

FIELD PROJECT REPORTS

By



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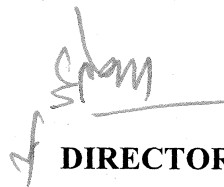
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CERTIFICATION

This is to certify that all the field projects submitted in this bound volume are the original works carried out by Dr. Bijay Prasad Mukhopadhyay during the two field postings of six months duration each under the guidance of the faculties of the National Institute of Epidemiology (ICMR), Chennai. This is in partial fulfillment of the requirements for the degree of Master of Applied Epidemiology and has not been submitted earlier, in part or whole, for any other publication or degree.

Date

30/1/19


DIRECTOR

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Dr. Bijay Prasad Mukhopadhyay

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Section 1: First field posting

Situation analysis of Hooghly District, West Bengal, India, 2007

Background

Before joining the MAE-FETP course at National Institute of Epidemiology, Chennai, I was superintendent of a state general hospital in Howrah district of West Bengal providing curative service cover to seven blocks and additional charge of monitoring another two blocks.

After my enrolment into the FETP course the West Bengal government placed me as their medical officer on trainee reserve (MOTR) for two years (2007-2008) in Hooghly district, West Bengal. During my MAE-FETP experience, I planned to share my experiences with my colleagues and guide the health personnel in (1) data collection, compilation, basic analysis for early necessary actions (surveillance) after identifying the priority areas, (2) the in depth analysis of one or two of those situations through the retrospective data analysis (secondary data analysis), (3) to find whether any information system existed for identification of the trigger events (analysis of the surveillance system), (4) also to find out whether there was any ongoing program running to address those particular health issue (program evaluation) and lastly (6) to study the special factors (determinants), if any, concerned with the special problem (topic for dissertation). As an epidemiologist I prepared to arrange for early detection, reporting, investigation and control of outbreaks. In this analysis I reviewed the public health impact of geographic and socio-demographic situation in Hooghly district and the available laboratory resources. I identified the public health priorities in the district. Further, I described the organization of health system and examined the current status of Millennium Development Goals

Description of the location of assignment

General presentation

We visited the offices of the chief medical officer of health (CMOH), Hooghly and his staff officers to get the initial idea about the district as a whole, their organization structure and functioning at different levels. We also visited the general administration offices including the meteorological sector for review of the general geographic considerations. We visited all the BMOH offices, all state general and sub divisional hospitals, some of the private laboratories and some of the laboratories run by the public private partnership

(PPP) for interview of the stake holders to understand their contributions in the health related activities. We reviewed records of relevant sections to understand and describe the existing, proposed and potential facilities available in those sections (both in public and private).

Hooghly ("Hogla", a special type of grass, then used to be grown in abundance), one of the 19 districts of West Bengal, is located in the south central part of the state. It has temperate climate with average yearly rainfall of 1180-1477 mm¹, geography of plains, heavily dense population (because of close proximity to the state capital as well as old agro industrial belts) and agro-based economy. There are 210 gram panchayats, 12 municipalities, one municipal corporation, 496 brickfields, 236 rice mills (with all migratory workers)^{2, 3} one industrial complex (Dankuni) in the urban area, one truck terminal (Dankuni), Tarakeswar, a state pilgrimage area drawing a large number of religious people every year, one commercial sex area, industrial floating sexual area in another place and several running or sick industries along the bank of river Ganges in the district. The factors having bearing on public health are (1) cosmopolitan nature of the district, (2) migrant population of the brick fields, (3) truck drivers of the high ways and truck terminal, (4) sick industries, (5) tribal areas, (6) agricultural and urban slum areas, (7) heavy population density, (8) some cultural beliefs (local faith healers) regarding snake bites, measles and chicken pox, (9) misbeliefs about sterilizations (as impotency following sterilization) and immunization (IPPI for a particular community for sterility in future), in both males and females (10) media dependence of the common people (for spreading rumors about pseudo out breaks), (11) public grievances regarding health care delivery (so called inadequate curative health care delivery) and (12) European influences in some of the areas including Dutch (Chinsura, Chuchura), Portuguese, French (Chandernagar, Chandannagar) and British (Serampore, Srirampur).

Population

Considering 2001 census population of the district of 5.04 million and annual growth rate of 10.2 per thousand population we calculated the projected population for 2007 to be 5.5 million in the area of 3149 sq. km. (population density per sq. km.1601), (table 1)¹.

Laboratory resources

The block level laboratories were mainly involved with the diseases under the vertical national programs. Only routine clinical pathology and biochemical tests were done at the state general and sub divisional laboratories. The district level laboratories (both public and private) did not do many of the investigations as per their norms, more so in case of public health like water testing. Most of the centers had less number of technicians with irregular supply of consumables and reagents and also ineffective maintenance system. However, there was a need for trained staff and equipments as per IDSP infra structural set ups. The School of Tropical Medicine, Kolkata, the State level laboratory, carried out virological studies (e.g. dengue, Japanese encephalitis, west Nile fever, chikungunia, hepatitis A/B/C/D/E and HIV), special bacteriological tests (e.g. leptospira antibody study) and protozoal studies (e.g. hydatid cyst disease, direct agglutination test for kalaazar). The Indian Institute of Serology in Kolkata, the WHO accredited laboratory for the Eastern region of India examined the stool samples for acute flaccid paralysis surveillance. National Institute of Cholera and Enteric Diseases in Kolkata detected the bacterial strain and serotyping for cholera and also for enteric diseases (mainly for rotavirus) (Table 2).

Major public health priorities

The key public health priorities in the district were (1) malaria (95 vivax cases and 10 falciparum cases ABER 3.39, API 0.01, SPR 0.05, SFR 0.005, PF % 10.5, death nil ⁴), (2) diarrhoeal diseases (percentage of children having diarrhoea in last two months as 13.7 in comparison to 10.2 of the state)⁵, (3) acute respiratory infections (percentage of children having ARI in last two months as 24.5 in comparison to 21.2 of the state)⁵ and (4) tuberculosis (annual new smear positive case detection rate of 51 per hundred thousand in comparison to the target value of 75)^{6 7} (table 3).

Organization of the health system

The health services in West Bengal started as a transformation of earlier health directorate since independence, like all other state, followed by integration of all national health programs at the community level through the multi-purpose health scheme in 1985. The unique feature of the government in the state is that both health and panchayat department have same hon'ble minister in charge which facilitates a close interaction between the two

departments. The chief medical officer of health (C.M.O.H.) is the district health authority with his staff officers (deputies) for logistics, public health programs, family welfare activities and immunization. Other special program officers include the district tuberculosis officer (D.T.O.), zonal leprosy officer (Z.L.O.), public health and communicable diseases (P.H. & C.D.), other assistants (ACMOH) for the individual sub divisions and day to day administration (medical administration: M.A.). Blocks are manned by the block medical officers of health (B.M.O.H.), primary health centre medical Officers (P.H.C. M.O.), community health nurses (C.H.N., also known as public health nurse: P.H.N.) and community health workers (C.H.W.). They also look after the public health activities at their respective levels (fig 1). At the district, block and village level different health and family welfare bodies (registered under the society registration acts) supervise and monitor the different health care activities. In addition, one civil servant of general administration (officer in charge health or OC health) looks after the coordination between the general administration cum peoples section (panchayat) and the health section. In a nut shell, the people's representative bodies (Panchayati Raj system) integrated themselves with the health system at each level from the state (Panchayat Ministry to Health Ministry) to village (gram pradhan or village sarpanch to community health worker). In the urban set up, there are municipalities (elected autonomous bodies) in the smaller towns with their own financial planning in all sectors including the health sector. Municipal corporations are larger set ups with similar structure like municipalities. There are nine municipalities (Bhadreswar, Chanpdani, Chuchura, Uttarpara, Rishra, Arambag, Tarakeswar, Srirampur, Bansberia,) and one municipal corporation (Chandannagar) with medical officers and other health staff at all places except Uttarpara, Tarakeswar and Bansberia where there were no medical officers. Their work includes providing services in slum areas, immunization, execution of some projects from time to time and outbreak controls in necessity. Because of ill developed reporting system as well as no direct accountability to the CMOH, these bodies did not contribute much to the health information management system of the district. However, they sometimes participate in some special national programs like pulse polio immunization rounds.

Indicators towards the millennium development goals

In the goal one, we found the percentage of children 6-59 month of age who received one dose of vitamin A in the past six months as ninety (92.5 %) percent in 2006-07 which in the state was eighty (79.5, 2005-06). Similarly, in the goal four, under-five mortality rate

in 2006-07 in the district was less (48.7) in context of that of state (67.6) but more than the country (39.0). The infant mortality rate (IMR) in the same time was 26, 38 and 57 in the district, state and the country respectively while measles immunization among children under one was 78364 (91%)(2006-07) in the district ,85.5% (2005-06) in the state and 67%(2003) in the country. To reach goal five, the district could achieve is maternal mortality ratio as 201 per hundred thousand in comparison to that as 266 in the state and 400 in the country while the proportion of births attended by skilled health personnel was 47.2%(2006-07), 56.7%(2003-04) and 42.5%(2001) in the district, state and respectively. The Contraceptive prevalence rate was better (69.7, 98-99) in the district than the state (47, 98-99) and the country (48.2, 99-00). Most of the HIV related data in the goal 6 were not available in the district except condom use rate of the contraceptive prevalence rate (2006) which still was much lower (13.5 %) in comparison to the state (34.5 %) and the country (32.2 %). Similar was the case of malaria where the specific data of MDG were not available in the district (program indicators data available). However, tuberculosis control on goal 6 showed similar progress with the state and the country (prevalence and death rate associated with tuberculosis: prevalence =123.1/hundred thousand/yr & death rate = 4.4%; state = 137/ hundred thousand /yr & death rate=3.9% and the country =131/ hundred thousand /yr & death rate 3.4%). The proportion of tuberculosis cases detected and cured under DOTS in the district was 6629 (88.3 %) similar to the state (29458, 86.4 %) and the country (364799, 83.4 %). However, the percentage of estimated new smear-positive tuberculosis cases registered under the DOTS approach was less in the district in comparison to others (68 in the district, 85 in the state and 71 in the country). The goal 7 in the district had mixed picture when the proportion of population with sustainable access to an improved water source, urban and rural was only 65.2 in 2005-06 while that in the country in 2002 was 86 but the proportion of urban population with access to improved sanitation was 69.4 (2005-06) in the district in respect to that in the country as 58 (2002) (Table 4, 5).

The achievement in respect to the MDG in the district was uneven similar to the state⁸. Many of the indicators were even not available (Table 4, 5). However, immunization coverage including measles coverage was higher although the less than five mortality rate did not improve in comparison to the country probably because of causes other than vaccine preventable diseases like diarrhoeal diseases and acute respiratory infections. Less maternal and infant mortality also supported that and also indicated a better status of RCH

II program in spite of moderate antenatal coverage and less skilled birth attendance. TB and malarial status was as per the state status.

Conclusion

The strength of the health system was its rural organization (figure 2, 3), position in the state (south central and near to the state capital) and well trained field staff (field visit). The weaknesses were staff deficiency in all tiers along with deficient infrastructure in the public health sector (particularly PHC) (project report of quality assurance of RCH II in the district) and less coordination with the urban health set ups. The challenges were to bring the urban health system in the main stream as well as to achieve the millennium development goals (Table 3, 4). The opportunities we could make available were follow up of the points observed in the quality assurance review meetings, involvement of the general administration through OC health in improving the primordial preventive health related issues like accessibility to safe water and sanitation.

I propose to do secondary data analysis on leprosy to get an insight into the control programme after amalgamation of the vertical program into the general health system. I intend to describe the HIV surveillance system of the district and evaluate the maternal care component of the RCH program in the district where I was involved in a quality assurance project regarding the same. In view of my interactions with handloom weavers of two main blocks of Hooghly in my previous tenure I plan to do my dissertation work on the morbidity of the handloom weavers of Hooghly district.

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2. District program management unit cell, CMOH office, Hooghly: 2006 Report: Action plan, 2006
- ³ Deputy CMOH II, Hooghly: 2006: Yearly report sent to the state.
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- ⁵ DLHS (1998-1999)
- ⁶ District Tuberculosis Office, Hooghly, 2006: yearly report sent to the state.
- ⁷ State Beaurow of Health Intelligence 2006: report page of Hooghly district
- ⁸ Wada Na Toro: MDG status of West Bengal press releases dt. 07.07.07

Table 1: Characteristics of the population of Hooghly District, W.B., India, 2001(Projected 2007)

Demographic characteristics	2001 population (in thousand)	%	2007 population (projected)	%
<i>Age</i>				
0-4 yrs	404.4	8.0	442.2	8.0
5-14 yrs	1063.0	21.1	1159.6	21.1
15-29 yrs	1385.8	27.5	1511.7	27.5
30-44 yrs	1139.6	22.6	1242.0	22.6
44-59 yrs	639.5	12.7	697.6	12.7
More than 60 yrs	409.6	8.1	446.7	8.1
<i>Sex</i>				
Male	2589.5	51.4	2824.5	51.4
Female	2452.4	48.6	2675.3	48.6
<i>Socio-economic status</i>				
Above poverty level	3294.7	65.3	3594.0	65.3
Below poverty level	1747.2	34.7	1905.8	34.7
<i>Caste</i>				
General	3541.3	70.2	3863.4	70.2
Schedule caste	1188.9	23.6	1296.9	23.6
Schedule tribe	212.1	4.2	231.1	4.2
OBC	99.7	2.0	108.4	2.0
Total	5041.9	100.0	5499.8	100.0

Table-2: Public health laboratory test done at the district Hooghly, West Bengal, India-2007

Public health problem	Test done at different levels					
	P.H.C.	C.H.C.	S.G.H./S.D.H.	District Hospital	P.P.P Scheme	Private
Malaria	M.P (blood slide)	M.P (blood slide)	M.P (blood slide, Immuno logical tests)	M.P (blood slide, Immuno logical)	M.P (blood slide, Immunological)	M.P (blood slide- + Immuno logical)
Tuberculosis	AFB at M.C. s (microscopy centre)	AFB at M.C. s (microscopy centre)	AFB at M.C. s (microscopy centre)	AFB at M.C. s (microscopy centre)	AFB staining, culture through outsourcing	AFB staining, culture through outsourcing
Other common bacterial infection	Nil	Nil	Nil	Slide smear for gram stain in selected case	Gram stain in selected case & reference test if required.	
Urine and stool routine analysis	Nil	done	done	Done	done	done
Water testing	Nil	Nil	Nil	Nil	Not done routinely	Not done
Immunoglobulin	Nil	Nil	Nil	Nil	Not done routinely but out sourcing done if required	
Other special test	Nil	Nil	Nil	Nil	Selected tests done either on demand or through sourcing done if required	

Table 3: Key public health priorities in Hooghly District Hooghly, W.B., 2007, India

Public health priority	Key elements	Ongoing prevention and control programs
Diarrhoeal diseases	Frequent outbreak, % of children having diarrhoea as per DLHS 1998-99 13.7 (state 10.2 %)	Reproductive and child health program
Malaria	95 vivax cases and 10 falciparum cases in 2006	National vector control program
Tuberculosis	Increased morbidity and mortality, annual new smear positive case detection rate as 51 per hundred thousand in comparison to the target value of 75	Revised National Tuberculosis Control Program
ARI	Increases less than five mortality; % ARI as DLHS 1998-99 is 13.7 (state 10.2 %)	Routine Immunization, Nutrition, School Health, RCH II Program
HIV / AIDS	Total person counseled (all sites, 2006): 19569, total tested (HIV): 16607 84.9 %), HIV positive: 78 (0.47 %), spouse counseled: 81, spouse tested: 81 (100 %), spouse HIV positive: 2 (2.47 %)	National AIDS control Program

Table 4: Indicators of progress for the health related MDG^{*}, Hooghly, W.B., India, 2007 (contd.)

