is a chronic parasitic disease caused by *Leishmania donovani*. The infectious agent is transmitted by a sand fly: *Phlebotomus argentipes*. Initially, the disease is asymptomatic. Then, fever, lymphadenopathy, splenomegaly and hepatomegaly may develop. The laboratory diagnosis is based upon a direct agglutination serological test. Parasitological confirmation is based upon the microscopic observation of the parasite. The case fatality ratio of visceral leishmaniasis is almost 100% in the absence of treatment. The recommended treatment for visceral leishmaniasis is sodium antimony gluconate administered by intra-muscular injections every day for three weeks.

In January 2004, a newspaper in the Indian state of West Bengal published an article that raised awareness about a concerning situation with respect to Kala-azar in the South 24 Parganas district of the State. The report made reference to a cluster of Kala-azar cases and four deaths in the block of Basanti (2004 population: 297,323 persons) of the Canning subdivision in the district of the South 24 Parganas. As a response to the news article, the public health workers of the area increased their passive and active case finding activities. On 8 April 2004, they conducted an exhaustive case search in the village of Chatrakhali (2004 population: 787), a village highly endemic in the block of Basanti. By the end of July 2004, the total number of cases of Kala-azar identified had reached 809, compared with 129 and 185 in 2003 and 2002, respectively. Among those tested, the proportion of persons testing positive had remained stable. The screening activities had substantially been scaled up because of the press article. Thus, recent improved case finding caused the recent increase in the number of people identified. Low level of case detection activities had led to a progressive accumulation of cases.

Mid 2004, all patients identified had been treated successfully and they are doing well. Public health officials communicated effectively the results of the active case search in the village of Chatrakhali to local community leaders. This leveraged the assignment of funds for prevention under a pilot scheme to purchase of bed nets and assignments of small grants for house improvement (e.g., prevent cracks in mud wall that constitute vector-breeding sites). Towards the second part of 2004, public health managers were asking themselves why were cases accumulated and whether the problem comes from a failure to apply the

proposed strategy or from limitations of the proposed strategy itself. These questions could not be answered through a simple review of monitoring indicators. These queries prompted us to consult with public health officials and organize an evaluation of the Kala-azar control programme in the district.

2.2.2. Methods

Describing the programme

We engaged the stakeholders of the Kala-azar control programme in the district of the South 24 Parganas, including:

Those who operate the programme, including sponsors (e.g., Central Government of India that supports some activities, partners (The School of Tropical Medicine in Calcutta where tests are done), managers (the joint director of health services, public health and communicable diseases at the state level, the chief medical officer of health of the district of the South 24 Parganas, the deputy chief medical officer of health- II of the South 24 Parganas, the assistant chief medical officer of health of the Canning sub-division, the medical officer of health of the block of Basanti and the medical officer of the Kanthalberia primary health centre) and health care workers (e.g., laboratory specialists, medical officers in the public health system, clinicians and community health care workers).

Those served / affected by the programme, including the general population and community leaders;

Those who would use the evaluation, including the public health managers of the district and in the state of West Bengal, specialists of Kala-Azar, policy makers.

To engage the stakeholders, we met with them, explained the purpose of the evaluation, gained insight over their perspective into the programme, asked them what they expected from the process, assured them that they would have a say in the evaluation process and reassured them that the evaluation procedure would be submitted to them for approval.

Evaluation design

To describe the programme, we reviewed records and documents, including WHO guidelines, national guidelines and operation manuals. We interviewed stakeholders and conducted direct observations of procedures in the field.

Evaluation indicators

The evaluation team decided that a formative evaluation would be more useful to clarify the goals of the programme and find out where the problem comes from. They further decided that the scope of the evaluation would be limited to assessing the effectiveness of the

interventions or service delivery at the level of the block of Basanti and that some aspects of the programme would not be evaluated (e.g., the support systems including training, procurement, monitoring and finances). What is the effectiveness of case finding and treatment and what are the factors that may affect this effectiveness. What is the effectiveness of vector control and what are the factors that may affect this effectiveness. What is the effectiveness of personal protection and what are the factors that may affect this effectiveness.

Data collection

Using the logic model the team identified a number of indicators (Table 1).

The team identified that they would need to collect information necessary to the calculation of these indicators through:

Reviewing of documents, guidelines, health care facilities, laboratories and records at the primary health centre; conducting a survey to interview a sample of health care workers, including medical officers, clinicians and community health workers; conducting a survey of the general population in the district; conducting a new active case search in the entire population of the village of Chatrakhali one year after the initial one in 2004 to estimate the incidence that would reflect the intensity of transmission. We sought and obtained approval of the ethical committee of the National Institute of Epidemiology, Chennai.

2.2.3. Results

The evaluation team gathered that the Kala-azar control programme was based upon a three-arm strategy that included (1) vector control with two rounds of residual spraying of houses with DDT, (2) personal protection to ensure that persons improved their houses (cracks in the mud wall constitute vector breeding sites) and slept under impregnated mosquito nets and (3) case finding activities that can be both active (e.g., mass screening) or passive (e.g., testing of patients in health care facilities when they present with compatibles signs and symptoms). We described the programme, through the creation of a logic model linking input, process, outputs and outcome (Figure 2).

Input of the programme

Out of 12 medical officers seven (58%) and out of 89 health workers 72 (81%) received formal training on kala-azar control programme. The health department spent 15 million rupees yearly for salary of staffs and 68,000 rupees for the cost of labour, transport and contingencies expenditure of the spraying operation in Canning-I block during 2004. Health department conducted ten mass surveys in selected endemic villages of Canning sub-

division and utilized 36 persons' full time. The health department sanctioned one spray squad for 45 days, which was 40% of the requirement. The spraying operation used 201 kilograms of 50% DDT wettable powder. As a part of pilot intervention programme to control kala-azar the panchayat department distributed 1000 insecticides impregnated bed-nets among 250 families.

Process indicators

Out of 420 community members interviewed 172 (59%) said that the health worker visited them at least once a month. Medical Officers conducted ten mass surveys (which is 8% of the population (Table 2). We estimated the time taken for reporting laboratory specimen varied between 1 day and 10 days or more during the community survey. The health department conducted one round of residual insecticidal spray during March and April in the year 2004 instead of two rounds.

Output indicators

2674 of 22,075 persons screened (12%) through mass surveys in 2004 and 809 patients were identified. All 809 patients were treated within seven days with recommended treatment.

Outcome indicators

There were two, five and four kala-azar deaths in 2002, 2003 and 2004 but there were no kala-azar deaths in 2005 (Table2).

2.2.4. Discussion

The kala-azar control programme operational in Canning-I block of the South 24 Parganas district is a reflection of the programme operating in other block areas of West Bengal. The kala-azar programme has good infrastructure and trained human resources. It is simple enough to be handled by the existing health personnel at the grass root level and health department infrastructure. Kala-azar control has been integrated with Primary Health Care. Here the multipurpose health workers, the health supervisor, laboratory technicians under the leadership of the medical officer form the crucial team to fight against kala-azar. The supply of logistics by the government of India was adequate. The quality of indoor residual spray with 50% wettable DDT powder was satisfactory to the community and almost all the houses were covered in 2004. But the overall, the situation is concerning and the key outcome indicator suggests that, at least in Chatrakhali, there is a high level of transmission. The entomological human to vector contact rate cannot be assessed. Because of this

persisting transmission, it is important to examine which of the three components of the strategy is failing.

With respect to the case findings activities, the outputs were satisfactory for the laboratory as all patients referred for screening had a laboratory test and for the treatment as all patients identified received appropriate treatment. However, the number of persons screened in 2004 was low, and was probably even lower in the preceding years. We traced back the causes of this poor case finding output. The inputs were sufficient (enough persons trained) although it was unclear what resources would be available if mobile teams had to screen actively and regularly in villages. In contrast, the process however was poor as there was no standard procedure in place to conduct mass screening and there is no algorithm to optimize passive screening in health care facilities.

With respect to vector control, the outputs were insufficient in a highly endemic village, with one house missed out of five for spraying activities. In addition, only one of the two rounds occurred. This insufficient spraying was caused by a lack of input in terms of spray gangs and DDT. However, processes required to be examined, as a high proportion of households seem to be unfavorable to spraying.

With respect to personal protection, the outputs were also limited. In Chatrakhali, 72% of persons slept under an impregnated bed net, but the village benefited from a special pilot distribution scheme. Most persons lived in houses that had cracks in the wall that constitute potential breeding sites. The causes of these poor outputs were clearly caused by a lack of input as house improvement scheme and bed net distribution were only conducted on a pilot scale. In addition, communication activities were limited. Finally, the absence of quantified target made it difficult for the team to judge the achievements of the programme.

There are limitations to this evaluation study. First, this evaluation study focused on a single area of South 24 Parganas district, which was selected purposely and this area may not be representative of the whole district and may affect the external validity of the results. Secondly, the interviewers belonged to the health department and questionnaires were not self-administered. This may have introduced interviewer's bias in the results. We addressed this limitation by giving uniform training to the interviewers and using structured questionnaires.

Overall, on the basis of the evidence gathered, we made six conclusion points:

The case finding covers an insufficient proportion of the population; the case finding activities are not clearly structured; there were insufficient resources allocated to spraying

activities; resources allocated to personal protection were also insufficient; members of the community were insufficiently aware of the ways by which they could protect themselves; and the objective of the programme were not precisely quantified. Based on our conclusions we recommend:

Formulate plans for annual mass screening of the population at risk, with allocation of sufficient human, material and financial resources to make sure that the increased case finding would be handled with sufficient laboratory and treatment capacity.

Develop and validate an algorithm for the screening of patients presenting with compatible signs and symptoms in health care facilities.

Increase the resources allocated to the spray gangs, including DDT and human resources so that two rounds can be conducted as recommended.

Identify funding resources to (a) distribute one impregnated bed net per person and (b) to support focused house improvement activities in endemic villages.

Conduct education, information and communication activities in the community to (a) increase the acceptability of spraying and (b) engage the population in sleeping under mosquito nets.

Set up objectives, targets and milestones for the leishmaniasis control programme.