Goals	Indicator	Value of the indicator		
		In [Hooghly]	In West Bengal	In India
Goal 1	Prevalence of underweight children < 5 yrs of age	NA	48.7 (98-99)	47(1999)
	Proportion of population below minimum level of dietary energy consumption	NA	NA	21(2001)
	% of children aged 6-59 month, received 1 dose of Vitamin A in last 6 months	92.5 (2006-07)	79.5(2005-06)	NA
	Proportion of infants less than 6 months, exclusively breastfed	NA	48.8(1999)	55.2(1999)
Goal 4	Under-five mortality rate	48.7 (2006-07)	67.6 (2006-07)	39.0 (2006-07)
	Infant mortality rate	26	38	58
	Measles immunization among children under one	91%(2006-07)	85.5% (2005-06)	67%(2003)
Goal 5	Maternal mortality ratio	201(2006-07)	266(2006-07)	400(2006-07)
	Proportion of births attended by skilled health personnel	47.2%(2006-07)	56.7%(2003-04)	42.5%(2001)
	Contraceptive prevalence rate	69.72	47(98-99)	48.2(99-00)
	Percentage of women receiving antenatal care	73.6	65.9(03-04)	NA

* Millennium development goal

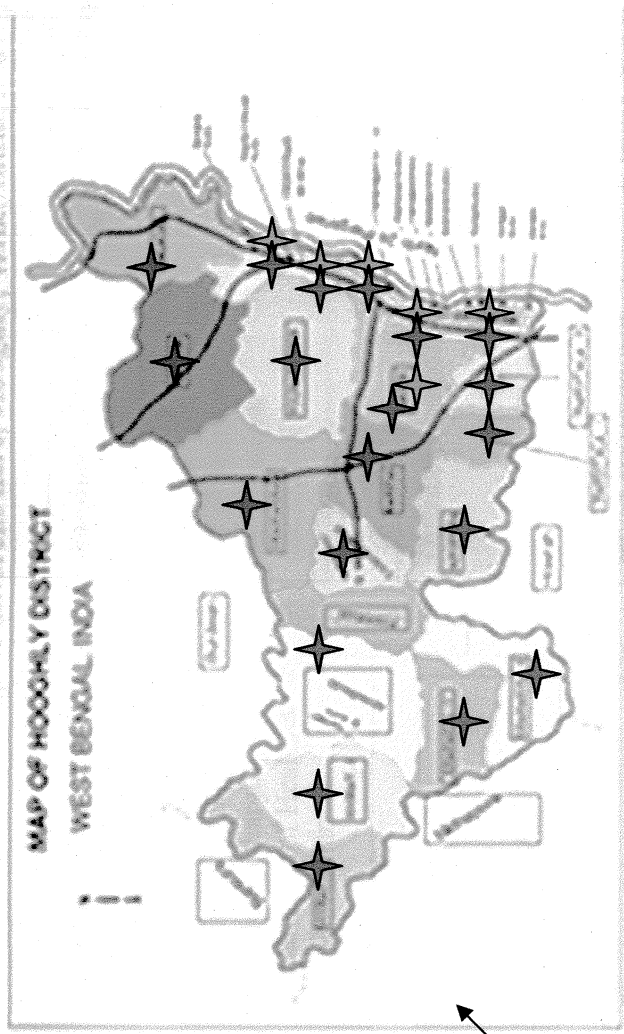
Table 5: Indicators of progress for the health related MDG[†], Hooghly, W.B., India, 2007 (concl.)

Goal	Indicator	Value of the indicator		
		In [Hooghly]	In West Bengal	In India
Goal 6	HIV prevalence among 15-24 yrs pregnant women	NA	0.8%(2006)	0.9%(2003)
(HIV)	Condom use(contraceptive prevalence) rate	13.5	34.5(2004)	32.2(2004)
	Number of children orphaned by HIV/AIDS	NA	NA	NA
	% condom use in most recent higher risk sex	NA	72.2(2004)	59(2001)
	% of STI clients managed as per guidelines	NA	86%(2003)	89%(2003)
	% of HIV (+) antenatal women with ART for PPTCT	NA	15.%(2004)	NA
Goal 6	Malaria death rate	Nil	0.008%(2004)	0.003%(2000)
(Malaria)	Proportion uncomplicated periphery managed (standard guidelines) malaria cases , within 24 hrs of S/S	NA	NA	NA
	% of pregnant women (malaria chemoprophylaxis/ Rx)	NA	NA	NA
	Proportion households (at least one ITBN) [‡]	NA	NA	NA
Goal 6	Prevalence (per hundred thousand per year) and death rate associated with TB	123.1, 4.4%	137, 3.9%	131, 3.4%
(TB)	Proportion TB cases detected and cured (DOTS)	6629 & 88.3 %	29458 & 86.4 %	364799 & 83.4 %
	% estimated NSP [§] TB cases registered with DOTS	68%	85%	71%
Goal 7	Proportion of population with sustainable access to an improved water source, urban and rural	65.2 (2005-06)	NA	86(2002)
	Proportion urban population (access to improved sanitation)	69.4(2005-2006)	NA	58(2002)
Goal 8	Proportion of population with access to affordable essential drugs on a sustainable basis	NA	NA	NA

[†] Millennium development goal

[‡] Insecticide treated bed nets

[§] New smear positive



Rural Health Establishment

Urban Health Establishment

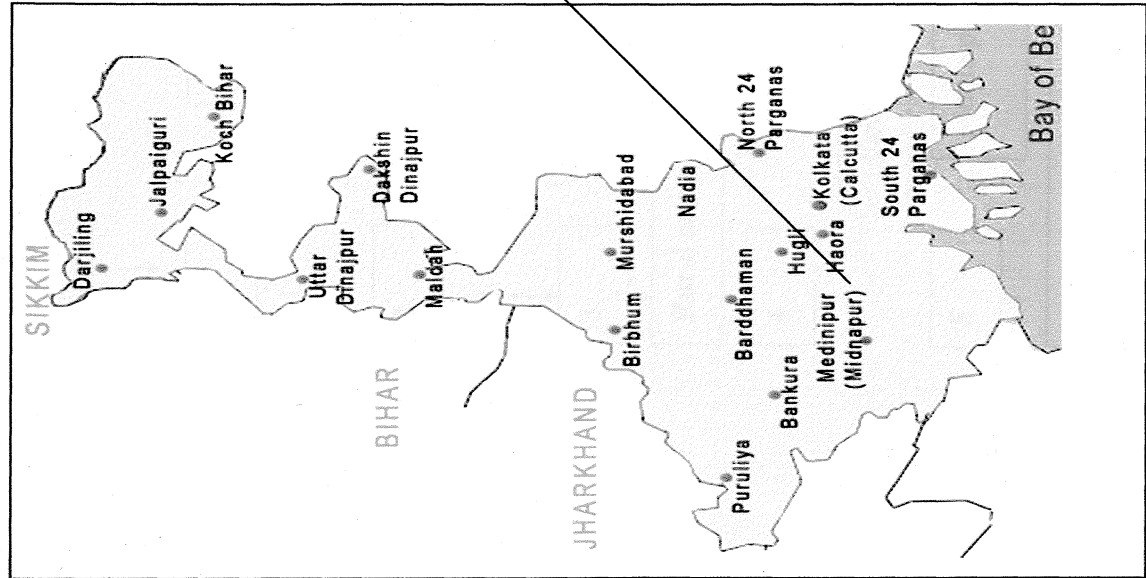
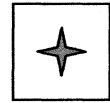


Figure-2: Schematic diagram of organization set up at different tiers, Hooghly, W.B., India, 2007

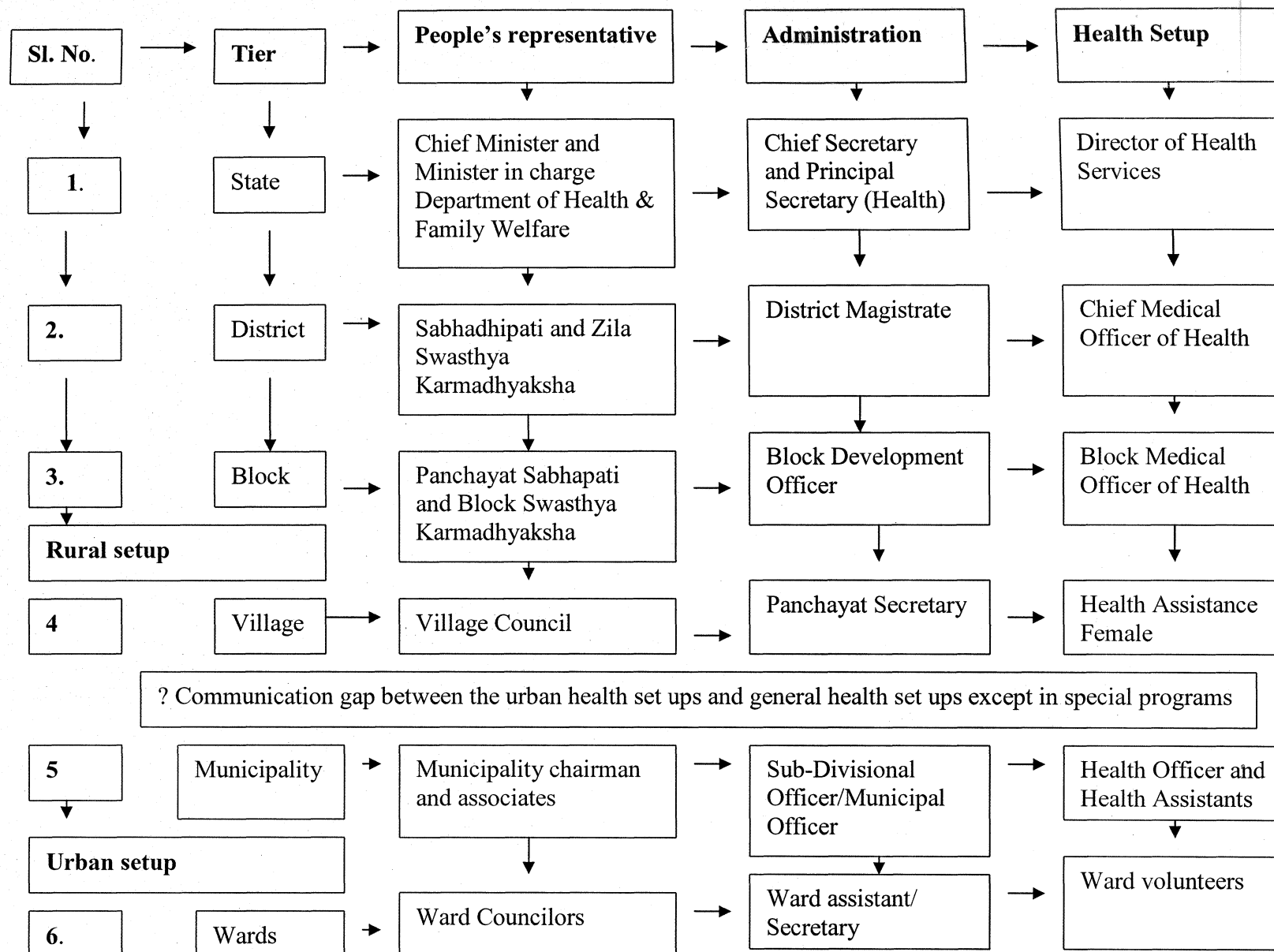
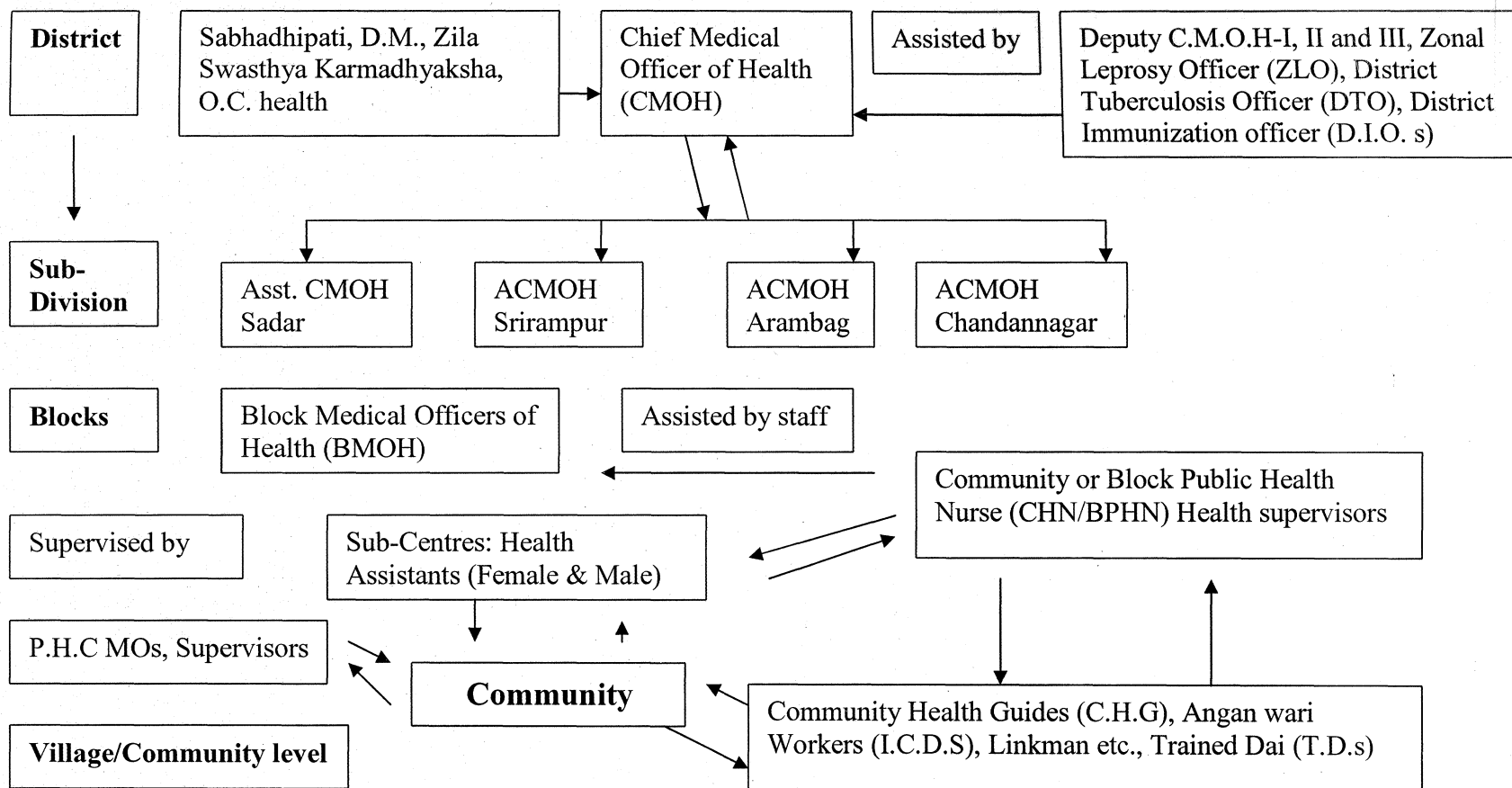


Figure-3: Organization structure of district level health set up, Hooghly district, West Bengal, India 2007-08



Secondary data analysis of surveillance data on leprosy in Hooghly district, West Bengal, India, 2002-2006

Introduction

Though Leprosy is a chronic low infective bacterial disease, endemic to the poor countries of the world, India belonged to the priority countries in the world leprosy map till the fourth modified leprosy elimination campaign (MLEC 4), 2003, detecting 104,000 cases⁹ and now is passing through a transition phase of follow up after attaining the WHO criteria for low endemic area. Any relaxation, at this stage, particularly after the amalgamation of the expert vertical program operators to the general health system can rebound to a critical level. Being totally dependent on the district nuclear teams for the cases to be validated¹⁰, time to time review of the district surveillance data along with secondary data analysis is therefore essential to detect the intervention points as well to sustain the achieved status to an epidemiological level. Situation wise what India is to the world in respect to leprosy (transition zone) applies to the state (West Bengal) and further to Hooghly district. It is thus useful to analyze the leprosy secondary data of the district to get insight of status of the district through different indicators as well as allowing comparability within the district and earlier status of self.