Scope of future study

As a next research step to this evaluation, we proposed:

- 1) To measure the burden of the disease (incidence/prevalence) in the endemic areas of the district and identify the risk factors associated with leishmaniasis.
- 2) To examine the sensitivity and the specificity of various clinical case definitions as well as the sensitivity and the specificity of various laboratory-screening tests used in the field. This information would generate evidence that would allow formulating a validated strategy for active and passive case finding. While research will continue to generate more information for decision making, work is already under way to implement the recommendations framed by this evaluation.

Figure 1. Blood samples requests for Kala azar, Canning subdivision, South 24 Parganas district, West Bengal, 1995 – 2004

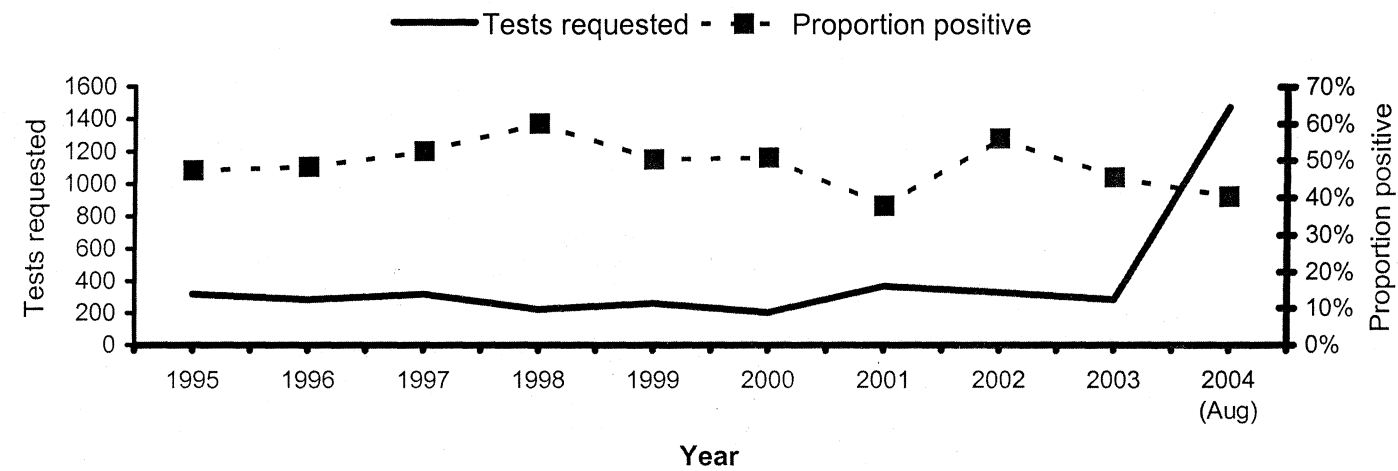


Figure 2. Logic model of the Kala-azar control programme, South 24 Parganas, West Bengal, India

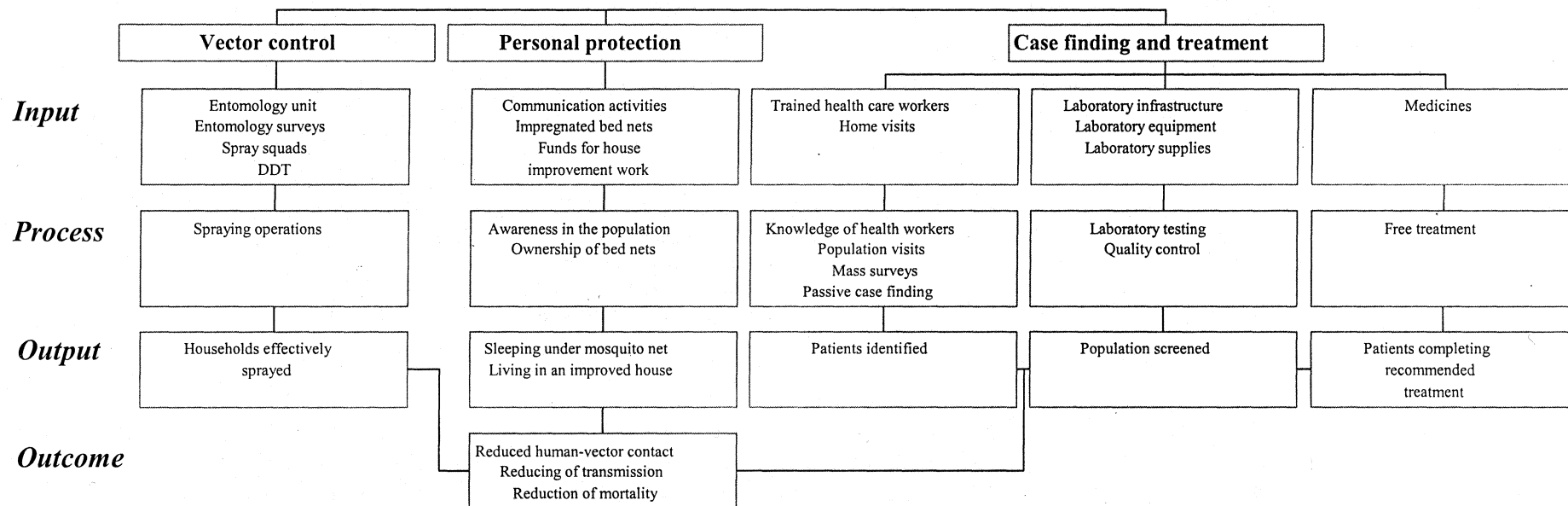


Table 1. Evaluation indicators for the Kala-azar control programme, South 24 Parganas, West Bengal, India

	Vector control	Personal protection	Case finding and treatment	
Input	▪ Number of entomology units ▪ Number of entomological survey between 2001 and 2004 ▪ Number of spray squad as a proportion of requirements ▪ Quantity of DDT available as a proportion of requirements	▪ Communication activities implemented ▪ Number of insecticide-impregnated bed nets distributed ▪ Funds allocated for house improvement work	Case finding	▪ Proportion of health care workers trained for Kala-azar ▪ Health workers searching for cases during house visits
			Laboratory	▪ Laboratory resources at all levels ▪ Laboratory equipment and supplies available
			Treatment	▪ Medicines available to treat Kala-azar
Process	▪ Number of rounds of spaying as a proportion of requirements ▪ Proportion of the target population covered by spraying ▪ Proportion of population accepting the spraying	▪ Proportion of the population aware of the cause of Kala-azar ▪ Proportion of the population owning an impregnated mosquito net	Case finding	▪ Proportion of health workers knowing the signs and symptoms of Kala-Azar ▪ Proportion of the population covered by mass surveys ▪ Proportion of the population visited once a month ▪ Passive case finding in health care facilities
			Laboratory	▪ Proportion of laboratory specimens crossed checked with agreement
			Treatment	▪ Proportion of patients treated for free
Output	▪ Proportion of households effectively sprayed	▪ Proportion of the population sleeping under an impregnated mosquito net ▪ Proportion of the population living not favourable to breeding sites	Case finding	▪ Proportion of the population screened ▪ Number of patients identified
			Treatment	▪ Proportion of patients treated as recommended ▪ Proportion of patients not completing the course
Outcome	▪ Human / vector contact indicators ▪ Number of Kala-azar deaths ▪ Incidence of Kala-azar			

Table 2: Summary of evaluation indicators for the Kala-azar control programme, South 24 Parganas, West Bengal, India

	Vector control	Personal protection		Case finding and treatment
Input	- No entomology unit at the state - No entomology unit at the district - No entomological survey between 2001 and 2004 - One spray squad for 45 days (40% of requirements) 201 kilos of 50% wettable DDT powder (25% of the 814 kilos required) - Two stirrup pumps (against three required)	200 posters and 15 banners displayed during the Kala-azar fortnight in 2004 1,000 impregnated bed nets distributed in a pilot scheme in 2004 in Chatrakhali for 22,075 persons at risk (5%) 20,000 INR allocated to 28 households in Chatrakhali village for house improvement work	Case finding	7/12 (58%) medical officers trained for Kala-azar 72/ 89 (81%) health workers trained for Kala-azar - Health workers search for cases during their house visits
			Laboratory	- Reference laboratory in Calcutta - Trained laboratory technician in the district - Sufficient lancets, slides and reagents provided by the Government of India - No facility to preserve slides and no slide boxes - Sufficient drugs provided by the central government
			Treatment	
Process	- One round of spraying instead of two needed 21,192 out of 22,075 persons covered (98%) among the target population according to registers 209 out of 420 community members (50%) accepting the spraying	233/ 420 (55%) members of the community reporting that Kala-azar was caused by a sand fly 552 of 751 persons (73%) of household owning bed nets to sleep in Chatrakhali village	Case finding	- No specific guidance for mass screening surveys 10 mass surveys in 2004 (8% population covered) 172/ 420 persons (59%) seen by the health worker at least one a month 38/38 (100%) health workers know the signs and symptoms that must lead to suspect Kala-azar - Passive case finding in health care facilities in the absence of a validated algorithm
			Laboratory	10% of laboratory specimens crossed checked with 100% agreement
			Treatment	All patients reported receiving treatment for free
				2674 of 22,075 persons screened (12%) through mass surveys in 2004
Output	494 of 751 persons (79%) reported living in households sprayed in 2004 in Chatrakhali village (One round out of the two needed)	545 of 751 persons (72%) using bednets to sleep in Chatrakhali village - No data on bednet coverage outside of Chatrakhali 124 of 751 persons (16%) living in households that are not favorable to breeding sites in Chatrakhali village.	Case finding	809 patients identified
			Laboratory	All persons referred for screening offered the test
			Treatment	809/ 809 patients (100%) treated within seven days with recommended treatment
Outcome	- No entomological surveys: Human / vector contact cannot be assessed - Two, five and four Kala-azar deaths in 2002, 2002 and 2003, no Kala-azar deaths in 2004 - Evidence of persisting high level of transmission: 150 of 751 residents of Chatrakhali (20%) infected with Kala-azar between 2004 and 2005			

SECTION – 3

OUTBREAK

INVESTIGATIONS

3.1. A Case Study of a recent Poliomyelitis case in Maheshtala Municipality, West Bengal: vulnerability of an urban slum area.

Abstract

In year 2003, India is among the three endemic countries where 99% of the world's concentrate. The number of polio cases substantially declined in 2003. No polio cases were reported from West Bengal between August 2004 and March 2004.