Globally, there were total 382,601¹¹ cases at the beginning of 2004 which reduced to 231,361¹² prevalent cases and 265,661 new cases at the beginning of 2007. Sixteen countries, majorities from South East Asia, America and Africa contributed 94 % of the whole disease burden of which 50 % were South East Asian countries. Globally, there were 218,605 cases at the beginning of 2008 of which new cases were 258,133¹³.

India, one of the sixteen countries, had leprosy prevalence of 0.84 per 10,000 in 2006 and 0.74 per 10,000 in 2007-2008 with total cases under treatment being 95,151 in 2006 to 87,228 in 2007-2008. The annual new case detection rate in 2005 - 2006 was 1.17 per 10,000 and 29 out of 35 states in the country achieved the leprosy elimination status. As on 31.03.2008, there were 87,228 cases of which as percentage of new cases, multi bacillary proportion (MB) was

47.19 %, female proportion as 34.53 %, child proportion being 9.42 % while visible deformity was 2.53 %¹⁴.

West Bengal (out of eleven endemic states of India) accounted for 10% case load of the country, ¹⁵ registering 149, 427 cases in 1994 (before M.D.T) with prevalence as 16.98 / 10,000 population to 10,794 cases in 2006 - 2007 with prevalence as 0.99/10,000 population¹⁶. The other indicators as on 31.03.2007 were: annual new cases as 13,620 to get annual new case detection rate (ANCDR) as 1.54 and prevalence – discharge ratio (PD ratio) as 0.64.

Hooghly district is one of the low prevalence districts of West Bengal with prevalence less than 1/10000¹⁷ and not included in the eleven of nineteen high prevalence districts. During 2006-2007, in Hooghly district, Pandua, Tarakeswar and Dhaniakhali block showed relatively increased prevalence of 1.51, .97 and 0.96 respectively in comparison to the over all district prevalence of 0.86¹⁷. Goghat I&II (Kamarpukur) had the prevalence equivalent to the district figure. The prevalence in floating (hospital O.P.D. cases) was quite high (1.73). Thus, we analyzed leprosy surveillance data in this district (1) to describe the disease burden in terms of time, place and person, (2) to describe the effectiveness of the ongoing program from the epidemiological information in the form of different indicators.

Methods:

We conducted a descriptive study on the population of Hooghly district. We visited the zonal leprosy office to collect data from the records, reports returns and other documents. We explained the purpose of our exercise and after obtaining verbal permission from the district program officer as well as the chief medical officer of health collected data at the community level. We thus included all available data from all blocks (n = 17) and four municipalities from 2001 to 2006 (as on 31.03.2007) along with the reports of the zonal leprosy office of the district and the state leprosy division in our study. We collected data on demographic characteristics as much as available and leprosy epidemiological data from the monthly reports of the block. We used the operational and program definition of W.H.O. both for case definitions and program indicators as below:

Case of Leprosy:

We defined a case of Leprosy as the occurrence of clinical signs of leprosy with or without bacteriological confirmation of the diagnosis and who has not yet completed a treatment with M.D.T. This was an operational definition to estimate its prevalence.

Multi Bacillary Case:

We defined a multi bacillary as per WHO guidelines as a person having 6 or more skin lesions and/or more than one nerve involvement.

Pauci Bacillary Case:

Under the same guideline, we defined a pauci bacillary case as a person having 1 to 5 skin lesions and/or only one nerve involvement.

Newly diagnosed cases:

We defined a newly diagnosed case as a person who has been diagnosed as a leprosy case and who has not taken MDT in the past.

We used data collected in the blocks as numerators as applicable and the district data as denominator wherever required. We also used the data of the state beaurow of health intelligence (SBHI) for different denominators as well as comparison data.

We compared the block data with the district data as well as state data as much as available.

We calculated the different indicators using standard case definitions of WHO guidelines as below.

Leprosy indicators:

Prevalence:

It is the number of patients registered at given point of time per corrected census population, usually expressed per ten thousand populations.

Annual new case detection rate:

It is the number of new cases registered in a year per mid year population and usually expressed per ten thousand populations.

Proportion of child percentage (%):

It is number of children among new cases registered in a year per total number of new cases registered during the year. We use it to assess the impact of the program. We also use it to calculate the drug requirements for child cases.

Proportion of female percentage (%):

It is number of females among new cases registered in a year per total number of new cases registered during the year. We use it to assess the impact of the program.

Proportion of disability (grade II deformity) percentage (%):

It is the number of new cases registered during the year with grade II disability per total number of new cases detected during the year. We use it to assess the efficiency in case detection (that is extent of delay).

Proportion of pauci bacillary (PB) percentage (%):

It is number of new pauci bacillary cases registered during the year per total number of new cases detected during the year. We use it to assess the impact of the program. We also use it to calculate the drug requirement for pauci bacillary cases.

Proportion of multi bacillary (MB) percentage (%):

It is number of new multi bacillary cases registered during the year per total number of new cases detected during the year. We use it to assess the impact of the program. We also use it to calculate the drug requirement for multi bacillary cases.

Results:

There were total 469 balance cases in a population of 5.46 million in the district as on 31.03.2007 (prevalence: 2.2 per ten thousand populations. Total new cases in the same time and population were 541 (ANCDR: 9.9 per ten thousand populations). Child cases which included the cases fourteen years and below were 28 in a population of 1.6 million (Child prevalence: 0.18 per ten thousand populations). Adult cases which included the cases of above

fourteen years were 513 in a population of 3.87 million (adult prevalence: 1.3 per ten thousand populations). There were 131 female cases in a female population of 2.65 million (female prevalence: 0.49 per ten thousand populations) whereas same in males were 338 (male prevalence: 1.2 per ten thousand populations). Ten cases had the deformity grade II (deformity prevalence: 0.002 per ten thousand populations). Pauci bacillary and multi bacillary cases were 212 and 257 respectively making their prevalence 0.39 and 0.5 per ten thousand respectively (Table 1). The general prevalence trend came down from 2.2 per 10,000 midyear population in 2002-03 to 0.7 in 2006-07. Similarly the annual new case detection rate declined from 3.3 per 10,000 in 2002-03 to 1.05 per 10,000 in 2006-07 (figure 1). The child prevalence showed a rise in 2002-2003 (1.01) and thereafter steadily declined to 0.2 and 0.18 till 2007 while adults remained at a higher side between 4.4 and 1.3 with again a down trend from 2002-2003 to 2006-2007. The female case prevalence retained a steady position between 0.46 and 0.49 from 2004 onwards while males were between 1.3 and 1.2 till 2007 (Figure 2). The pauci bacillary case prevalence was 1.13 in 2002-03, dropped down to 0.56 in 2003-2004 and remained steady between 0.33 and 0.39 in the next coming years. The multi bacillary case prevalence was 1.7 in 2002-03, came down steadily to 0.4 and 0.5 in 2005-2006 and 2006-2007 respectively (Figure 3). The place distribution showed higher prevalence (though less than national and state figure in some areas) in Pandua, Goghat, Tarakeswar, Dhaniakhali and Kamarpukur block (figure 4).

Discussion:

The disease prevalence figures in the district remained in the WHO leprosy elimination target prevalence after 2004-2005. The child cases and adult case indicators remained better than the West Bengal status in the later part. All indicators were otherwise marginally below the West Bengal status after 2003-2004.

The disease prevalence 2002-03 to 2006-07 was consistent with the global scenario as well as national level ¹⁴ due to the efficient program management and availability of effective medicines (Rifampicin and Dapsone) but with some margin of improvement. The annual new case detection rate also showed steady decline similar to the national figure (figure 2).due to same factor of effective treatment. The possibility of an artifact due to amalgamation with the

general health system (i.e. vertical program with general program) should also be kept in mind. However it is unlikely to explain the sustained low figures. Multi bacillary prevalence though show low level after 2004, its percentage in relation to the total cases remained high steadily even in 2006-2007 both in the district and the state^{16, 17}. On the contrary, pauci bacillary figures showed persistently low figures after 2004. There might be several explanations for this. Firstly, the decreased new case detection might leave many undiagnosed pauci bacillary cases in the community. Community health workers of general health system might not be as efficient as vertical program leprosy workers or might be busy in their other routine works. Moreover, absence of active surveillance might also contribute to the accumulation of undetected pauci bacillary cases who in turn transformed to multi bacillary cases. Secondly, as the residual effects were long lasting, multi bacillary cases tended to default and hide to re register themselves later on in a new place with a new hope. That might have reflected as a pseudo increase in multi bacillary cases. Thirdly, good and effective program management might have reduced the volunteer leprosy patients who were more of pauci bacillary than multi bacillary type leading to more multi bacillary patients in the community.

Female cases were less than male cases. Ideally, this should have been equal. But less exposure of females to outside droplet infections and more voluntary participation for diagnosis and treatment might be the cause of fewer figures. In some cases, females might be more conservative about disclosure of illness. Child percentages indicated the communicability of the multi bacillary case and were fairly consistent with the global picture¹⁸. A high multi bacillary case load naturally indicated a high deformity status. It also indicated less functioning of surgical reconstruction centre.

The district leprosy indicator figures were marginally better than the state figures in all cases namely prevalence trends, annual new case detection trends (figure 1). Trends showed steady decline after 2004 due o successful implementation of fourth MLEC in the state (Figure 2 and 3). Involvement of the Panchayat in the campaigns added more momentum to the success of the program. The place distribution showed particular behavior of the cases. The western par of the district is in contact of Bankura district, an adjacent district of Orissa which has high leprosy patients. MB cases later on concentrated in the Hindu and Muslim pilgrimage areas of

Tarakeswar and Pandua which gave rise to higher prevalence to those areas. The picture modified to some extent later on due to aggressive case management under MLECs.

Our study had some limitations. Firstly, though the data collection was better in the rural sectors (that is, in the blocks) it was poor or absent in the urban areas (that is, in the autonomous municipality areas) which might not represent the true district population figures. Secondly, the efficiency and competency of the general health care delivery staff might be different from the vertical staff after the amalgamation of vertical staff to multipurpose staff. Thirdly, we did not review the validation status of the cases by the district nuclear team. However, as we calculated the indicators excluding both urban cases and population, figures might not distort the ratios much. Moreover, the district organized the re orientation training for all category staff. The case detections were also alright. The district nucleus team was also very active.

The indicators might have further improved with (1) regular reports of the urban health system, (2) particular stress on the higher prevalence area as shown on the area map particularly around the pilgrimage areas and (3) In the hospital OPD services, (4) more emphasis on child and female cases for more validation and in depth analysis and (5) establishment of reconstructive surgery centre for rehabilitation of grade II deformity cases. We therefore, recommend (1) sensitization of the urban health set ups with special effort at the managerial levels, (2) encouraging the BMOH of the concerned blocks with special local special camps in their area, (3) deputing vertical program staff in the district hospital skin OPD and other OPD from where the dermatologists reported higher or fresh MB cases, (4) to be more vigil about child and female cases, (5) to include the individual data than group data in priority areas for better follow up of the program and (6) establishment of new reconstruction surgery centres for management of advanced deformity cases.