On 22nd April 2004, a local practitioner reported a suspected Acute Flaccid Paralysis case from Maheshtala municipality, West Bengal. An outbreak investigation was carried out on 23rd April as per WHO guidelines. The aim of the investigation was to confirm the case, tract down the wild virus circulation and initiate control measures.

The case was a male unimmunized child of 18 months. He had fever for three days before the onset of paralysis on the right leg. The paralysis was asymmetrical without any loss of sensation. The child had no history of travel 35 days prior to onset of paralysis. Two stool samples were positive for poliomyelitis (PINPEV). There was residual weakness after 60 days. The outbreak was the result of weaknesses of the immunization programme and the health system as a whole and the system needs to be reorganized immediately. The district health authority must engage a special officer for the purpose. NGOs must be involved.

Key words: Maheshtala, polio, paralysis, and outbreak

3.1.1. Introduction

The extensive use of polio vaccines since 1954 and WHO's global initiative to eradicate poliomyelitis, circulation of polio virus is limited to seven endemic countries namely – India, Nigeria, Pakistan, Egypt, Afghanistan, Niger and Somalia. Virtually all the world's polio cases (99%) are concentrated in just three countries – India, Nigeria and Pakistan. The American region was declared polio free in 1994 followed by Western Pacific in 2000 and Europe in June 2002.

Polio cases in India dropped substantially from 1556 new cases in 2002 down to 223 cases in 2003. During 2004, 72 new cases were identified (October 2004).

During 2003, twenty-eight cases were identified in West Bengal. As a result, the Government of West Bengal made polio eradication apriority programme. Five National / Sub- National Immunization Days were observed. There were no reported polio cases from August 2003 in West Bengal. But on April 22nd, a local practitioner reported a suspected Acute Flaccid Paralysis case from Maheshtala municipality.

As Acute Flaccid Paralysis is a disease under surveillance by W.H.O, class IA, an outbreak investigation of Acute Flaccid Paralysis was carried at Maheshtala Municipality on 23.04.04. Polio cases were regularly reported in this municipal area during last five years. This is due to the fact that there are some areas with low polio immunization coverage. Some population groups are also reluctant to receive vaccine. Planned endeavors have been taken by the district health authority to cover those vulnerable areas.

The objective of the investigation is track wild polio virus circulation, classify cases as confirmed, poliomyelitis compatible or discarded, monitor routine immunization coverage in the Maheshtala municipality area and focus efforts in low performing areas and to identify high-risk areas for planning mopping up immunization.

3.1.2. Methods

Confirmation of outbreak and diagnosis:

We used WHO guidelines for AFP surveillance and case investigation formats as published in “ Surveillance Acute Flaccid Paralysis guide, 2000” by ministry of health and family welfare, government of India.

Case definition

Suspect

Fever, abrupt onset of weakness or paralysis of leg(s) or arm(s), no progression of paralysis after first three days, paralysis not at birth or associated with serious injury or mental retardation.

Physician confirmed

Flaccid paralysis, no sensory loss, muscle tenderness, absent or depressed deep tendon reflexes, asymmetrical findings, wasting of affected muscle (late findings), residual paralysis 60 days after onset of illness should be added as a criteria in areas of low incidence.

Laboratory confirmed:

Cases that are culture positive and are serologically positive for poliovirus (four fold or greater rise in serum polio antibody titre).

Surveillance record review

We conducted surveillance record review at Maheshtala municipality health office and also at district health office.

Environmental survey

We made an environmental survey in the Kankhuli Laskarpara locality of Maheshtala municipality on the days of investigation.

Informal discussions

We conducted informal discussions with the chairman of the municipality, councilors, community leaders, members of NGOs and local people.

3.1.3. Results

The case identification number was IND – WB – SPG – 04 – 021. He was a male child of eighteen months residing in ward no. 8 of Maheshtala Municipality area. The locality is Kankhuli Laskarpara under Bidhangarh post office, South 24 Parganas.

In respect to his clinical history, the child presented with fever for three days, with cough followed by inability to walk properly. A right sided limping was noticed on 11.04.2004. There was a limping gait on the right side. No other abnormalities were found. On the next day a pediatrician who referred the case to Institute of Child Health, Kolkata, examined him. The patient was not hospitalized. He attended outpatient department of Institute of Child Health on 16.04.2004. On 22.04.04 the child was again examined by a local practitioner, who informed the case to the Surveillance Medical Officer, as a suspect case of Acute Flaccid Paralysis. He had not received OPV doses through routine EPI before onset and had not received OPV doses through supplementary immunization activities either.

The child had no history of travel, 35 days prior to the onset of paralysis. Four days before the incident he visited ward no. three of Maheshtala municipality and stayed for three hours. With respect to his clinical signs and symptoms, It was a febrile acute flaccid paralysis case. The date of onset of paralysis was 11th April 2004 and maximum within one day. The patient gave no history of injection during 30 days before onset of paralysis. Patient had fever. The paralysis was asymmetrical without any loss of sensation on his right leg (Table: 2).

Table: 2. Description of the clinical signs

Clinical examination	Initial case investigation; date: 23.04.04		60- day follow-up; date: 18.06.04	
Tone: (normal/reduced/increased)	UL Right: Normal	LL Right: Reduced	UL Right: Normal	LL Right: Normal
	Left: Normal	Left: Normal	Left: Normal	Left: Normal
Power: (Grade 0 to 5)	Right palm: 5/5	Left palm: 5/5	Right palm: 5/5	Left palm: 5/5
	Right hand: 5/5	Left hand: 5/5	Right hand: 5/5	Left hand: 5/5
	Right arm: 5/5	Left arm: 5/5	Right arm: 5/5	Left arm: 5/5
	Right thigh: 3/5	Left thigh: 5/5	Right thigh: 4/5	Left thigh: 5/5
	Right leg: 3/5	Left leg: 5/5	Right leg: 5/5	Left leg: 5/5
	Right feet: 4/5	Left feet: 5/5	Right feet: 5/5	Left feet: 5/5
Reflexes: Biceps:	Right +	Left +	Right +	Left +
Triceps:	Right +	Left +	Right +	Left +
Supinator:	Right +	Left +	Right +	Left +
Knee jerk:	Right diminished -	Left +	Right-diminished	Left ++
Ankle jerk:	Right-diminished	Left +	Right-diminished	Left +
Planter:	Right- flexor	Left -flexor	Right - flexor	Left- flexor
Circumference: Mid-arm	Right- 14cm	Left- 14cm	Right-14cm	Left -14cm
Fore-arm	Right – 13cm	Left-13cm	Right-13cm	Left -13cm
Mid-thigh	Right -22.5cm	Left -22.5cm	Right-23cm	Left -24cm
Mid-calf	Right -15.5 cm	Left- 15.5cm	Right-16cm	Left -16cm
Cranial nerves affected	Right- normal	Left-normal	Right -normal	Left -normal

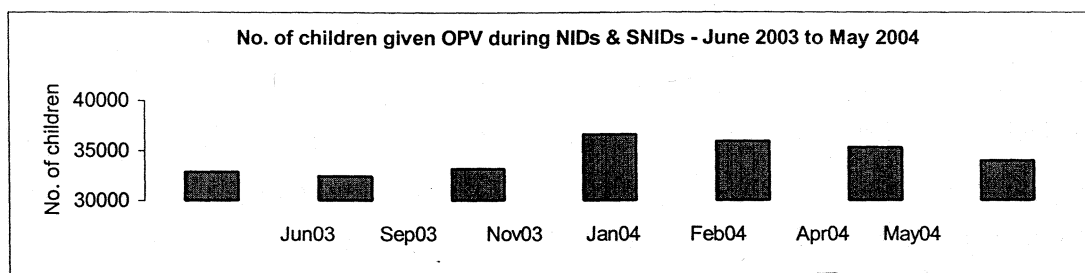
Two stool samples collected on 24th and 25th April under good condition were positive for P1 NPEV. Sixty days follow up examination was done on 16th June 2004 residual weaknesses was present on the right leg.

We immediately conducted an active case search was done in community residing in Ward no. 8 area of Maheshtala municipality. No additional case was found. Outbreak Response Immunization was organized between 26.04.04 and 29.04.04 in 463 households. A molecular study of the virus isolated indicated that it belonged to a sub type currently circulating in Bihar, a neighbouring state.

Surveillance record reviews at Maheshtala health office indicate low coverage during routine immunization sessions. During the year 2000 to 2003 the average percentage of OPV immunization among infants was about 55%. The OPV coverage was 60% of expected level of achievement up to May 2004 among infants in Maheshtala. There was no record of the total number of enumerated children below five years of age in the

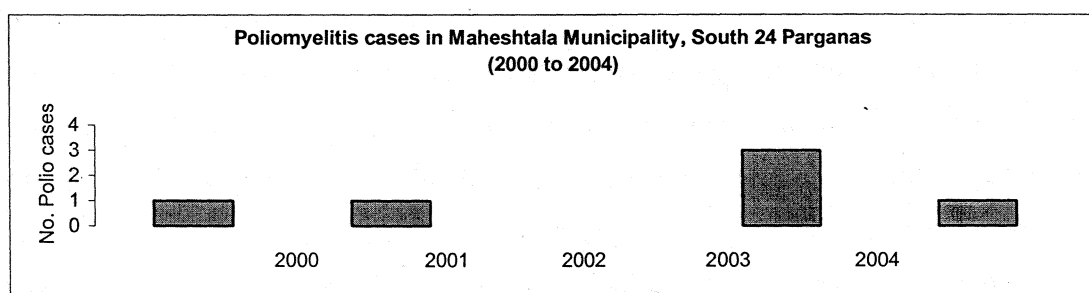
municipality. The number of children vaccinated in the Intensive Pulse Polio Immunization programme during June 2003 to May 2004 ranged from 32388 to 36604 (Figure: 1).

Figure: 1



Polio cases were regularly reported from Maheshtala municipality area during last five years (Figure: 2).

Figure: 2



We made an environmental survey in the Kankhuli Laskarpara locality of Maheshtala municipality on the days of investigation. It was a typical urban slum with dense population (population density about 30,000 per square kilometer). Most of the people lived in single storied pucca houses with asbestos roof. The sanitation was poor. Since it was rainy season at that time, we found water logging in most of the narrow lanes. The waste bins were overflowing in most of the places. There were six ponds, which were used for domestic purpose. The sources of drinking water were tube-wells and PHE stand pipes. We found two PHE stand pipes submerged in the water logging.

We conducted informal discussions with the chairman of the municipality, councilors, community leaders, members of NGOs and local people. The attendance of councilors in the health programmes was less than 30%. The councilor in charge of health reported that seven out of eight sanitary inspector posts were vacant. Three posts (40%) of part time medical officer posts were vacant. The children belonging to families with an income below the poverty level (BPL) were the beneficiaries of Calcutta urban development project. The

functionaries under this project are the only available grassroots level workers for health programmes. So the population above the BPL is not usually covered by government sponsored programmes. NGO response was minimal.

3.1.3. Discussion

The single polio case reported from West Bengal in the year 2004 was from Maheshtala municipality; South 24 Parganas. The male child remained unimmunized even at the age of 18 months. He was never enumerated as an eligible child for Intensive Pulse Polio Immunization programmes. He became a prey of polio and suffered from limpness of the right leg even after sixty days. Though a pediatrician examined him on 12th April 2004, a local practitioner did the official notification of the case as a suspect case of AFP on 22nd April. The outbreak of a polio case in Maheshtala municipality was the cumulative effect of failure of the eradication programme. Poor routine immunization coverage and poor coverage in IPPI programmes (NIDs / SNIDs) lead to building up of pockets of susceptible population. The population movement from neighbouring states increased the chance of transmission of wild virus among the susceptible population. The community did not fully participate in the Government health programmes, as it was inadequate and irregular. There is practically no sanitary system in the municipality. The environment was prone to oro-faecal contaminations especially during monsoon. There was lack of support from the political parties. Community failed to own-up this programme. Local NGO participation was absent.

The Health Management Information System of the Health Department of Maheshtala Municipality was weak in data collection, compilation and transmission. The health workers did not enumerate the beneficiaries before the IPPI programme. Total number of children below five years of age was not known during all programme activities. The impact of IEC programmes was not felt. Overall lack of preparedness in planning, implementation and follow-up was observed.

To eradicate polio from Maheshtala Municipality a multi sectorial approach is absolutely necessary. Health Department must work hand in hand with Social Welfare department, Public Health Engineering and Maheshtala Municipality Administration to improve sanitation. The Chief Medical officer must instruct one of his district level officers to devote on supervising health activities in Maheshtala municipality.

Maheshtala Municipality Health Services needs to be reorganized by submitting an effective plan to the government. The Health infrastructure needs improvement to meet the demand of health care of the locality. Regular advocacy meetings with the political party leaders may ensure their full support during the programme. Health department may organize IEC programmes for awareness generation in the community. The Involvement of NGOs like Indian Medical Association, Indian Public Health Association, Southern Health Improvement Samity, Tagore Society, Child in Need Institution and Amanat Foundation will bring technical, social and financial support in the eradication programme.

If successful, polio will be the second disease after smallpox to be eradicated. The savings of polio eradication programme, once immunization stops can be used to address other public health priorities. Public health experts point to the dire circumstances if the eradication initiative falters now. Failure to eradicate polio would result in resources invested wasted and the work of 20 million volunteers worldwide, international confidence in future global public health initiative being compromised.

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References

- Updated Recommendation of the Advisory Committee on Immunization Practices (ACIP), poliomyelitis prevention in the US. Morb. Wkly Rep. 2000; 49 (RR-05).
- Robbins FC, Nightingale E O. Selective primary health care: Strategies for control of ds in the developing world. Ix Poliomyelitis. Rev. Infect. Ds. 1983;5: 957-68.
- Harrison's Principles of Internal Medicine, 15th edn. McGraw Hill, New York.

3.2. An increase in the number of reported cases of Visceral Leishmaniasis in Canning, West Bengal: Need for new active case finding strategies

Abstract

Background:

December 2003, local newspapers reported an outbreak of Visceral Leishmaniasis including deaths in some villages of Canning sub-division. An Investigation was conducted to understand the nature and extent of the outbreak including its etiological factors and to suggest possible control measures.

Methods:

Cases were defined as a person residing in Chatrakhali village, showing clinical signs (mainly prolonged irregular fever, splenomegaly and weight loss) with serological and/or parasitological confirmation since January 2004. Active case search by house-to-house survey was conducted in Chatrakhali, one of the villages where most of the cases were identified between January 2004 and June 2004. Clinical examination conducted and blood samples were collected from all (787) villagers for direct agglutination test.

Results:

There were 181 cases with a prevalence rate of 23.8% (95% CI: 20.6%, 26.7%). It was equal in both sexes and most prevalent in 6-14 years age group. Surveillance record review over a period from 1995 to 2004 showed that there was a sharp increase in the number of cases in first half of 2004 as compared to the previous years. By the end of July 2004, the total number of cases of Kala-azar identified had reached 809, compared with 129 and 185 in 2003 and 2002, respectively. Among those tested, the proportion of persons testing positive had remained stable.

Conclusions:

The increased reported number of cases in 2004 was a pseudo-outbreak secondary to active case search in an endemic village like Chatrakhali in Canning sub-division. Recent improved case finding caused the recent increase in the number of people identified. Kala-azar is a real public health problem in the South 24 Parganas district. However, what was perceived to be an acute problem was a chronic situation. The low level of case detection activities had led to a progressive accumulation of cases. This study invites for more in depth analytical studies to develop new active case finding strategies for Kala-azar control.

Key words: house-to-house survey, Kala-azar, pseudo-outbreak, active case search, control strategies.

3.2.1. Introduction

Visceral Leishmaniasis (VL) is being reported from about 47 countries around the world, which include 15 African countries, 16 Asian, and eight each from American and European continents. Approximately 200 million people are at risk and 100,000 cases with 5000 deaths occur annually (R. C. Mahajan *et al*, 1999). WHO estimates that the disease is responsible for 100-200 days of life lost per case (WHO 1990)(1,8,9). Leishmania / HIV co-infection is considered as a public health problem (WHO 1997)(2). Actual estimation of the incidence and prevalence of Kala-azar cases is difficult. Fluctuations of cases occur in a short period of time during epidemics (3). The distribution of the disease is focal. Often the cases are misdiagnosed or under diagnosed. The case burden may be 4 – 5 times higher than the reported cases (5).

In India, (Kala-azar) Visceral leishmaniasis, occurs epidemically and endemically in well defined areas in the eastern parts of the country, including Bihar, West Bengal, eastern districts of Uttar Pradesh, Assam, foothills of Sikkim, and to a lesser extent in Tamilnadu and Orissa (3). Indian Kala-azar is a non-zoonotic infection with man as sole reservoir. All age groups are affected, with a highest prevalence between 5-9 years of age. The resurgence of Kala-azar in West Bengal started after 1980. At present, 9 districts of the state are endemic for Kala-azar (4). Population movement introduced the disease from Bihar and Bangladesh. South 24 Parganas district is one of nine endemic districts of West Bengal, but the disease is almost confined to the of Canning sub-division in the southeastern part of the district.

In December 2003 local newspapers reported an outbreak of Kala-azar including deaths in some focal areas of Basanti of Canning. Surveillance data on Kala-azar of this region indicated that there was an increase in the number of reported cases between January and June 2004 in comparison to last five years. No similar episode occurred in last five years. In response to the request of the State and District health authorities, we led an outbreak investigation team on 8th April 2004 at Chatrakhali, one of the villages where most of the cases were identified. The presence in South 24 Parganas district of a team of public health personnel provided an opportunity to investigate this outbreak and to suggest possible control measures based on the findings.

3.2.2. Methods

Public health surveillance

We defined a case of Kala-azar as a physician diagnosis of clinical signs and symptoms of Kala-azar in a person residing in Chatrakhali village, with serological confirmation which occurred since December 2003.

Active case search

We conducted an active house-to-house case search in Chatrakhali village. Medical officers examined all residents and took blood samples on "Whatman" filter paper for Direct Agglutination Test in the laboratory. The laboratory of School of Tropical Medicine, Kolkata, examined all the samples for serological confirmation. All confirmed Kala-azar patients were treated with Injection Sodium Antimony Gluconate (10mg/ kg body weight IM / IV *15 days * courses)(6). Repeated blood samples were taken from patients whose bloods were positive at 400 dilutions, to see any rise in titre include them as cases.

Surveillance record review in Canning and in district office

We reviewed surveillance record over a period from 1995 to 2004 (June) in Canning sub-divisional hospital. We reviewed all hospital and sub-centre records to identify similar episodes of the previous years. We compared records to understand the details of possible outbreak. We collected records of the number of patients tested and number of positive tests was collected from Canning sub-divisional hospital. We reviewed surveillance records of the reported Kala-azar cases from Canning to the district office. We compared these to understand the endemicity of Kala-azar in this area.

Environmental investigation

We surveyed the Chatrakhali village and unaffected adjacent areas to understand the possible environmental factors and transmission dynamics. We looked for the presence of possible risk factors with respect to housing, including the type of house, dampness, ventilation and adequate light. We recorded ownership of domestic animals among the households. In addition an epidemiological team from Rajendra Prasad Memorial Research Institute of Medical Science (ICMR) Patna conducted an entomological survey on 24 houses selected randomly on 5th April 2004 (9).

We interpreted data through the interviews using the questionnaires. We calculated proportions. EPI-6 software (Atlanta, GA, USA) was used for Univariate analysis.

3.2.3. Results

Descriptive epidemiology

The reference laboratory of School of Tropical Medicine, Kolkata, reported a total of 181 Kala-azar cases and three deaths from Kala-azar between 1st January 2004 and 30th June 2004. (Population: 760, period prevalence: 23.8%, case fatality ratio: 1.7%). The monthly number of reported cases from Canning to the district health authority peaked during the month of April 2004 (when the case search was conducted) and then decreased during the month of June 2004 (Figure: 1). The disease affected all age groups but prevalence was highest among 6-14 years age group and much lower among the adults, 46 –60 years. The prevalence did not differ by sex (Table: 2). The investigating team examined all villagers. Weight loss, anorexia and fever were the most common signs and symptoms among 181 Kala-azar cases (figure: 2).