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Table 1: Leprosy status at a glance of Hooghly district, West Bengal, India, 2006 - 2007

Cases	# as on 31.03.2007	Total population	Indicator	Remarks
Total balance cases	469	5,460,650	2.2	Prevalence per 10,000 population
Total new cases	541	5,460,650	9.9	Annual new case detection, per 10,000
Child (14 yrs or less) cases	28	1,589,049	0.18	Child prevalence (14 yr or less) per 10,000
Adult (above 14 years) cases	513	3,871,601	1.3	Adult prevalence (more than 14 yrs) per 10,000
Female cases (includes female children)	131	2,653,876	0.49	Female (including children) prevalence per 10,000
Male cases (includes male children)	338	2,806,774	1.2	Male prevalence (includes children) per 10,000
Deformity grade II	10	5,460,650	0.002	Deformity grade II prevalence per 10,000
Pauci bacillary cases	212	5,460,650	0.39	Pauci bacillary prevalence per 10,000
Multi bacillary cases	257	5,460,650	0.5	Multi bacillary prevalence per 10,000

Figure 1: Trend of reported prevalence and new case detection of leprosy cases of Hooghly district and West Bengal, India, 2001-2007

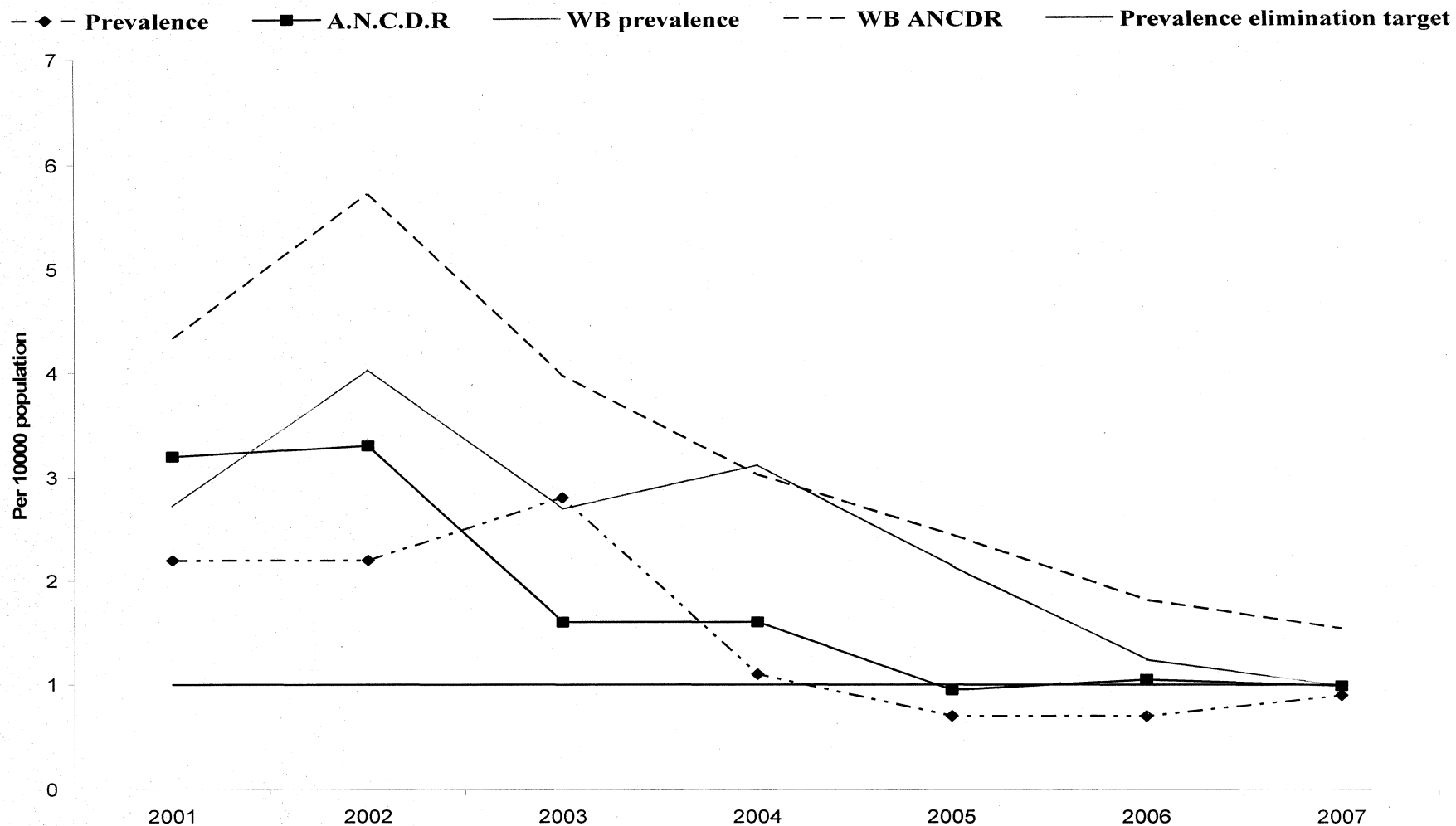


Figure 2: Trend of reported age and sex specific prevalence of leprosy cases of Hooghly district, West Bengal, India, 2001-2007

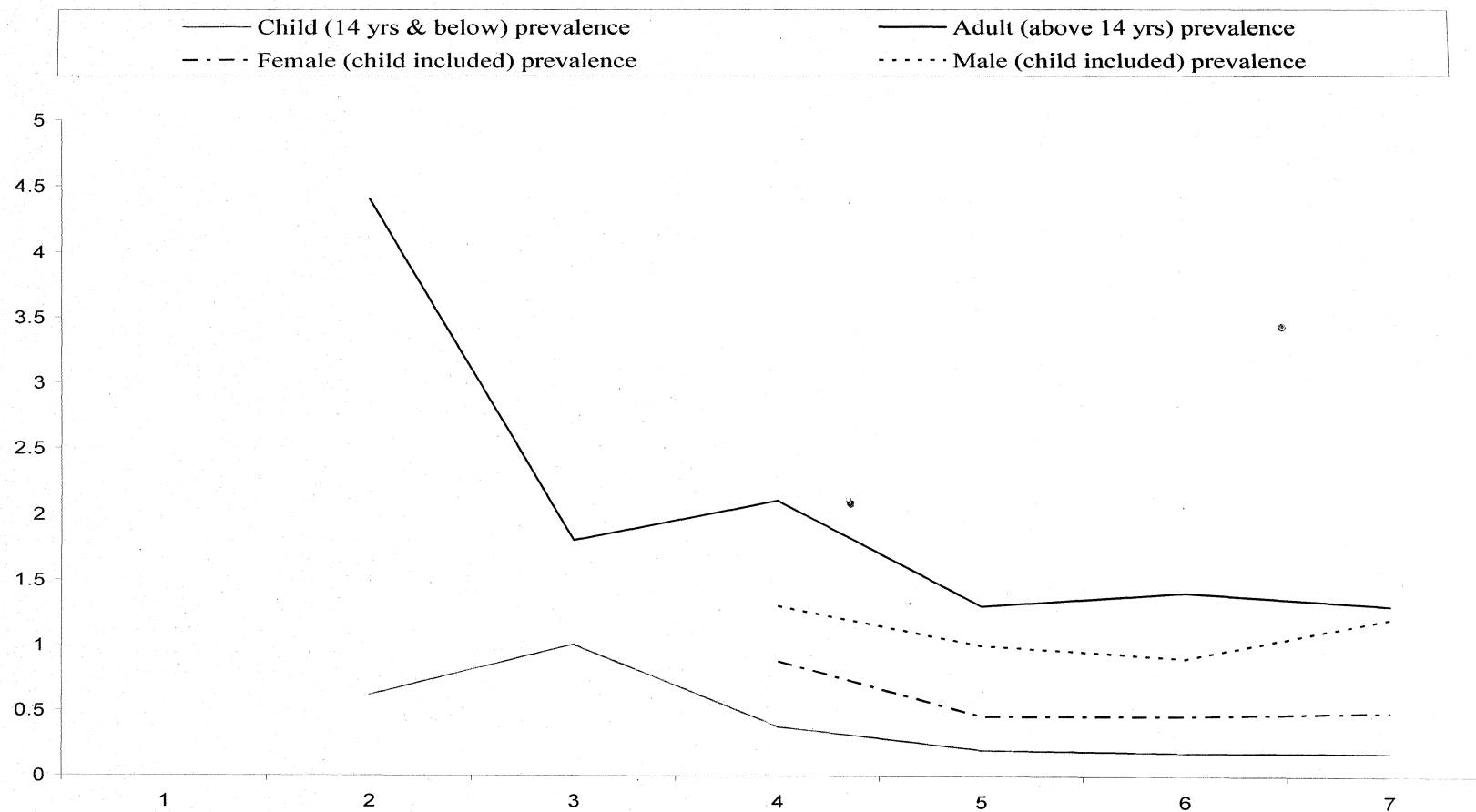


Figure 3: Trend of reported prevalence of PB, MB and deformity leprosy cases of Hooghly district, West Bengal, India, 2001-2007

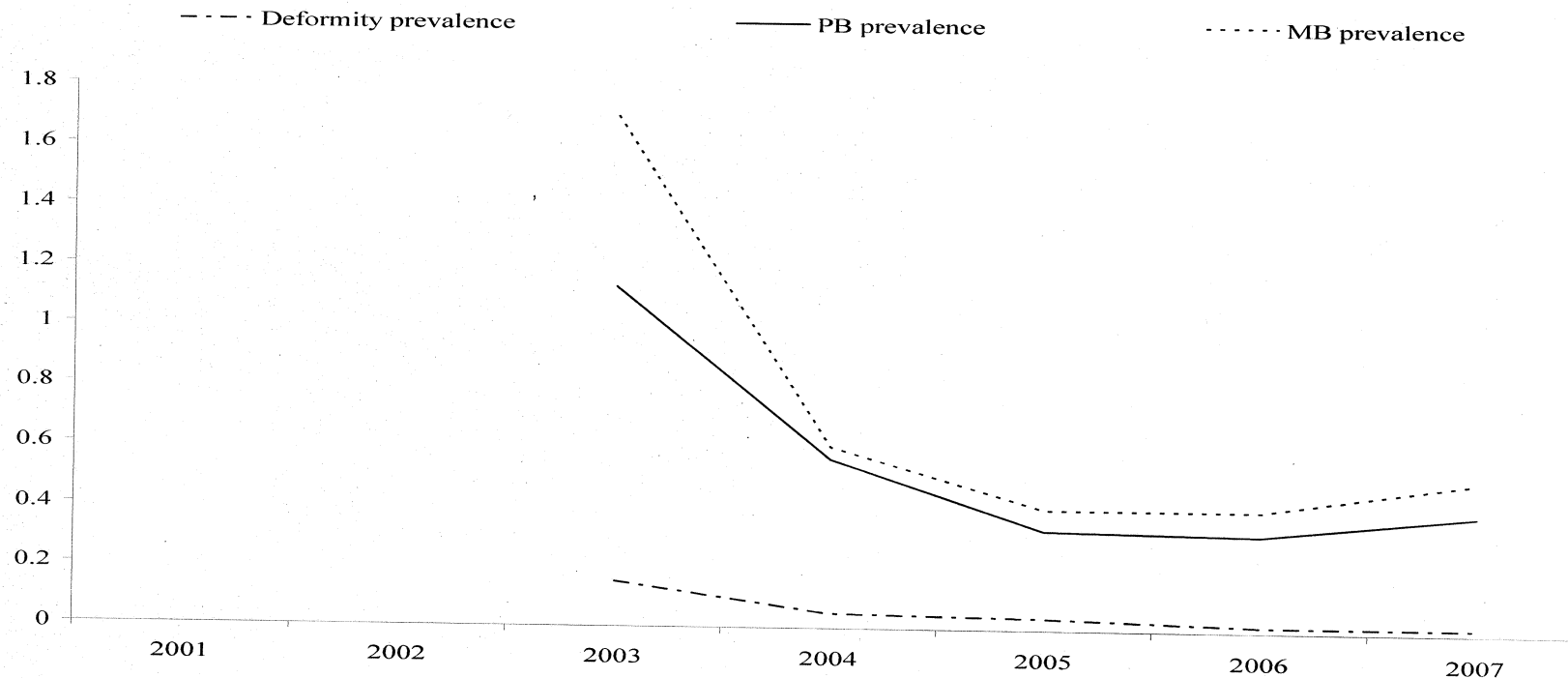
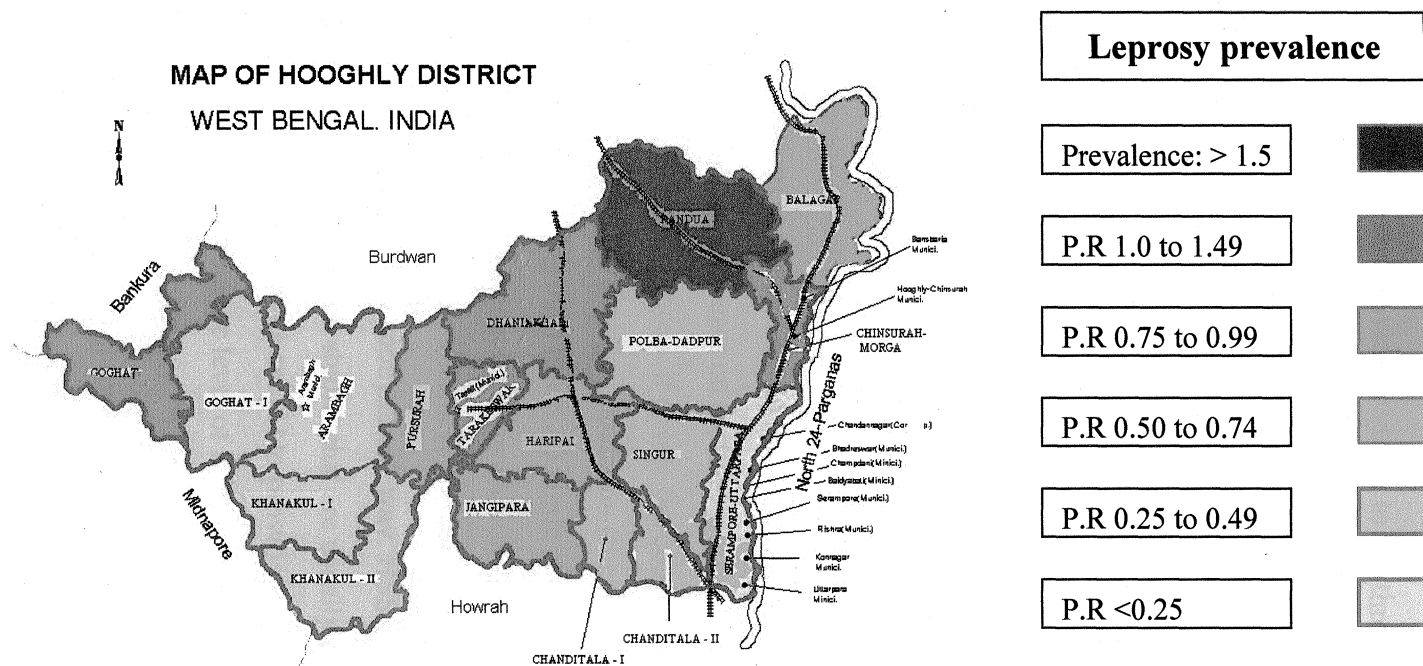


Figure 4: Prevalence of leprosy according to blocks, Hooghly district, W.B., India, 2006



Description and evaluation of the HIV Surveillance system in Hooghly District, West Bengal, 2007

Introduction:

Human Immuno deficiency Virus (HIV) is a retrovirus which destroys the immune system of human body and leaves the victim to life threatening opportunistic infections, neurological disorders or unusual malignancies¹⁹. The infection spreads through the body fluids of the HIV infected persons. Effective modes of transmission are through sexual contact, blood and blood products and mother to child (vertical transmission)^{20 21 22}..

As per global estimates, in 2007, total population with HIV infection was 33.2 million (30.6 -36.1 million) including 2.5 million (1.8 -4.1 million) new infections and 2.1 million (1.9 -2.4 million) deaths²³. The first case of HIV in India was reported in 1981. There were 2.5 million people living with HIV infection in 2006²⁴, with highest prevalence in men who have sex with men (MSM) and injecting drug users (IDU)²⁵.