Surveillance record review

Laboratory records indicated that during January 2004 to June 2004 there was increase in the number of tests requested compared with the previous years (Figure 3). However the proportion of positive test did change over time (Figure 3). The total number of reported cases ranged from 104 to 178 annually between 1999 and 2003. In 2004 (August), the reported number of cases was 594 (Table: 1).

Environmental investigation

All villagers lived in mud houses with thatched roofs. There were only one to two rooms in each house accommodating an average of five persons in each room. There were little ventilation and illumination. There were neither beds nor bed nets. Villagers had domestic animals including cows, pigs and poultry. Cultivation was the main occupation and the village was surrounded by paddy fields. Two tube wells and four wells are source of drinking water. There were eight ponds with stagnant water for domestic use.

3.2.4. Discussion

Kala-azar is highly endemic to the Canning sub-division of South 24 Parganas district of West Bengal. Chatrakhalī is one of the villages from where most of the cases were identified. The disease cause substantial mortality and morbidity. In addition, it created major concern in the public as the local newspapers have highlighted it. The reported number of cases increased when health department conducted house-to-house survey. The environment of the village favoured sandflygenic conditions.

The acute increase in the number of reported cases in 2004 were a pseudo- out break secondary to active case search. The district health authority initiated an active case search in some villages of Canning between January and June 2004. A large number of cases were identified during this period (figure: 3). It was not an acute problem but rather the problem was chronic. Although there was a sharp increase in the number of tests requested, the proportion of positive tests did not change over time (Figure: 3). The increased number of cases was a consequence of better case finding. Epidemiological investigation suggested that the lifestyle and environmental conditions favoured high exposure to the vectors. The village was surrounded by paddy fields, which favoured breeding of sand fly. Entomological survey reported high vector density in Chatrakhali village. The dampness of the mud houses, poor ventilation, and insufficient light, absence of bed nets and cots and presence of domestic animals were significantly associated with altered risk to Kala-azar infection (10).

The study had some limitations. The cases were confirmed by serology in the absence of parasitological confirmation. But the testing tool was Direct Agglutination Test, which was found 96.5 - 100% sensitive and 91 – 95% specific in India and Mediterranean countries (11).

The yield of large number of positive cases by a mass survey strategy in an endemic village indicated that the current case finding strategies by the health department were insufficient to address the burden of Kala-azar in the region.

This situation can be prevented by 1) developing a plan of action to control Kala-azar including a new active case finding strategies in the Canning sub-division, West Bengal, 2) Focus immediate preventive efforts on Chatrakhali, 3) Reduce exposure to sand flies by vector control (insecticidal spray with DDT), Use of insecticide impregnated bed nets, use of techno-ecological measures like plastering the walls and floor up to one foot from the angles on both sides or Malathion paint formulation, in the form of slow released emulsified suspension applied on the walls (S.K.Kar *et al* 1999). Intervention studies in this region will be very useful to plan future control measures by the health department. 4) District health authority must organize advocacy meetings to explain to the press and decision makers about the situation. There is a need to evaluate the Kala-azar control programme in the district.

Acknowledgements

I thank Dr Debasish Maji and Mr. Pradumnya Patra who provided the surveillance data, health workers of Basanti block who collected the data for the house-to-house survey. I am grateful to Prof. Amitava Nandy, Dr. R. Ramakrishnan and Dr. Yvan Hutiny for their technical guidance during the survey.

References

1. World Health Organization Control of Leishmaniasis. Technical Report Series. 1990; 793 WHO. Geneva pp 9-112.
2. World Health Organization Leishmaniasis / HIV co-infections. Weekly Epidemiological Record 1997; 72: 49-56.
3. Marin Kelle C J. The Control of Leishmaniasis. Bull. WHO 1980; 58: 807-818.
4. Nandy A, Addy M, Chowdhury A and Ghosh A. In Proc. International Workshop on Leishmaniasis, Ottawa, Canada pp1988; 8-15.
5. Report of Expert Committee on the control of Leishmaniasis- 1990 WHO Technical Report Services No. 793.
6. The Leishmaniasis: Control of Tropical Diseases – WHO, 1993, Geneva.
7. Progress Report – 1996, WHO, Division of Control of Tropical Diseases, Geneva.
8. Report of WHO, Division of Control of Tropical Diseases – March 1999, Geneva.
9. Rajendra Memorial Research Institute of Medical Sciences, Patna – 2004 – Personal Communication.
1. Bern C, Joshi AB, Jha SN, Das ML, Hightower A, Thakur GD, Bista MB. Division of Parasitic Diseases, National Center for Infectious Diseases.
2. Singh S, Recent Advances in the Laboratory Diagnosis of Leishmaniasis. In: Indian Kala-azar Shyam Sunder (Eds). 1996; pp 39-56.

Tables and Figures

Figure 1. Cases of Kala-azar by date of reporting, Chatrakhali village, South 24 Parganas, West Bengal, India, 2004

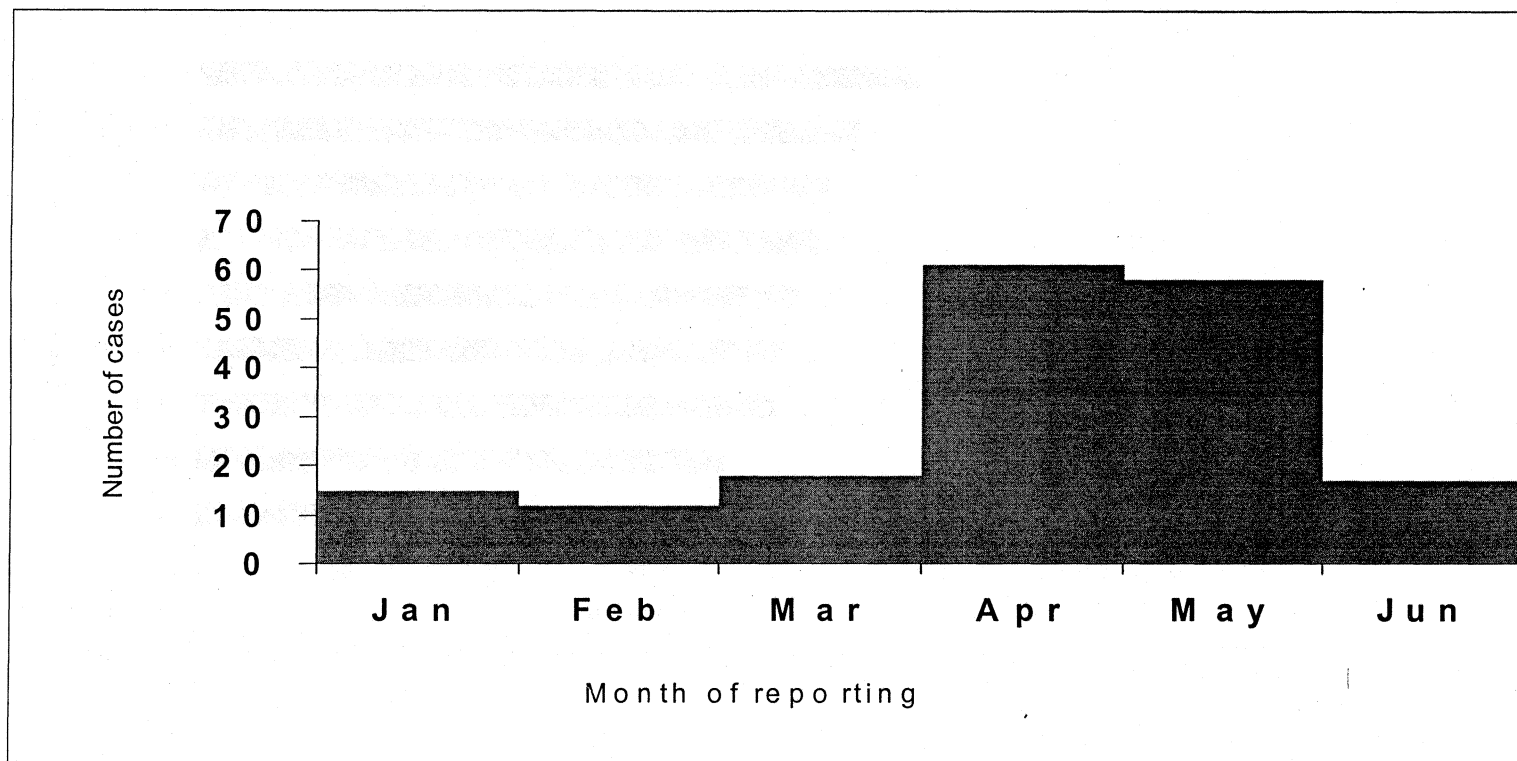


Figure 2. Distribution of signs and symptoms in Kala-azar cases in Chatrakhali village, South 24 Parganas district, West Bengal, India, 2004 (n=181)