HIV surveillance system (HSS) has been classified into routine and sentinel type. In the routine surveillance, the clients are directed through IEC activities or non governmental organization to report to the system. In the sentinel system, special sentinel sites capture the suspects. HSS in India focuses on sentinel groups that are critical populations based on epidemiological considerations. It covers the core high risk groups of female sex workers (FSW), MSM, IDU; bridge population (the people having sexual contacts with those in the core high risk group) like STD clinic attendees, and general population represented by mothers in antenatal clinics (ANC). The operational strategy follows the voluntary counseling and testing approach through integrated counseling and testing centres (ICTC) in an “unlinked anonymous” way. HSS also collects supplementary data at some intervals through special studies that are usually difficult and expensive²⁶. The objectives of HSS system in India are (1) to provide an understanding of the spread of HIV infection by determining the level of infection in different states and identifying pockets of high prevalence (“hot spots”) (2) to determine the geographical distribution and time trends of infection (3) to provide information for the prioritization of resources and evaluation of the national response, (4) to estimate number of people infected with HIV in the country, utilizing the HSS data in the absence of any other reliable community

based data and (5) to identify data to facilitate the integration of HIV /AIDS and Reproductive Child Health under National Rural Health Mission (NRHM).

All individuals attending the sentinel sites from 1st September to 30th November constitute the sampling frame. Sampling procedure includes consecutive selection of 250 persons from high risk and special groups; 400 from ANC clinics and 250 from STD clinics, attending the site for the first time. Two important components, namely the sentinel site (manned by one in charge, one nursing assistant and one laboratory technician) and HIV testing laboratory (manned by one in charge and one laboratory technician) execute the whole operation. Higher organizational designatories monitor the activities as per needs. Clients opt for voluntary blood testing at the laboratory of their choice after pre-test counseling and also undergo post-test counseling after receipt of the result, irrespective of their HIV status, about the infection, disease, future follow ups and availability of anti retroviral therapy if required. NGOs are important component of this activity.

Since 1998, National AIDS Control Organization (NACO) in collaboration with National Institute of Health & Family Welfare (NIHFW), National Institute of Medical Statistics (NIMS) and Indian Council of Medical Research (ICMR) have been conducting annual rounds of HIV surveillance in designated sentinel sites all over India. The sites increased from 164 in 1998 to 1122 in 2006²⁶. From 2003, ANC (Rural) sites, T.B. sites, migrant population, eunuchs and truckers' sites were included in HSS. This was to understand the spread of epidemic in rural areas and other vulnerable groups of the country²⁶.

In West Bengal in 2006, HIV prevalence in ANC clinic was 0.4, in STD clinics 1.66 and in the target groups (including FSW, MSM, and IDU etc.) were 6.6.²⁷

The objectives of our study were (1) to describe the HIV surveillance system in Hooghly district (2) to evaluate the HIV surveillance system with reference to the different attributes of surveillance system.

Method:

We took the different groups from routine and sentinel sites in the year 2007 as study population. We reviewed the different manuals as well as reports of different health units in this context. We interviewed the staff of the sentinel surveillance team, the counselors in the ICTCs, employees of the blood banks, Deputy CMOH II; the HIV surveillance officer, the medical officers and health workers of different ANC sites, blood banks, STD clinics health facilities in the district. The beneficiaries included antenatal mothers, the

clients of the STD clinics, the common people in the community, the high risk groups in the high risk areas and the bridge group people in the bridge area.

We used semi-structured questionnaires to know the opinion of different stake holders in the system. We prepared a logic model of the qualitative and quantitative attributes of a surveillance system namely acceptability, flexibility, sensitivity, cost, timeliness, simplicity, positive predictive value, usefulness and representativeness (table 1).

Indicators:

Acceptability - the proportion of the different centres (ICTCs, blood banks) reporting prevalence data to the district and the proportion of HIV counselors willing to participate in HIV surveillance.

Flexibility – the utilization of the potential sources of information available for surveillance data in case of additional need.

Sensitivity -the proportion of true HIV positives detected by the surveillance system.

Cost - the total cost incurred for the sentinel surveillance activities, including cost of testing, remuneration of centres, costs at district level and miscellaneous costs for contingency works.

Timeliness - the median time interval between surveillance period (routine & sentinel) and feedback to the district.

Simplicity - review of the surveillance flow chart to describe the operational system in the background of the theoretical system.

Positive predictive value – the proportion of subjects detected as true case (through confirmatory test) among those positive on the screening test in the surveillance system.

Usefulness - the proportion of HIV stakeholders who thought surveillance as useful.

Representativeness - the proportion of activity reports described and sent to higher tier of organization.

Result:

All the four ICTCs in Hooghly district were reporting regularly with two sending the complete report. Out of the four blood banks in operation, three sent the reports regularly at the district level and one sent report directly to the regional blood bank. One blood bank was not operational. All the four ANC clinics and two PPTCT clinics sent their report regularly to the district. Of the 15 local N.G.O.s (branches or franchisees of some large national or international N.G.O.s) that received some fund from the district, two

sent reports regularly. All the counselors were cooperative and actively took part in the reporting system. There was one sentinel site for STD clinic clients in the district hospital complex. Pockets of high risk groups, such as brothel- and non-brothel based sex workers and truckers were present across the district. However, no sentinel site was designated for them.

The attributes of HSS

Representativeness:

We could not assess the representativeness of HIV cases for different risk groups in the absence of the knowledge of actual population of the groups in the district.

Flexibility:

All the counselors participated in the surveillance system, so as the other stakeholders. The system included the reporting of coexisting sputum positive TB cases from RNTCP since 2008. In 2008 an MSM site also started reporting to the system.

Cost:

The state allocated 3.5 million rupee for the whole state which per district came as Rs. 175,000 for each district. Taking account the total district share, we found the screening cost as Rs. 11 for both counseling and testing, while unit case cost was Rs. 2303.

Simplicity:

All the 64 stakeholders were of the opinion that the system was complicated. However, 24 (37.5%) were otherwise comfortable in reporting in spite of the complicated protocols. In depth discussion revealed that 47 (75 %) had difficulty in remembering the rigid protocols.

Acceptability:

The government organizations sent the surveillance reports regularly. Several community-based NGOs were involved in the system even though they might not send their reports.

Sensitivity:

We could not calculate this attribute as we could not find the actual number of cases in the community.

Positive Predictive value:

We could not calculate this value for want of data on the confirmed cases.

Timeliness:

Nine out of ten government centres and 2 out of 15 NGOs sent reports within one month.

Usefulness:

The district in 2006 had total 19569 persons counseled for HIV testing of whom 16607 (84.9 %) were tested for HIV. Of them 78 (prevalence 0.47) were HIV positive. Total 81 spouse were counseled of whom all tested their HIV status and 2 (prevalence 2.47) were positive.

Discussion:

It is the ability of the system to describe health events accurately in terms of time, place and person in the population. In Hooghly district, the prevalence, area and time of illness in the community were not known. The STD sentinel site was far from the target group areas thus were not representative. MSM sentinel site, though was nearer to the population was yet to define its population. ANC clinics, ICTC and PPTCT clinics also did not have any defined population. The HSS system did not generate data to assess its representativeness as it was beyond the scope of its objectives.

Simplicity refers to an attribute of structure and ease of operation of the system. The stakeholders opined that the system was complicated because of rigid protocols, laboratory guidelines, and ethical issues. However, in spite of these complicated factors the HSS was operational possibly due to adequate funds, and active support of the government. Acceptability is the willingness of individual and institutions to participate in the surveillance system. The NGOs were working in the community without much resistance. Thus the system was acceptable to the stake holders as well as community. The appreciation of the unlinked anonymous approach of the system and the seriousness of the disease might be reason for some acceptability. Participation of HIV positive persons as voluntary counselors for new sero-positive persons was also encouraging. Sensitivity of a surveillance system is the capacity of the system to detect the proportion of true cases in the population. We estimate it by the proportion of the number of cases that the surveillance system captures (numerator) to the number of cases in the population (denominator). We could not find any suitable method to find the denominator (i.e. the number of cases in the community).

The positive predictive value of a surveillance system is the probability that a case captured by the system is a true case. It depends on the prevalence in the community, and the sensitivity and specificity of the tests. We estimate it by the proportion of confirmed cases captured by the system to the total number of cases captured by the system. In the HSS protocol there was no such provision of collection of those data. Thus we could not calculate the positive predictive value of HSS.

The timeliness of a surveillance system is the ability of the system to trigger appropriate action in time. We calculate the reporting delay as the median time interval between the time of onsets and time of reporting. In this case, there was no specific delay in the system itself probably due to well structured set up of NACO guidelines. The data compiled at the district level was analyzed at the state level. Data from STD site in the district was useful to estimate HIV prevalence in the state. HIV prevalence in the district could not be estimated due to lack of other sentinel sites in the district. We could not assess some of the attributes of the HSS due to lack of data. We could not organize any survey in the community to estimate the size and HIV prevalence of different population groups. Inclusion of testing sites for all population groups in the HSS will provide district level data for estimating HIV prevalence. This information will be extremely useful to understand and control the HIV epidemic both at district and state level. However, such a step can be undertaken only after further evaluation of the availability and capability of the health infrastructure in the district for this purpose.

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Table 1: Logic frame indicating HIV surveillance attribute indicators, Hooghly district, West Bengal, 2007 contd.

Attributes	Indicators	Data needed	Source of data
Acceptability	Proportion of ICTCs reporting prevalence data to the district	Number of centres reporting data	District HIV office records
		Total number of centres operating	State AIDS society records
	Proportion of blood banks reporting prevalence data to the district	Number of blood banks reporting data	District HIV office records
		Total number of blood banks operating	District blood safety records
Flexibility	Utilization of the potential sources of information available for surveillance data in case of additional need.	Sources utilized for surveillance	District HIV office records, interview with the district officer
		Potential sources of information available	
	Proportion of HIV counselors willing to participate in HIV surveillance	Number of counselors willing to participate	Interview of counselor
		Total number of HIV counselors in the district	District and NGO-s records
Sensitivity	For each group, comparison of (1) extent of the surveillance coverage and (2) the actual HIV prevalence in that group according to best available evidence.	Prevalence of sentinel surveillance sites / different active population groups reported to the system	District records
		Prevalence of HIV in different population groups according to all sources of information	Surveillance data, articles in journals and internet, grey literature

Table 1: Logic frame indicating HIV surveillance attribute indicators, Hooghly district, West Bengal, 2007 concld.

Attributes	Indicators	Data needed	Source of data
Cost	Cost incurred for the sentinel surveillance activities	Cost of testing, Remuneration of centres, costs at district level	State HIV surveillance officer
		Number of tests done, centres included and districts involved	District records
Timeliness	Median time interval between surveillance period (routine & sentinel) and feedback to the district	Surveillance period of last years	Records of sentinel centres
		Dates of feedback to the district	District and state records
Simplicity	Review of the surveillance flow chart to detect opportunities for simplifications	Description of the actual system	Qualitative interviews with participants
		Description of the theoretical system	Guidelines, operation manuals and forms
Positive predictive value	Proportion of screen subjects detected as true case	No of subjects screened for true case	District records
		Total number of subjects screened as case	Records of sentinel centres
Usefulness	Proportion of HIV stakeholder thought surveillance as useful	Number of HIV stakeholder thought surveillance as useful	Qualitative interviews with stakeholders
		Total number stakeholders present	District and state records
Representativeness	Proportion of activity reports described and sent to next tier	Number of activity reports described and sent to next tier	District and state records
		Number of activities scheduled for description and transmission according to best possible resources	Surveillance data, articles in journals and internet, grey literature

Table 3: Group wise HIV infection (sero positive), West Bengal, India, 1998 - 2006

Year	% of prevalence of HIV infection					
	STD	FSW	IDU	MSM	ANC	
1998		2.16	NA	NA		0.45
1999		1.34	NA	NA	NA	0.13
2000		1.73	NA	NA	NA	0.39
2001		0.8	NA	NA	NA	0.16
2002		2.23	NA	1.46	NA	0.31
2003		2.68	6.46	2.61	NA	0.44
2004		2.79	4.11	2.22	1.33	0.43
2005		2.47	6.8	7.41	0.54	0.9
2006		1.66	6.12	4.64	6.6	0.4

1. STD : Sexually transmitted diseases

2. FSW : Female sex workers

3. IDU : Intravenous drug user

4. MSM : Men having sex with men

5. ANC : Ante natal clinic

Table.4: Group wise HIV infection (sero positive), Hooghly, West Bengal, India, (April-December, 2007)

HIV surveillance site	Person counseled	Person tested	% person tested	Person HIV +ve	% person HIV +ve	# spouse counseled	# spouse tested	Spouse HIV +ve	% spouse HIV +ve
Blood bank	14738	12154	82.5	67	0.55	0	0	0	NA
PPTCT (ANC)	3715	3690	99.3	3	0.08	81	81	2	2.47
ICTC	1096	743	67.8	5	0.67	0	0	0	NA
HIV + TB	20	20	100.0	3	15.00	0	0	0	NA
Total	19569	16607	84.9	78.0	0.47	0.6	81.0	2.0	2.47

Figure 1: Group wise HIV infection (Sero positive), West Bengal, India, 1998-2006

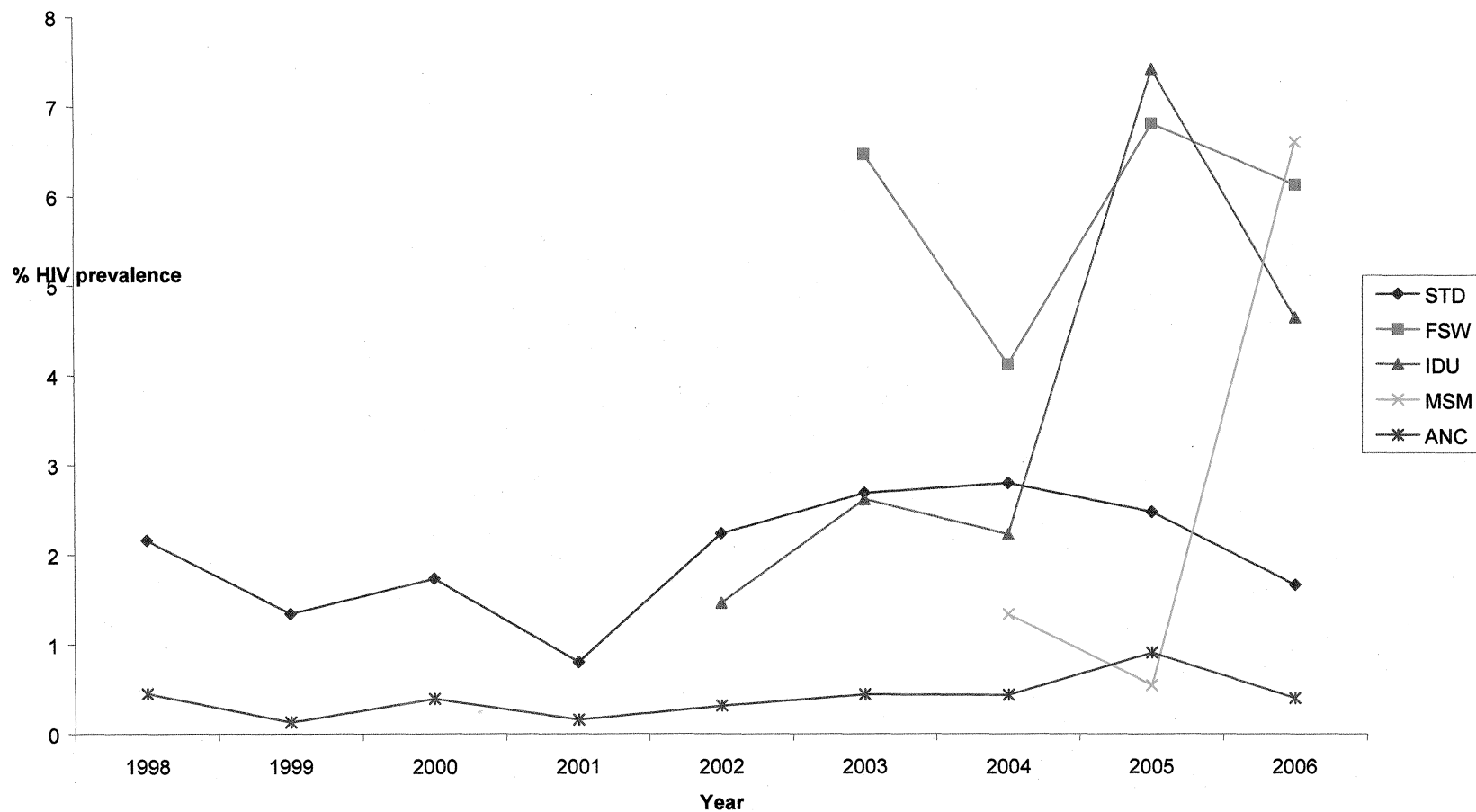
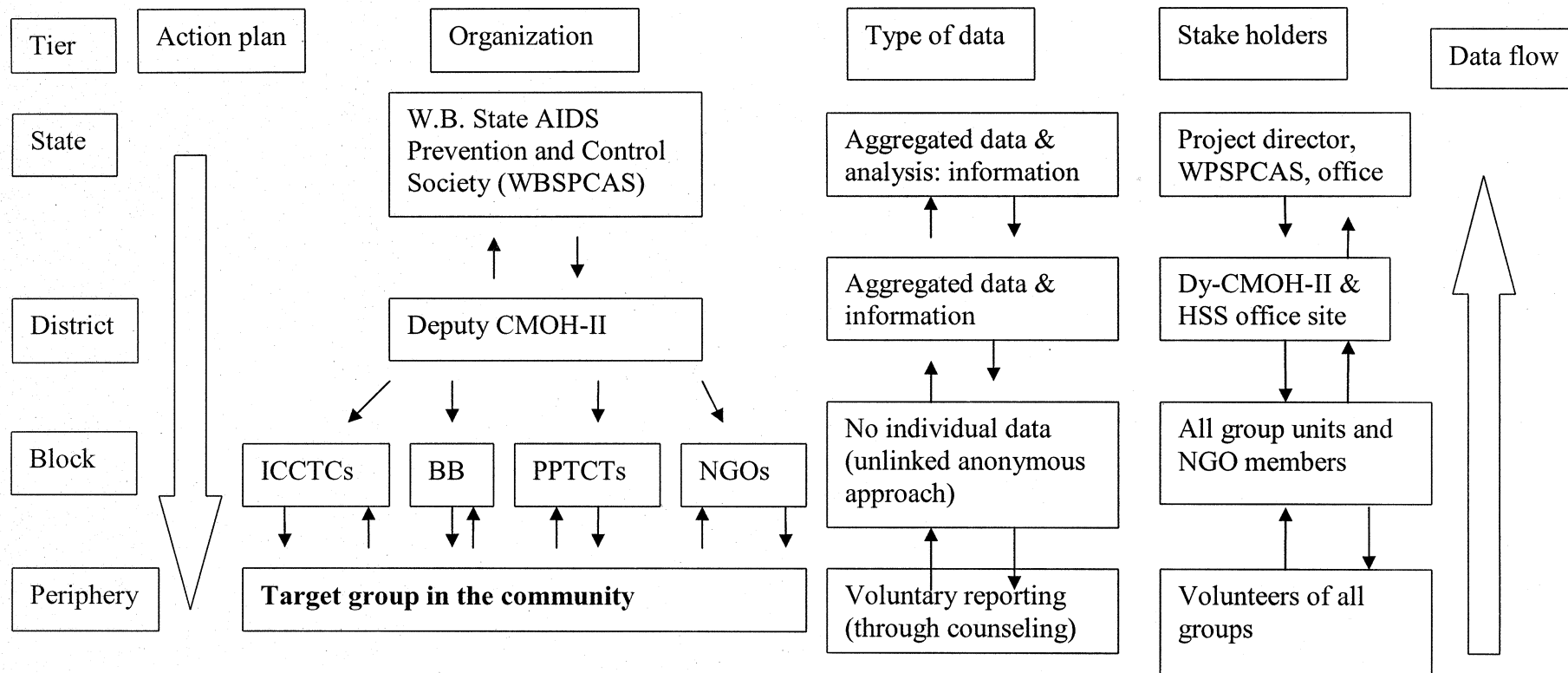


Figure-2: H.S.S. data flow chart, Hooghly district, West Bengal, India, 2007



Section 2: Second field posting

Evaluation of the maternal care component of Reproductive and Child Health programme - phase II, Hooghly district, West Bengal, India, 2007

Introduction:

Reproductive and Child Health (RCH) programme is based on the philosophy of (1) basic instinct of reproduction that people had the ability to reproduce and regulate their fertility and (2) to make the outcome of reproduction safe (i.e. safe motherhood, safe childhood, safe sex without pregnancy or contracting disease)²⁸. Among the various components of RCH, safe child and motherhood component is considered the most important.²⁹ Safe motherhood interventions involve activities of antenatal care (ANC) (managing high risk mothers, immunization for tetanus, safe delivery^{30,31,32} anaemia control program facility to prevent hemorrhage associated reproductive deaths i.e. unsafe abortion, partum hemorrhages)³³. Several initiatives were undertaken after the adoption of the National Population Policy 2000³⁴. These include organizing RCH camps in remote areas, Border District Cluster Strategy (BDCS) through strengthening of infrastructure in 49 selected districts of 17 states³⁵, integrated management of childhood illness (IMCI) and training of dais.

In view of some operational deficiencies of RCH I, RCH phase II was redesigned and incorporated within the National Rural Health Mission (NRHM). The new initiatives³⁵ are (1) training of MBBS doctors in anaesthetic skill for emergency obstetric care (EMOC) at first referral units (FRU), (2) training of MBBS doctors in obstetric management skills (BMOC), (3) setting up of blood storage centres at FRUs, (4) development of cadre of community level skilled birth attendants³⁶ and (5) Janani Suraksha Yojana (national maternal benefit scheme) with its allied sub allotments (referral transport fund, patients illness fund and different welfare society funds) and Vande mataram scheme and lastly (6) to ensure the quality of care. West Bengal has shown an improvement in maternal and child health situation after the implementation of RCH II³⁷. The infant mortality rate (IMR) has reduced from 51 per 1000 live births in 2000 to 38³⁸ per 1000 live births in 2005³⁹ while the maternal mortality ratio (MMR) declined from 218 in 1991-2001⁴⁰ to 194 in 2001-2003⁴¹

In Hooghly district in the year 2006-2007, out of 570,294 eligible couples (526,101 (92.3 %) rural and 44,193 (7.7 %) urban) there were 68,817 registered ANC cases (65,357 (95 %) rural and 3460 (5 %) urban). Among 60911 deliveries in rural area, 1315 (2.2 %) were attended by the lady health visitor, 4606 (7.6 %) by other trained birth attendant and 1651 (2.7 %), by

untrained birth attendant. With this background, we described and evaluated the maternal care component of RCH II programme in Hooghly district in 2007-08.

Methods

We took all the antenatal mothers of the Hooghly district as our study population. We conducted a cross-sectional survey among all 8 community health centres (in West Bengal, they are known as Rural Hospitals or RH), all 9 Block Primary Health Centres (BPHC), 30 % (22) randomly selected Primary Health Centres (PHC) and 10 % (66) Subcentres (SC). We interviewed all the health officers in-charge, medical officers (M.O.), community health nurses (CHN: in W.B., they are known as block primary health nurses or BPHN and PHN), health workers (supervisors), health visitors (health assistants: HA) and selected antenatal mothers related to various aspects of antenatal services in the district.

We enquired about the knowledge of the health care provider about the ANC screening procedures (and number of high risk cases detected and referred to suitable higher centres. We visited the selected health units on the clinic days to observe some of the processes. We conducted an exit poll survey among five randomly selected mothers in each health unit to know their perception about the warning signals of pregnancy and how useful the service provided to them was. We also reviewed the clinic register, immunization register, high risk referral register and field diaries. We collated details of funds available or utilized from the different heads of NRHM fund.

We framed all the activities into four arms namely antenatal registration, antenatal check ups (including examination, laboratory tests, Inj. T.T. and high risk screening referrals), institutional delivery and post delivery follow up and supervision. We prepared a logic model in terms of input, process and output with respect to those four arms (Table 1).

Indicators used for evaluation:

In order to estimate some of the input and process indicators we used the operational definitions and classifications as per the UNFPA's technical report entitled "Planning Population and Development Projects (1999)"^{43 44 45 46}.

Infrastructure: We included the buildings (condition, location from the community, lighting, waiting place with sitting arrangements, separate latrines for ladies). We also included running water facility and furniture. According to percentage of availability of infrastructure with respect to the initial opening establishment table we classified the health units into less than 50%, 50 to 99 % and 100% serviceable scale.

Providers' availability: We included the man power (trained or untrained, skilled or unskilled) in this category. We classified the health units, according to percentage of actually posted staff, into less than 50%, 50 to 99% and 100% sanctioned scale.

Readable and writable items: Antenatal cards, registers and field diaries, reporting forms and IEC materials accounted as readable and writable. We verified the stock ledger, enquired the status of using them and estimated their proportional availability for each category of health unit.

Logistic supply: All the expendable and non expendable items of maintenance and routine use were accounted in this category. We verified the monthly maintenance figure (MMF), quarterly indents and annual budget report form (B form) and categorized the health units into less than 50%, 50 to 99 % and 100% availability.

Expected level of achievement (ELA): In the beginning of the year, every health unit along with associated officers and people's representatives assesses the needs of the community for the year wherein some expected level of achievement (ELA) for various services is set as part of the health action plan. We categorized the health units by percentage of reaching the respective ELA.

Data analysis: We entered data in Excel software and analyzed using Epi Info version 6 to calculate the frequencies for the indicators.

Results

Overall status of maternal care

Of the 74783 pregnant women in the district 92% were registered with the government health setup. Most (93%) registered women had completed three antenatal checkups and 87% had institutional delivery. The antenatal registration was nearly 50% in urban area compared to 96.5% of the estimated pregnant women in the rural area. However, majority of the registered pregnant women (96%, urban and 93%, rural) completed three antenatal checkups. Less than half (49.6 %) pregnant women had institutional delivery in the urban area while more than eighty (87.7) percent deliveries in the rural area were conducted in the institutions. Total referral was 38.1 % in the urban area and 8.0 % in rural area (Table 2).

Input indicators

We included 8 CHCs, 9 BPHCs, 22 PHCs and 66 sub centres in our survey. All health workers in all the health units were trained in delivery of maternal care services. All the CHC and BPHC were posted with BMOC trained medical officers. EMOC medical officers were

trained in 75% C.H.C.s and 44% BPHCs. Clinics in all the health units were using standard antenatal cards while use of IEC material ranged from 27% in PHCs to 100% in BPHCs. All the health units, except 5 PHCs (22.7 %), had minimum 50 % providers' availability. Fourteen (64%) PHCs had infrastructure with less than 50 % serviceability. Infrastructure was 50-99% serviceable in majority of other health units. Logistic supply was below 50% authorization scale in 50% PHCs, 2 (25 %) CHCs and 3 (33.3 %) BPHCs. All the eight (100%) CHCs, 7 (78 %) BPHCs and 3 (14 %) PHCs were ready for institutional delivery. (Table 3)

Process indicators

Mothers had completed three antenatal checkups in 88% or more of all the health units, except the PHCs (68 %). The expected level of achievement for antenatal screening was 97% for all the health units. For antenatal screening 1 BPHC, 7 (32%) P.H.C.s and no sub centre were below 50% of ELA. The expected level of achievement for clients' satisfaction was 96% for all the health units. At least 50% ELA was achieved in all health units and 17 (77%) PHCs. In all CHC, BPHC, 98.5% SC eighty percent clients perceived ANC as useful while in PHC that was only 36%. All the health units except 17 (77%) PHCs had at least 50% ELA for antenatal immunization. Of all the health units only 32 (49%) SCs had 100% ELA for antenatal immunization. For all the health units ELA for antenatal counseling was 98%. All health units except 7 PHC (39%) had at least 50% ELA for antenatal counseling. Laboratory tests were being done in 5 (62.5 %) CHC, 2 (22.2 %) BPHC, 1 (4.5 %) PHC and 22 (33.3 %) sub centres (Table 4).

Output indicators

All CHC, BPHC and Sub centres had achieved the expected level of full ANC check up (three clinic visits, two Inj TT and 100 Iron tablets with Folic acid) but only 15 (68 %) PHC could achieve that. Less than 50% mothers knew about warning signals of pregnancy in 2 (22%) BPHCs, 10 (45 %) PHCs and 2 (3%) sub centres. Deliveries were being conducted in 8 (100 %) CHC, 7 (77.8 %) BPHC, 3 (13.6 %) PHC and no sub centres. Postnatal supervision was done in 8 (100 %) CHC, 9 (100 %) BPHC and 15 (68.2 %) PHC. Though no sub centre had the infrastructure for institutional supervision, 65 (98.5 %) of them had the follow ups done either in the associated referral centres or nearby institutions. Seven (32%) PHC had to rely on home supervision (Table 5).

The urban government health units had lower antenatal registration than the rural units but clinic attendance among the ANC registered mothers was similar in both. Majority was regular in the clinics but treatment of special cases like anaemia, high risk referral was lower in the urban sector. Similar pattern was observed for institutional delivery. Home delivery by LHV as well as high risk referral was more in the urban than rural area.

All the health units (CHC, BPHC, PHC, SC) had trained health workers which provided the foundation stone of the maternal care delivery system. While the posting of medical officer and the related clinical components of institutional delivery, new born care, emergency obstetric care, clinical and specialized supervisions were concentrated in the CHC and BPHC, subcentres had good infrastructure, providers' availability and all the preventive care components of antenatal screening, immunization, counseling and indirect supervised post natal follow ups. In summary, all interpersonal linkage services between the antenatal mothers and health care provider were better provided in the subcentres. The major deficiency in the subcentres was absence of institutional delivery followed by neonatal care. The complete post natal follow ups were not documented probably because of absence of post partum units at those periphery levels.