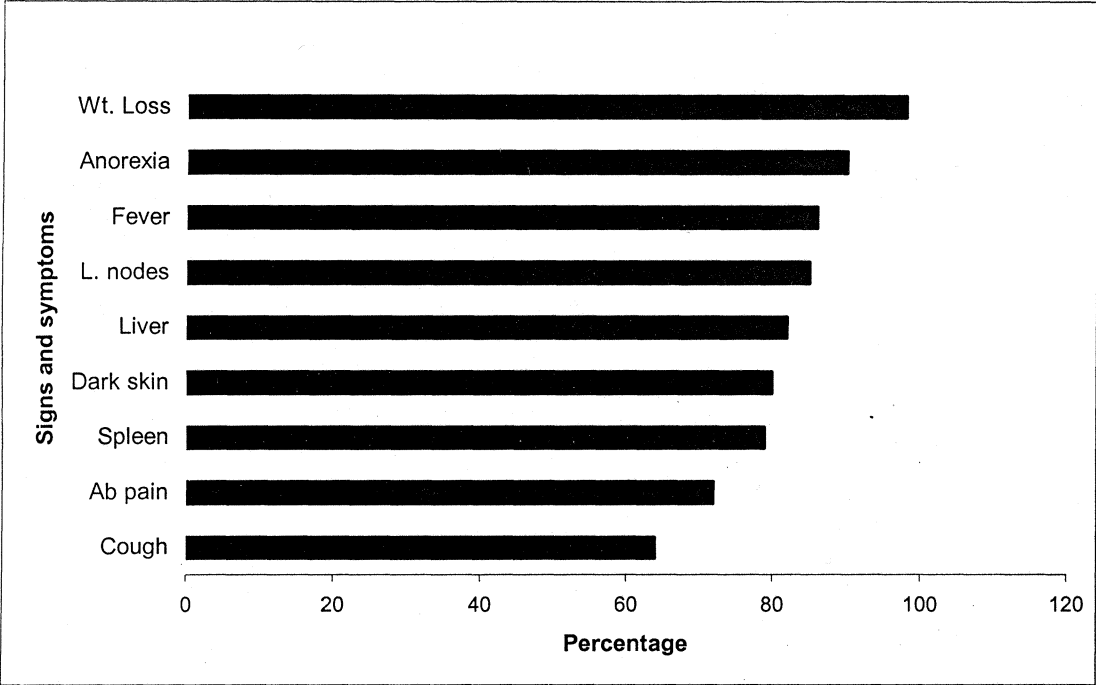
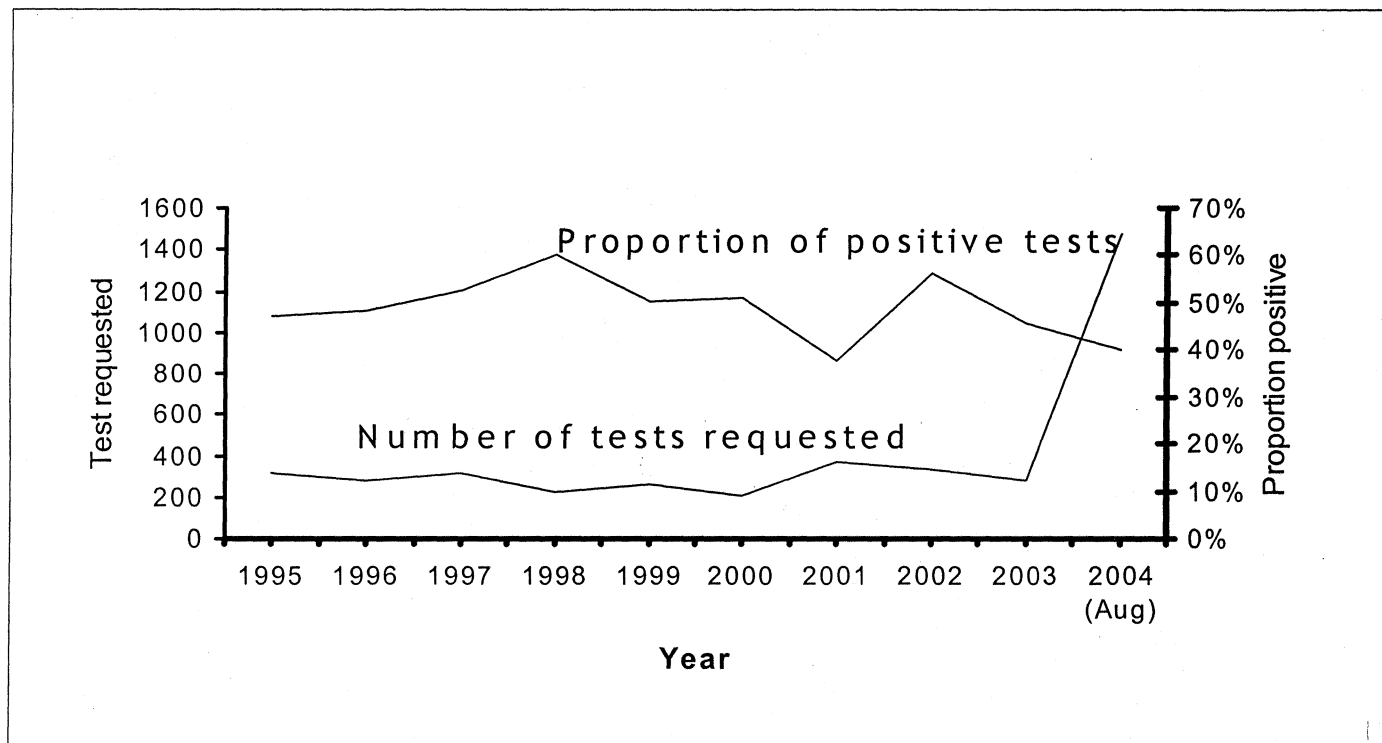


Table 1. Period prevalence of Kala-azar by age and sex groups, Chatrakhali Village, South 24 Parganas, West Bengal, India, January - June 2004

Age group	Cases/Total	Prevalence (%)
0-5 years	21/98	21.4
6-14 years	47/121	38.8
15-45 years	94/414	22.7
46-60 years	12/91	13.2
>60years	7/36	19.4
Male	90/391	23.0
Female	91/369	24.7
Total	181/760	23.8

Figure 3: Blood samples requests for Kala azar, Canning, South 24 Parganas, West Bengal, India, 1995 - 2004



3.3. Cholera Outbreak at Kachua village of Magrahat-I block, South 24 Parganas, West Bengal, India, 2004.

Abstract

Background:

Outbreaks of cholera are common in the gangetic area of India and Bangladesh. We investigated an outbreak of 55 cases of severe diarrhoea that was reported from Kachua village, South 24 Parganas district, West Bengal, June 2004. Of these, 18 were hospitalized. We tested 28 stool samples and seven water samples for isolation of causative organism at the National Institute of Cholera and Enteric Diseases, Kolkata. No food sample was collected.

Methods:

We reviewed all available hospital and sub-center records for the present and previous years and compared the records to understand the possible outbreak. Conducted a matched case control study to identify the possible exposure variable. We defined a case will be occurrence of three or more loose stool in a day with or without vomiting and with or without dehydration in a person in Kachua village since 15th June 2004. We selected neighborhoods controls also matched for age (+/- one year) and sex.

Results:

There were clustering of cases around three ponds; a total attack rate and case fatality was 4.4% and 3.6% respectively. Attack rate was highest (11.6%) among 0 to 4 years of age group. Matched case control study implicated the exposure of bathing in pond water (Odds Ratio_{M-H}: 7; 95% C.I., 2.8 to 17). The attributable risk percent in the exposure to bathing in pond water was 86%. Consumption of food from street vendor had an odds ratio_{M-H} of 2.3 (95% C.I., 1.06 to 5). Odds ratios_{M-H} for other exposures was not significant. *Vibrio Cholerae* El-tor O1 Ogawa was isolated from six out of 15 rectal swabs. Faecal contamination was found in two water samples collected from ponds.

Conclusions:

The present outbreak of Cholera (*Vibrio cholera* O1 Ogawa) was due to ingestion of contaminated pond water during mouthwash while bathing in ponds. The ponds were contaminated by the practice of washing soiled linens in the pond and sewerage from household drains into the near by water body. We therefore encouraged villagers to bathe in tube well water.

3.3.1. Introduction

Since 1800, cholera has spread throughout the world in seven large waves, called pandemics. The seventh pandemic began in 1961 in Indonesia and affected approximately 100 countries until now. Severely affected countries have reported national attack rates of over 1% of their population. In some areas with severe epidemics, attack rates of 20% have been recorded. Case fatality ratios have been as high as 33% - 50% in areas where medical treatment is not available. The outbreaks of cholera are common in the gangetic area of India and Bangladesh. The agent of cholera that used to be *Vibrio cholerae* classical is now replaced by *Vibrio cholerae* Eltor that has less severe symptoms. Cholera commonly spreads through fecal oral contamination. A dose of more than one million organisms is usually needed to cause illness. Transmission by direct person-to-person contact, such as touching patients, is rare. Water is also frequently contaminated in the home when inadequately washed hands come in contact with stored water. Bathing or washing cooking utensils in contaminated water can also transmit cholera. Only *Vibrio cholerae* serogroup O1 and serogroup O139 are known to cause *epidemics* of cholera. Immunity due to previous *Vibrio cholerae* infection is serogroup specific. There are other serogroups of *Vibrio cholerae*, that can cause isolated cases of watery diarrhea, but they do not cause outbreaks. The current seventh pandemic of cholera is due to *Vibrio cholerae* O1.

Cholera outbreaks are common in West Bengal. There were 1,989,136 cases and 1,770 deaths in West Bengal during 2004. The sanitary system is poorly developed in the urban areas and it is almost non-existent in the rural areas. There are lots of ponds in the villages, which are mostly contaminated by faecal matter. A FETP scholar recently investigated a cholera outbreak in Haora district and reported that consumption of contaminated pond water was the most likely cause. There were recent reports (2003 – 04) of sporadic outbreaks in South 24 Parganas.

On the morning of 23rd June 2004 the field health workers of Khapur sub-center of Magrahat-1 block, informed the medical officer block health centre, over telephone that a person died due to acute diarrhoea in of Kachua village on 16th June 2004. Twenty-five more villagers were also suffering from acute diarrhea and they observed clustering of cases. The Kachua village of Magrahat-1 block of South 24 Parganas district is located about 40 Km. away from Kolkata city. The nearest hospital (Baneshwarpur BPHC) is 3 Km. away. The village has a population of 1314 (2004). Most of the people of the village depend on cultivation and business. We investigated an outbreak investigation to identify the

etiological agent, the source of infection and the mode of transmission and to propose recommendations for the control of the outbreak.

3.3.2. Methods

Public health surveillance

We reviewed all available hospital and sub-center records for the present and previous years. We compared the records to understand the possible outbreak. We defined a case as the occurrence of three or more loose stool in a day with or without vomiting and with or without dehydration in a person in Kachua village since 15th June 2004. We carried out a rapid survey with the help of members of the investigation team and volunteers from the locality. We enlisted the cases according to the date of onset.

Environmental assessment

We visited the unaffected adjacent areas (Khapur and Rabindrapalli) to understand the possible environmental factors and transmission dynamics. We also collected water samples.

Analytical study

We conducted a matched case control study, using our case finding definition. We selected neighborhoods controls also matched for age (+/- one year) and sex. Then we prepared questionnaire to collect information about symptoms, treatment history and a number of potential exposures including bathing habit; food habit and drinking water used. We calculated the matched odd's ratio for the suspected exposures according to matched case control study.