There are more private delivery institutions in the urban area than rural area owing to their commercial nature and easy accessibility. In absence of good urban reporting system there will be always some under reporting from the private clinics and institutions as reflected in the antenatal registration and delivery statistics. Because of increased awareness and better access to the institutional health care delivery system the referrals were more in the urban sector. The cases could be managed at the urban institutions than rural one probably because of better infrastructure and providers' availability. Better accessibility probably explains the increased figure of home delivery by LHV in the urban area where as the deliveries by untrained personnel were more in the rural area.

The better availability of man-power (providers' availability) in CHC and BPHC is because of their design and purpose. This is further strengthened by the implementation of a World Bank and WHO sponsored State Health System Development Project - phase II⁴⁷.

Antenatal immunization status of pregnant women in the district is probably an under estimation because of high utilization of the private sector that are not a part of the government reporting system. In villages the common practice is that the first delivery is conducted at the parents' house unless there is a reputed government hospital nearby in laws' place. In that case, the mother makes one antenatal card in the parents' place but stays at in

laws' place. There she usually takes immunization from a nearby and convenient private clinic. During the ninth month of pregnancy she returns to her parents' place and uses the initial card for availing institutional delivery. While C.H.C.s are the first referral units for complicated cases, there is more interpersonal interaction between health workers and beneficiaries at the sub centre level. Thus, knowledge of warning signals was more among registered pregnant women at CHC and subcentres.

The performance of PHCs in general was inferior in Hooghly district as also in whole West Bengal,^{48 49}. Some of the important reasons for this are poor maintenance of buildings, unwillingness of the young medical officers to stay in the rural areas and interference by local miscreants. The state government has plans of upgradation of the PHC and other lower tiers through NGO and public private partnership programme⁵⁰. These projects are still in the beginning phase and their impact has not reflected in the current evaluation.

Our study has some limitations.. We could not establish any documentary completeness regarding post natal follow ups and further family planning services. Similarly, we could not review the fund utilization status and many other output, outcome and impact indicators mentioned in the logic model because of short time and logistic constraints.

The weaknesses in the antenatal care component of RCH II in Hooghly district were (1) availability of less MO, other provider availabilities, infrastructure and logistics in the PHC set ups, (2) less communication skills in CHC and PHC, (3) less integrated post care follow up supervision at all levels. Infrastructure, providers' availability and logistic support are interrelated and the status of one has a direct impact on the others across all the health units in the district.

We recommend (1) strengthening of PHC set ups through NRHM, HSDI or PPP scheme, (2) utilization of more IEC material and other communication methods in CHC and PHC set ups because post partum units (PP Units) which mainly functions on post natal follow ups and family planning methods are not included in the peripheral set ups at present, and (3) orientation training of the different tier workers about the total contact period of a newly married couple in eligible couple and contraceptive register (ECCR)³².

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- ³⁰ IIPS, 1995
- ³¹ Govindswamy et al, 1993
- ³² The principles of antenatal care, Dr Sue Page, mitchell@om.com.au
- ³³ Government of India, Annual Report, 1999-2000, Ministry of Health and Family Welfare, New Delhi.
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- ³⁸ SRS, 2000
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- ⁴¹ SRS, 2001-2003
- ⁴² District program Management unit report, office of the Chief Medical Officer of Health, Hooghly
- ⁴³ Health Care Quality: An international Perspective. Edited by A.F. Al-Assaf, WHO, Regional Officer for South-East Asia. WHO Regional Publication, SEARO, No. 35, 2001
- ⁴⁴ District Quality Assurance Programme for Reproductive Health Services: An Operational Manual". Manual developed by FRONTIERS Programme and UNFPA for Department of Health and Family Welfare, Government of Gujarat. May 2006
- ⁴⁵ Reproductive & Child Health Project (Phase 1, Round 2, 2002) Results, New Delhi: Ministry of Health & Family Welfare and International Institute for Population Science Mumbai. 2004

- ⁴⁶ Reproductive & Child Health Project (Phase 1, Round 2, 2002) Results, New Delhi: Ministry of Health & Family Welfare and International Institute for Population Science Mumbai. 2004
- ⁴⁷ Manual of SHSDP II, Govt of West Bengal, 1994-2001
- ⁴⁸ Health on March, Govt of West Bengal reports summary
- ⁴⁹ Interim report of Quality assurance project, a collaborative project of Government of India, Govt of West Bengal with technical collaboration with GTZ and PATH, 2007
- ⁵⁰ District plan, Health System Development Initiatives (HSDI), manual, page 5

Table 1: Logic model of antenatal care delivery system, Hooghly district, West Bengal, India, 2007

Arms	1. Antenatal registration		2. Antenatal services (screening, Inj. T.T., tests, high risk referral)		3. Institutional delivery		4. Supervision and monitoring	
Indicators	Data collection		Indicators	Data collection	Indicators	Data collection	Indicators	Data collection
Input	Proportion of available trained field worker	Records of DIO, action plan	Proportion of available trained field worker	Records of DIO, action plan	Proportion of ready institute	Records of DIO action plan	Proportion of available supervisor	Micro plan
	Proportion of available trained medical officer		Proportion of EMOC MO					
	Proportion of usable infrastructures	Stock ledger	Proportion of laboratory reagents available	Stock ledger	Providers availability	Survey reports	Proportion of usable fund	Cash book
Proportion antenatal cards, IEC materials	Proportion of high risk pregnant women		Survey reports	Proportion of usable fund	Cash book			
Process	Proportion of pregnant women registered	Clinic register	Proportion of pregnant women examined	Clinic register	Proportion of JSY fund used	Centre cash book		
			Proportion of pregnant lab tested	Lab register	Proportion of refer. transport fund used	Institution cash book		
			Proportion of pregnant women given 2 Inj. T.T.	Immun. register	Proportion of pt. illness fund used	Institution cash book		
			Proportion of high risk referral	Referral register	Proportion of RKS fund used	Institution cash book		
			Proportion of pregnant women counseled	Clinic register				
Output	Proportion of pregnant women with complete check up, Inj. TT, IFA				Clinic register, field diary, field report			
	Proportion of delivery in Institute				Delivery register			
	Proportion of pregnant women supervised				Field diary, field report			
Outcome	Maternal and neonatal morbidity							

Table 2: Maternal care status of Hooghly district, West Bengal, India, 2007

Maternal care	Urban **			Rural			Total		
	#	Total	%	#	Total	%	#	Total	%
Population		391,464			3,763,194			4,154,658	
Antenatal registration									
Eligible couple	44193	391464	11.3	526101	3763194	14.0	570294	4154658	13.7
Estimated pregnant women (PW ^{††})	7046	44193	15.9	67737	526101	12.9	74783	570294	13.1
Total registered in the health set up	3460	7046	49.1	65357	67737	96.5	68817	74783	92.0
Antenatal care									
Total PW with complete ANC check up	3310	3460	95.7	60734	65357	92.9	64044	68817	93.1
Total anaemia (PW) cases treated	900	3460	26.0	45189	65357	69.1	46089	68817	67.0
High risk pregnant women	520	3460	15.0	9468	65357	14.5	9988	68817	14.5
Total high risk cases (PW) treated	520	520	100.0	7055	9468	74.5	7575	9988	75.8
Total high risk cases (PW) referred to FRU ^{‡‡}	0	520	0.0	2418	9468	25.5	2418	9988	24.2
Natal care									
Total delivery reported to the system	2120	3460	61.3	61336	65357	93.8	63456	68817	92.2
Total Institutional delivery	1717	2120	81.0	53764	61336	87.7	55481	63456	87.4
Total home delivery by LHV	231	2120	10.9	1315	61336	2.1	1546	63456	2.4
Home delivery by trained birth attendant	51	2120	2.4	4606	61336	7.5	4657	63456	7.3
Home delivery by untrained birth attendant	121	2120	5.7	1651	61336	2.7	1772	63456	2.8
Total PW referral to next tier for delivery	808	2120	38.1	4918	61336	8.0	5726	63456	9.0

** Calculations are based on reports of four municipalities

†† Estimation has been based on 17/1000 Birth rate and 10 % wastage factor

‡‡ First referral unit, usually a rural / state general /sub divisional hospital with emergency caesarian section facility

Table 3: Input indicators of maternal care delivery system, Hooghly district, West Bengal, India, 2007

Indicators	CHC (n = 8)		BPHC (n = 9)		PHC (n = 22)		SC (n = 66)	
	#	%	#	%	#	%	#	%
Trained staff								
Field worker	8	100	9	100	22	100.0	66	100.0
Medical officer (BMOC) ^{§§}	8	100	9	100	13	59.1	NA ^{***}	NA
Medical officer (EMOC) ^{†††}	6	75	4	44.4	NA	NA	NA	NA
Readable, writable (minimum available)								
Antenatal cards	8	100	9	100	22	100.0	66	100.0
IEC materials	4	50	9	100	6	27.3	53	80.3
Providers availability (% of authorization)								
Less than 50 %	0	0	0	0	5	22.7	0	0.0
50 % to 99 %	5	62.5	9	100	17	77.3	40	60.6
Fully available	3	37.5	0	0	0	0.0	16	24.2
Infrastructure (% of serviceability)								
Less than 50 %	1	12.5	3	33.3	14	63.6	4	6.1
50 % to 99 %	6	75	6	66.7	8	36.4	60	90.9
Fully serviceable	1	12.5	0	0	0	0.0	2	3.0
Logistic supply (% of authorization scale)								
Less than 50 %	2	25	3	33.3	11	50.0	0	0.0
50 % to 99 %	5	62.5	6	66.7	11	50.0	56	84.8
as per full scale	1	12.5	0	0.0	0	0.0	10	15.2
Institutional delivery								
Institute ready for delivery	8	100	7	77.8	3	13.6	0	0.0

^{§§} Basic medical obstetric care

^{***} Not authorized as per the present guidelines

Table 4: Process indicators of maternal care delivery system, Hooghly district, West Bengal, India, 2007

Indicators	CHC (n = 8)		BPHC (n = 9)		PHC (n = 22)		SC (n = 66)	
	#	%	#	%	#	%	#	%
Antenatal screening (% ELA⁺⁺⁺)								
Expected level of achievement		97.0		97.0		97.0		97.0
Less than 50 %	0	0.0	1	11.1	13	59.1	1	1.5
50 % to 99 %	3	37.5	8	88.9	9	40.9	65	98.5
100%	5	62.5	0	0.0	0	0.0	0	0.0
Completed 3 check ups	8	100.0	7	77.8	6	27.3	49	74.2
Clients perceived ANC as useful(% ELA)								
Expected level of achievement		96.0		96.0		96.0		96.0
Less than 50 %	0	0.0	0	0.0	5	22.7	0	0.0
50 % to 99 %	4	50.0	8	88.9	17	77.3	42	63.6
100%	4	50.0	1	11.1	0	0.0	24	36.4
Antenatal immunization (% ELA)								
Expected level of achievement		97.0		97.0		97.0		97.0
Less than 50 %	0	0.0	0	0.0	17	77.3	0	0.0
50 % to 99 %	8	100.0	9	100.0	5	22.7	34	51.5
100%	0	0.0	0	0.0	0	0.0	32	48.5
Immunization status (mother)								
Completed 1 clinic session	0	0	1	11.1	3	13.6	3	4.5
Completed 2 clinic session	3	37.5	0	0.0	14	63.6	30	45.5
Completed full clinic session	5	62.5	8	88.9	5	22.7	33	50.0
Antenatal counseling (% ELA)								
Expected level of achievement		98.0		98.0		98.0		98.0
Less than 50 % of ELA	0	0.0	0	0.0	7	31.8	0	0.0
50 % to 99 % ELA	8	100.0	9	100.0	15	68.2	59	89.4
100%	0	0.0	0	0.0	0	0.0	7	10.6
Laboratory test								
ANC laboratory tests done	5	62.5	2	22.2	1	4.5	22	33.3

Table 5: Output indicators of maternal care delivery system, Hooghly district, West Bengal, India, 2007 concld.

Indicators	CHC (n = 8)		BPHC (n = 9)		PHC (n = 22)		SC (n = 66)	
	#	%	#	%	#	%	#	%
Full antenatal care (3 ANC visits, 2 Inj TT and 100 IFA) (ELA)		99	95			93		95
Achieved 100 %	8	100	8	88.9	15	68.2	66	100
% mothers know the warning signals								
Less than 50 %	0	0	2	22.2	10	45.5	2	3.0
50 % to 99 %	8	100	7	77.8	12	54.5	62	93.9
All	0	0	0	0	0	0	1	1.5
Institutional delivery								
Institutional delivery conducted	8	100	7	77.8	3	13.6	0	0.0
Supervised post natal follow up done								
Home supervision	0	0	0	0	7	31.8	0	0
Clinic supervision	0	0	0	0	7	31.8	1	1.5
Institute supervision	0	0	3	33.3	8	36.4	21	31.8
Specialized supervision	8	100	6	66.7	0	0	44	66.7

Scientific study critique

General information:

Title of the paper: Cassia occidentalis poisoning as the probable cause of hepatomyoencephalopathy in children in western Uttar Pradesh

Authors: V. M. Vashishtha, Amod Kumar*, T. Jacob John+ & N.C. Nayak ,*Mangla Hospital, Bijnor (UP) , *Department of Community Health, St Stephens Hospital, New Delhi, ;+Christian Medical College,,Vellore & #Sir Ganga Ram Hospital, New Delhi, India*

References: Thirty one references consisting of Articles on Encephalopathy, Chandipura Virus, some features of Toxic plant seeds like Cassia Occidentalis, reports of some experiments on animals about the effects of the toxic plant seeds like Cassia Occidentalis

Reviewer: Dr. Bijay Prasad Mukhopadhyay, MAE FETP 2007

Date: 10.10.2007

General narrative comments:

Reference 1, 6, 7 and 11 showed that, the first author tried several times to demystify the illness, reported from the western Uttar Pradesh. This also cited the epidemiology in identifying the most probable cause by statistical association. It was similar like the cases of Staphylococcal Toxic Shock Syndromes in young Girls and use of intra vaginal Tampon. We are eager to see (1) further study about the toxic principles for the syndrome and (2) the effects of the interventions as suggested like community education about the poisonous nature of the stated plant weed and reducing the density of the plant before the flowering. The whole topic is relevant with a significant public health importance (in terms of fatality).

Area	Checklist items	Grading from 1 (strongly disagree) to 5 (strongly agree) §§§					Explanations ****
		1	2	3	4	5	
Overall assessment of the paper	The background provides a description of the public issue at the global and local levels and logically introduces the need to answer a specific research question.			√			No literatures showed it as a global issue. The plant is quite commonly seen in other rural areas with out any reports of fatality or other illnesses. However the fatality was sufficient enough for public health importance.
	The methods section provides sufficient information on the methods used, including the type of study, the sampling strategy, the case definitions, the data collection and the data analysis.				√		All are well described except the fact that whether any sampling was done or required in selecting the Neighborhood controls.
	The results reports sound scientific results that meet the study's objective and the research question. They are presented with sufficient details and adequate statistical information (e.g., Confidence Intervals).					√	All are sufficiently explanatory.
	The discussion summarizes and interprets the results, discusses the findings in view of what is already known, frames what the results of the study can support, defines the limitation of the work and suggests next steps in terms of (1) intervention and (2) research.						All are sufficiently strong except the fact that scope of further study and any effects on intervention were lacking.