Laboratory procedure

We collected a total of 15 rectal swabs in Cary Blair transport media – two from the two patients admitted at the hospital and 13 from the patients during field investigation. We collected seven water samples – three from the taps adjacent to the households of patients, two from tube wells and two from ponds used regularly by the community. The National Institute of Cholera and Enteric Diseases, Kolkata, analyzed the samples.

3.3.3. Results

Descriptive Epidemiology

The medical officer and public health personnel informed that no such similar episodes occurred in the corresponding periods of the previous three years in this village in such magnitude. In this context, present episode was considered as an outbreak. There were a total of 55 cases (Attack rate: 4.2%) in Kachua village. Two patients died (case fatality rate: 3.6%). Mean duration of illness was 2.8 days. All the 55 patients presented with watery diarrhoea, 44 (80%) complained of vomiting, and all presented with moderate to severe dehydration. 18 (33%) patients were admitted in the hospital with severe dehydration. Mean frequency of passing stool at the onset of illness was 10.3 times per day.

The index case was a child of one year nine months age, unimmunized, malnourished and suffered from acute watery diarrhea on 15th June 04. He was a child of a local quack practitioner. He received oral rehydration therapy and died at home on 16th June 04. Then two cases were reported on 17th June. There was sharp rise in the reporting of cases with a highest reporting of 20 cases on 22nd June. Subsequently the number of reported cases reduced. The outbreak continued until the 25th June 04 (Figure I).

The 0-4 year age group was most affected (11.6%, Table 1) followed by 5-14 years age group (8.6%). The >60 years group was least affected. Incidence of cases was also similar for both the groups (4 for both male and female) on the whole.

The cases of cholera were scattered throughout the village figure 2 with clustering to some households locating besides the water bodies.

Environmental assessment

There were no common festival or mass gathering within a week of starting of the outbreak. There was one street food vendor coming to the village. We could not find any relevant clues for the outbreak except the water sources.

Source of drinking water supply in both affected and unaffected adjacent areas were mainly the nearby water reservoir supplied through tap-water supply and tube wells. There were five tube-wells, three tap-water sources and twelve ponds in Kachua village. The population used tap water or tube-well water for drinking and cooking. However, they also used pond water to clean the utensils and other purposes, such as washing and bathing.

The ponds were half filled with water, green in colour due to presence of algae and planktons. However, ninety percent of the household has a sanitary latrine. There was no sewerage system and liquid waste drained directly into the water bodies.

We isolated V. Cholerae 01, El Tor Ogawa from six stool samples out of the 15 collected from the patients. No pathogens could be isolated from the two stool samples of two patients admitted in the hospital who had received antibiotics at the hospital. All the strains of V.cholerae O1 were uniformly susceptible to Tetracycline, Doxyclyne, Azithromycin and Ceftriaxone. Few strains showed reduced susceptibility to Ciprofloxacin and Norfloxacin. All the strains were resistant to Cotrimoxazole.

Analytical Epidemiology

Matched case-control study

We recruited 55 cases and 55 controls. Cases and controls were similar according to religion and income. 47(86%) cases and 49(89%) controls were Muslim (p-value= 0.29) and 33(60%) cases and 29(53%) controls live below poverty line (p-value=0.23) (Table 2). McNemar Chi-square analysis of the relationship between data from cases and data from controls (two dichotomous variables, paired) in the case-control study of 55 subjects in Kachua village are shown in table 3. McNemar Chi-square for bathing in pond water was highly significant (Chi-square=15.8, p-value <0.0005). Bathing in tube-well water had McNemar Chi-square of 17.6, (p-value < 0.0005). Consumption of food from street vendor had McNemar Chi-square of 4.4 (p-value <0.05). McNemar Chi-square for other exposures were not significant

3.3.4. Discussion

The outbreak of cholera in Kachua village was explosive in nature attacking 55 persons and two deaths within a short period. Though the villagers drank and used for cooking tap or tube well water, they used contaminated pond water for bathing, mouth washing and clean utensils. Persons using pond water for bathing has high risk of getting infected by cholera. Laboratory tests of pond water found pathogens in it. One street food vendor sold tiffin regularly. The risk for cholera infection by consuming food from the vendor was significant. Use of tap water and tube well water for drinking, cooking and bathing was safe.

There was no festival or ceremony just before the outbreak. So the chance of outbreak from a common gathering or festival was unlikely. The index case was a child of a local quack practitioner. He might acquire the infection from the clinic. The family members washed the soiled linens in the pond adjacent to their house. Most of the villagers bath in the ponds. During taking bath people put water in their mouth for mouthwash, some of the

contaminated pond water is ingested. This leads to faecal-oral transmission and propagation of the disease. In the Muslim community, it is customary to visit the diseased person. So all the neighbors might have come to the house of the index case that died and due to lack of personal hygiene they might have been infected and there was also person-to-person transmission of the disease.

One street vender sold tiffin early in the morning regularly. The risk for consumption of food from street vendor was significant (odds ratio: 2.3; 95% CI: 1.06 to 5). But food samples were not tested since he did not visit the village during our investigation. We could not assess on his practice of systematic food handling and personal hygiene. There is a possibility of incorrect food handling practice or unsatisfactory personal hygiene practice that led to transmission of the disease from person-to-person.

We had some limitations in our study. We could not collect food samples from the street vendor to test it in the laboratory for presence of pathogens. So we are not sure to implicate it as a causal factor for the recent outbreak. We also did not collect information of different practices of the villager about use of pond water. This prevented us in identifying the actual practice, which is causal for transmission of cholera.

Based on clinical, epidemiological and laboratory findings, we can conclude that the outbreak of acute watery diarrhoea in Kachua village was an outbreak of Cholera (*Vibrio cholera* O1 Ogawa). The cholera outbreak in Kachua village was notified on time and investigation was started as soon as it was noticed. The outbreak of cholera was due to ingestion of contaminated pond water during mouthwash while bathing in ponds. The ponds were contaminated by the practice of washing soiled linens in the pond. We did inter personal communication and health education to all the individuals. The water sources were chlorinated and people used boiled water for drinking purposes.

From our present study we recommend that health education may be given to community regarding personal hygiene, water use, disposal and disinfection of faeces and linens used by the patients, use of oral rehydration salts and home available fluids for the home management of diarrhoea. The health staffs with the help of villagers notify the contaminated ponds. They will identify some ponds for disinfection by the health department and educate villagers about water sanitation. A laboratory support service is necessary to be established at the district level, at least, to detect the cause of the outbreak.

Conflicts of interest

The author has no conflicts of interest concerning the work reported in this paper.

Acknowledgements

I am grateful to the National Institute of Epidemiology, Chennai and National Institute of Cholera & Enteric Diseases, Kolkata for allowing me to undertake this study internationally famed institute. I express my sincere thanks to Dr.R. Ramakrishna, Assistant Director, NIE, Chennai and Dr. Mihir Bhattacharya, Assistant Director, NICED, for their positive attitude, keen interest and wholehearted cooperation during the course of my study. I am grateful to Dr.Pradip Kumar Mondal, Chief Medical Officer of Health, South 24 Parganas, Dr.Dipankar Majhi, Deputy CMOH II, South 24 Parganas, the health workers, and the villagers of Kachua for their help to conduct the study.

References

1. Last, H.W., A Dictionary of Epidemiology. New York: Oxford University Press.
2. Centers for Disease Control. "Investigation of disease outbreaks, Principles of Epidemiology."
3. Evans, A.S. "Epidemiological Concepts and Methods."

Figure 1. Distribution of Cholera cases by date of occurrence, Kachua village, South 24 Parganas, West Bengal, India, 2004

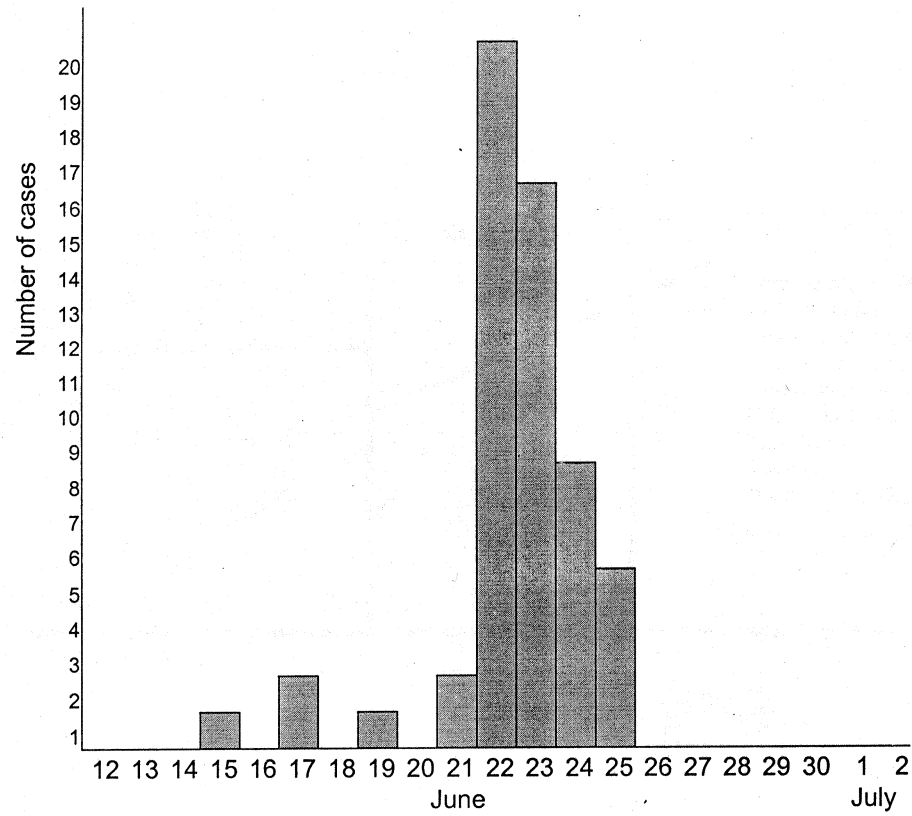


Figure 2. Spot map of Kachua village, South 24 Parganas, West Bengal, India, 2004

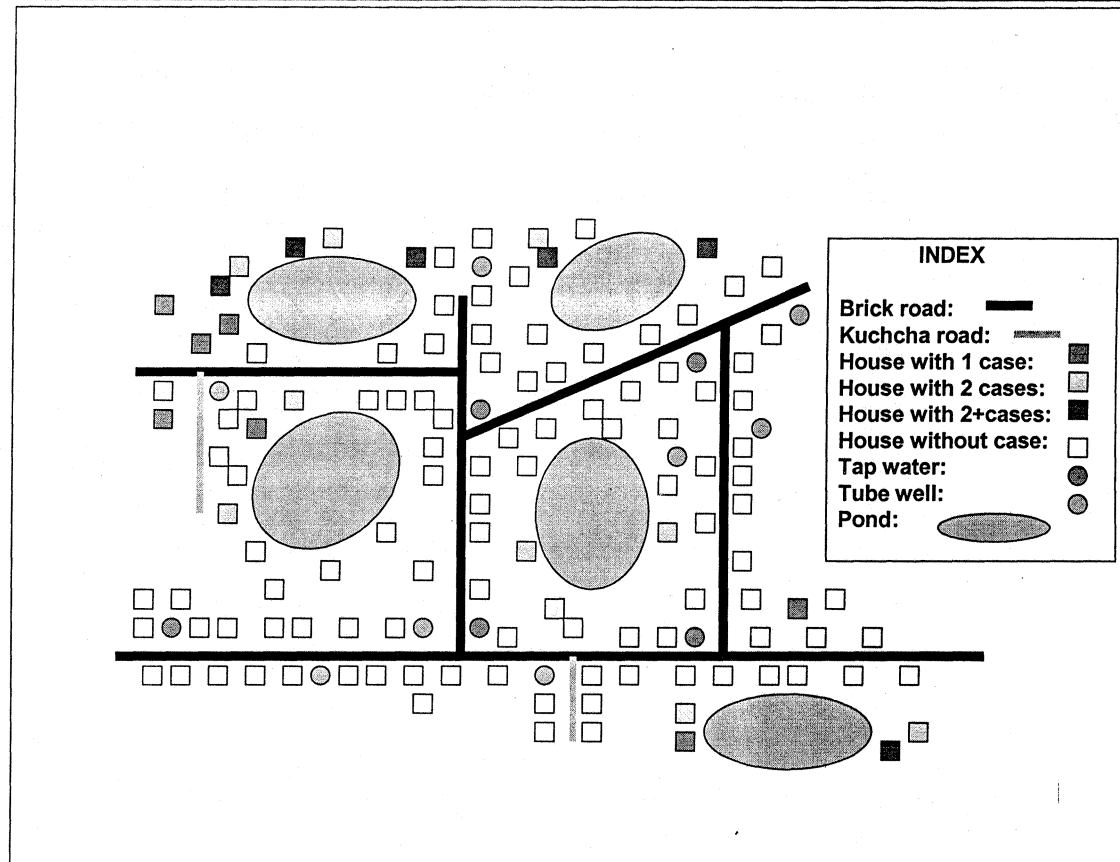


Table 1. Age and sex specific attack rates of cholera cases in Kachua village, South 24 Parganas, West Bengal, India, 2004 (n = 55).

Exposures		Number of cases	Population	Incidence (%)
Age group in years	0 to 4	15	129	12
	5 to 14	18	210	9
	15 to 44	21	717	3
	45 to 59	1	159	1
	60+	0	99	0
Sex	Male	28	666	4
	Female	27	648	4
Total	Total	55	1314	4

Table 2: Characteristics of cholera case-patients and control-subjects, Kachua village, South 24 Parganas, West Bengal, India, 2004

Characteristics	Cases (n=55)		Control (n=55)		P value
	#	%	#	%	
Age greater than 15 years	33	60	33	60	0.5
Male sex	28	51	28	51	0.5
Muslim	47	86	49	89	0.3
Income below poverty line	33	60	29	53	0.2

Table 3. Selected exposures among case-patients and control-subjects, matched case-control study, Kachua village, South 24 Parganas, West Bengal, India, 2004

Exposures		Members of discordant sets		Matched odds ratio _{M-H}	95% confidence interval
		Case exposed	Control exposed		
Drinking water	Daily consumption of tap water	9	11	0.8	0.3 - 2
	Daily consumption of Tube well water	9	12	0.75	0.3 - 1.9
Food intake	Consumption of watered rice	6	4	1.5	0.4 - 6.3
	Consumption of food from street vendor	17	6	2.8	1.1 - 8
Bathing practices	Bathing in tap water	10	13	0.8	0.3 - 1.9
	Bathing in tube-well water	3	27	0.1	0.0 - 0.4
	Bathing in pond water	25	3	8.3	2.4 - 35
	Bathing in dug-well water	9	10	0.9	0.3 - 2.4

SECTION - 4

PUBLISHED

ARTICLES

4.1. Life Events as Risk Factors For Myocardial Infarction: A Pilot Case-Control Study in Kolkata, India

[This paper was published in the Journal of Health, Population and Nutrition 2005 June; 23 (2): 131-136 © 2005 ICDDR, B: Centre for Health and Population Research. ISSN 1606-0997]

ABSTRACT:

This case-control study was conducted in the Cardiology Department of Medical College, Kolkata, India, during 2000-2001, to explore the link between stressful life events and subsequent myocardial infarction (MI). One hundred consecutive confirmed MI patients were selected as a case group. One hundred age-, sex- and income-matched controls were selected from visitors other than relatives who attended these patients. The subjects were interviewed and asked to rate 61 life events with a number between 0 and 20. They also noted which of these they had experienced in the last one-year. The main exposure variables include life events as per E. S. Paykel, smoking, alcohol consumption, chewing of tobacco, marital status, literacy, employment, and monthly per-capita income. The results showed that an MI patient was likely to experience 4.16 stressful life events, which were twice as much as the control group (2.24). The total stress score was the highest for serious personal illness followed by illness of family members and unemployment for the MI patients. For the controls, conflict between husband and wife, death of friends, and personal illness had the highest total stress score. The mean stress score for the MI patients was 35.5 compared to 17.4 among the controls. The MI subjects were more likely to have experienced stressful life events than the controls.

Key words: Myocardial infarction; Life events; Stress: Risk factors; Case-controlled studies: India

SECTION –5

PAPER

PRESENTATIONS

5.1. Evaluation of the Kala-azar (Visceral Leishmaniasis) Control Programme in South 24 Parganas District, West Bengal, India, 2005.

Abstract

Background:

In January 2004, a newspaper report made reference to a cluster of Kala-azar cases and four deaths in the block of Basanti, India. Public managers are asking themselves why cases accumulated and whether the problem comes from a failure to apply the proposed strategy or from its limitations. These queries prompted us to consult with public health officials and organize an evaluation of the Kala-azar control programme in the district.

Methods:

We reviewed records and documents, including WHO guidelines, national guidelines and operation manuals. We interviewed stakeholders and conducted direct observations of procedures in the field.

Results:

The key elements for control of visceral leishmaniasis in India include case finding and treatment, vector control and IEC. 7/12 (58%) medical officers and 72/89 (81%) health workers trained for Kala-azar. Sufficient lancets, slides and reagents provided but there were no facility to preserve slides. 36 persons' full time was utilized to conduct ten mass surveys. The district authority provided 1000 insecticides-impregnated bed nets and subsidies for improving housing to families below poverty line. Out of 2674 blood samples examined, 809 (30%) blood samples were positive. All confirmed cases were treated. Patients were not followed up after completion of treatment. All the cases identified were cured.

Conclusions:

The number of persons screened in 2004 was low. It is therefore necessary to trace back the causes of this poor case finding output. The inputs seem sufficient although it is unclear what resources would be available if mobile teams had to screen actively and regularly in villages. In contrasts, the process however is poor as there is no standard procedure in place to conduct mass screening and there is no algorithm to optimize passive screening in health care facilities.

Vector control was insufficient, with 20% house missed for spraying activities. In addition, only one of the two rounds occurred. 72% of persons slept under bednet, but the village benefited from a special pilot distribution scheme. Most persons live in houses that have cracks in the wall that constitute potential breeding sites. In addition, the communication activities were limited.

(Presented at third MAE-FETP annual conference at Chennai, 29th July, 2005. This paper was also invited for oral presentation at Bi-regional WPRO-SEARO TEPHINET Conference, 9-12 January, 2006, Chennai, India)

5.2. Cholera Outbreak at Kachua Village of Magrahat-I block of South 24 Parganas District, West Bengal, India, 2004.

Abstract

Background:

Outbreaks of cholera are common in the gangetic area of India and Bangladesh. We investigated an outbreak of 55 cases of severe diarrhoea that was reported from Kachua village, South 24 Parganas district, West Bengal, June 2004. Of these, 18 were hospitalized. We tested 28 stool samples and seven water samples for isolation of causative organism at the National Institute of Cholera and Enteric Diseases, Kolkata. No food sample was collected.

Methods:

We reviewed all available hospital and sub-center records for the present and previous years and compared the records to understand the possible outbreak. Conducted a matched case control study to identify the possible exposure variable. We defined a case will be occurrence of three or more loose stool in a day with or without vomiting and with or without dehydration in a person in Kachua village since 15th June 2004. We selected neighborhoods controls also matched for age (+/- one year) and sex.

Results:

There were clustering of cases around three ponds; a total attack rate and case fatality was 4.4% and 3.6% respectively. Attack rate was highest (11.6%) among 0 to 4 years of age group. Matched case control study implicated the exposure of bathing in pond water (Odds Ratio_{M-H}: 7; 95% C.I., 2.8 to 17). The attributable risk percent in the exposure to bathing in pond water was 86%. Consumption of food from street vendor had an odds ratio_{M-H} of 2.3

(95% C.I., 1.06 to 5). Odds ratios_{M-H} for other exposures was not significant. *Vibrio Cholerae* El-tor O1 Ogawa was isolated from six out of 15 rectal swabs. Faecal contamination was found in two water samples collected from ponds.

Conclusions:

The present outbreak of Cholera (*Vibrio cholera* O1 Ogawa) was due to ingestion of contaminated pond water during mouthwash while bathing in ponds. The ponds were contaminated by the practice of washing soiled linens in the pond and sewerage from household drains into the near by water body. We therefore encouraged villagers to bathe in tube well water.

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