§§§ The appropriate boxes have been ticked in the form of yes.

**** Explanations have been provided to justify the grading of each of the items.

Area	Checklist items	Grading from 1 (strongly disagree) to 5 (strongly agree)					Explanations
		1	2	3	4	5	
Methods	The study design is adequate to meet the objective.					√	Normal convention of less proportion involvement or clustering favored a Case control Study.
	The study population is well defined and relevant to the research question					√	As the outcome was quite serious, it was expected that the hospital based cases were representatives in the community. In fact this has been mentioned as coverage of as large as 1800 square Kilometer.
	Definitions are specified, sound and based upon standardized criteria when available					√	All epidemiological definition, requirement of Time, place and person has been fulfilled.
	Sampling methods are statistically sound and adapted.				√		While for cases it was adequate, in case of controls it was probably lacking.
	The sample size was estimated beforehand appropriately.				√		While for cases it was adequate, in case of controls it was probably lacking.
	The study is exempt from bias.				√		While for cases it was adequate, in case of controls it was probably not affirmative.
	The data that were collected are well described and relevant					√	Is relevant and epidemiologically adequate
	The data was collected was of sufficient quality.					√	59 variables were included
	The analysis is thought beforehand and appropriate.		√				There was scope of reviewing the dummy table possibly in view of planning a matched analysis, which was not done (at least not presented in the journal)
	The indicators generated are appropriate and well calculated.		√				The odds ratio calculated were right and variables chosen were appropriate but calculating unmatched analysis in a matched study was probably not appropriate. The reasons for doing unmatched analysis were not mentioned.
	The statistical tests used are appropriate and well computed.				√		All probability value (p), point estimate (odds ratio) and interval estimate (confidence interval) were calculated, but matched adjusted odds ratio or multivariate method would have been more appropriate.
	Appropriate attention has been given to human subject protection issues				√		As no mentioning were there regarding minimizing harms while interviewing the relatives of the dead children which might have caused a psychological upsets (reference: the ethical problems in case of Dr. Tulsi' s case study on Suicide)

Area	Checklist items	Grading from 1 (strongly disagree) to 5 (strongly agree)					Explanations
		1	2	3	4	5	
Methods	The study design is adequate to meet the objective.					√	Normal convention of less proportion involvement or clustering favored a Case control Study.
	The study population is well defined and relevant to the research question					√	As the outcome was quite serious, it was expected that the hospital based cases were representatives in the community. In fact this has been mentioned as coverage of as large as 1800 square Kilometer.
	Definitions are specified, sound and based upon standardized criteria when available					√	All epidemiological definition, requirement of Time, place and person has been fulfilled.
	Sampling methods are statistically sound and adapted.				√		While for cases it was adequate, in case of controls it was probably lacking.
	The sample size was estimated beforehand appropriately.				√		While for cases it was adequate, in case of controls it was probably lacking.
	The study is exempt from bias.				√		While for cases it was adequate, in case of controls it was probably not affirmative.
	The data that were collected are well described and relevant					√	Is relevant and epidemiologically adequate
	The data was collected was of sufficient quality.					√	59 variables were included
	The analysis is thought beforehand and appropriate.		√				There was scope of reviewing the dummy table possibly in view of planning a matched analysis, which was not done (at least not presented in the journal)
	The indicators generated are appropriate and well calculated.		√				The odds ratio calculated were right and variables chosen were appropriate but calculating unmatched analysis in a matched study was probably not appropriate. The reasons for doing unmatched analysis were not mentioned.
	The statistical tests used are appropriate and well computed.				√		All probability value (p), point estimate (odds ratio) and interval estimate (confidence interval) were calculated, but matched adjusted odds ratio or multivariate method would have been more appropriate.
	Appropriate attention has been given to human subject protection issues				√		As no mentioning were there regarding minimizing harms while interviewing the relatives of the dead children which might have caused a psychological upsets (reference: the ethical problems in case of Dr. Tulsi' s case study on Suicide)

Area	Checklist items	Grading from 1 (strongly disagree) to 5 (strongly agree)					Explanations
		1	2	3	4	5	
Writing	The content is well distributed by chapters and sections.					√	It followed the style of publishing in a Journal.
	The language is simple and clear. The word count is < 3000.					√	Though it was 3011 including 2 tables, otherwise it was less than 3000 (2603) words.
	The writing is sequential, going from one point to the next.					√	It followed the style of publishing in a Journal.
	The active voice is used throughout.				√		Mostly.
	The vocabulary is precise, consistent and standardized.					√	
Tables and figures	There are no more than five tables and or figures. All are needed.					√	
	The choice of graph or table to display information is judicious.					√	Probably no graph was required.
	The tables are clear, exact and the totals add up.					√	
	The graphs are effective, appropriate and understandable					√	Probably no graph was required..

Matter selected for Word Count: Count = 2603 Words

Section 3: Outbreak investigation

Three sequential outbreaks of mass hysteria among school children in Howrah district, West Bengal, India, 2007

Abstract

Background:

Between 10th August and 14th September, 2007, 237 cases, suggestive of mass hysteria were reported in three schools of West Bengal. We investigated these clusters to confirm the diagnosis, estimate the magnitude and identify the associated epidemiological factors.

Methodology:

After initial confirmation of the outbreak and case search from hospital records and school surveys, we conducted a class and gender matched (1:1) case control study in all three schools. We used Epi Info to estimate adjusted matched OR.

Results:

Three most common psychogenic symptoms among the case-patients were headache (44.5%), dizziness (40.1%) and dyspnoea (31.5%). Overall attack rate was 19 % with variations across the schools. Third, fifth, tenth grade and female students were affected more. Overall, perceptions of bad smell (adjusted O.R. 2.5, 95 % C.I. 1.4 - 4.6), evil power (adjusted O.R. 2.1, 95 % C.I. 1.2 - 3.6), and hot and humid condition (adjusted O.R. 2.1, 95 % C.I. 1.2 - 3.7) were significantly associated with the illness.

Conclusion:

Three sequential outbreaks of mass hysteria occurred in Hooghly district for which no obvious cause was found. Perception of bad odor, hot and humid environmental condition and apprehension due to rumors of evil spirit were thought to be possible triggers. We recommended cleaning of the urinal or latrine areas; avoiding prolonged standing in schools with provision of water and other liquids in between the class and psychological counseling in schools, particularly for the adolescent students.

Key words: mass hysteria, school, epidemiological factors, West Bengal.

Three sequential outbreaks of mass hysteria among school children in Howrah district, West Bengal, India, 2007

Introduction:

Mass hysteria, also known as epidemic hysteria or mass psychogenic illness has been defined as a constellation of symptoms suggestive of organic illness, but without an identifiable cause, that occurs between two or more people who share beliefs related to those symptoms^{51,52}. Most published outbreaks of mass hysteria have occurred in schools or in the factories and few in towns and villages⁵³. The common characteristics of these outbreaks include rapid onset and resolution of symptoms, symptoms associated with minimal physical or laboratory findings, spread by 'line-of-sight' transmission⁵⁴, females affected more than males and failure to identify a physical or biological etiological agent⁵⁵. Typical symptoms of mass hysteria are nausea, muscle weakness, fits or headache⁵⁴. Mike Dash, British historian and foretold researcher identified six elements for mass hysteria, namely (1) conducive regional conditions, (2) availability of effective channels for communication for spread, (3) socio economic stress as well as lack of faith on authorities, (4) marginal traditional cultures for alternative explanations, (5) triggering episode for induction and (6) breaking downs on official controls⁵⁶.

On 10th August 2007, 19 students from a girls' high school in Khila village of Howrah district in West Bengal were admitted to Udaynarayanpur State General Hospital, Howrah. They had symptoms of lightheadedness (dizziness), headache, nausea, leg stiffness, dyspnoea, pain chest, weakness, giddiness and body ache. The electronic and print media reported this incident giving it wide publicity. Similar episodes occurred in the same school on 11th and 23rd August 2007 among 11 and 15 students, respectively. On 24th August 2007, the Block Medical Officer of Health (BMOH), Kamarpukur Block Primary Health Centre (BPHC), Hooghly district reported that 91 students from a coed school in Khatul village were admitted in his BPHC with similar symptoms. On 25th and 26th August, 2007 another 59 and 28 students, respectively, from the same coed school were admitted. This school was about 150 kilometer from the school in Khila village of Howrah district. On 14th September 2007, 14 cases occurred in a primary coed school in Samantakhanda village of Kamarpukur block of Hooghly district of West Bengal, approximately 25 kilometer away from the school in Khatul village. We investigated these

three clusters with the objectives of (1) confirming the diagnosis, (2) estimating the magnitude and (3) identifying factors associated with the illness.

Methods

Descriptive epidemiology

Confirmation of the diagnosis, case definition and case search:

The psychiatrist examined the case-patients admitted in Udaynarayanpur State General Hospital, Howrah. We defined the case as an event in a student from the three schools who presented with any of the symptoms of lightheadedness (dizziness), headache, nausea, leg stiffness, dyspnoea, pain chest, weakness, giddiness, body ache, fits between 10th August 2007 and 14th September 2007. We actively searched for cases from hospital records by conducting a school survey. We collected information about the classes in which they were studying (for age), sex, date and time of onset, and symptoms from all the case-patients.

Environmental investigation:

We inspected the three schools immediately after the illnesses. We also interviewed the teachers, guardians, local community leaders and local peoples regarding the school environments, home environments, cultural beliefs and myths if any.

Analytical epidemiology

We conducted class (age) sex matched case control (1:1) study to identify factors associated with the illness. We included all the case-patients identified in the three schools as cases and an equal number of un-affected school children of same sex from the same class as controls. We interviewed the children using structured standardized questionnaires written in Bengali, the local language. We collected information about possible risk factors during the forty eight hours preceding the date of onset of symptoms. This included (1) arrival exertion (defined as any journey except in a vehicle for more than half an hour) (2) keeping hungry for more than four hours after meal (fasting or hypoglycemia), (3) perceiving bad smell (4) feeling very hot, humid or suffocating (5) belief in existence of evil spirit (6) having any fear in mind (7) Prolonged standing for more than two hours.

Data analysis:

We analyzed the data using Epi Info software version 6. We calculated class (considering same age groups in each class) and sex specific attack rates. We plotted the epidemic

curve to represent the distribution of the cases over time. We drew maps showing the number of cases in each class rooms of all three schools. We calculated matched odds ratio and 95% confidence interval for each factor. .

Results

Descriptive epidemiology

We identified a total of 237 case-patients during three sequential outbreaks in three schools. During the first outbreak in the girls' school at Khila, there were 45 cases: 19 on 10th August, 11 on 11th August and 15 on 23rd August 2007. One hundred and seventy eight students were affected during the second outbreak in Khatul High school (a coed school) over three consecutive days between 24th-27th August 2007. The third outbreak in the primary school at Samantakhanda occurred on 14 September 2007 affecting 14 students (Fig.1).

Common psychogenic symptoms among the case-patients were headache (44.5%), lightheadedness (dizziness) (40.1%) and dyspnoea (31.5%) (Table 1). Based on constellation of psychogenic symptoms and absence of any physical signs, the psychiatrist confirmed the diagnosis as mass hysteria.

The case-patients were reported from students of all grades with an overall attack rate of 19% . The attack rates were highest among students of third (38 %), fifth and tenth grade (28 %) with variations across the schools. In Khatul High School the attack rates were markedly higher in all grades, compared to the other two schools. Females had more attacks (19.5 %) than males (16.3 %). (Table 2)

Environmental investigations: We inspected the school campus of Khila Girls' High School on the very next day of the first episode of outbreak and found a stuffy and smelling urinal and latrine complex. The headmistress of the school arranged for thorough cleaning on that day itself. The environments of the other schools were neat and clean. The only thing common to all the schools was that the days were quite hot and humid. In Khila Girls' School there was a rumour of an evil spirit of a student who died in a road accident two years back. Samantakhanda Primary School had a tree near the school and an evil spirit, appearing in noon and night, was believed to reside in that tree.

Analytical Epidemiology:

Among various exposures in the girls' school at Khila and Samantakhanda Primary School none was found significantly associated with illness. In the coed school at Khatul,

presence of hot and humid condition (adj OR 2.65 95 % C.I. 1.25 – 5.64) and bad smell (adj O.R. 2.05, 95 % C.I. 1.11 - 3.79) was significantly associated with the illnesses (Table 3). Overall, perception of bad smell (adj. O.R. 2.5, 95 % C.I. 1.4 - 4.6), presence of an evil power (O.R. 2.1, 95 % C.I. 1.2 - 3.6), presence of hot and humid condition (adj O.R. 2.1, 95 % C.I. 1.2 - 3.7) were significantly associated with the illness (Table 4).

Discussion:

There were three sequential outbreaks of mass hysteria among school children in Hooghly district, West Bengal. The illness affected students of all grades. Attack rates in first two schools were higher among females. The significant association with the exposures of perceiving bad smell, presence of an evil power, and presence of hot and humid condition suggests that the threshold of children was low due to the hot and humid days in the schools and the provocation factors perceived bad smell as well as rumor of the evil spirit in two schools.

The three sequential outbreaks had only few similarities. There were three episodes of mass hysteria in the first school in Khila. The first episode had certain triggering factors like stuffy and smelling urinal and toilet, whereas there were no such triggering provocations for other episodes in the first school except the presence of the environmental investigation teams. The media gave wide publicity to the outbreak in first school. In the second school, though the toilets were clean, perception about bad smell among school children was found to be associated with the illness. Besides, there was a rumor of evil spirit in the first and third school, though these factors were not significantly associated with the illness.

Several outbreaks of mass hysteria, including few from India⁵⁷, have been reported⁵⁸,⁵⁹,⁶⁰,⁶¹,⁶². The findings of the sequential outbreaks in Hooghly district of West Bengal are similar to the earlier reported outbreaks including setting of the outbreaks, rapid onset and rapid resolution of the outbreaks, psychogenic symptoms, higher attack rates among females, triggering events like bad smell, apprehension due to media reports and rumors of evil spirit⁶³,⁶⁴. There were reports of similar outbreaks from Bangladesh almost at the same time as this one with related exposures⁶⁵.

Our investigation has certain limitations. First, we could not assess the likelihood of illness being increased in females due to matching with sex and one school being girls' school only. Second, we could not assess the mental status of the affected students in any school. Third, we did not measure the heat and humidity status in any school. Fourth,

qualitative analysis of the psychological components (particularly when we labeled the attacks as mass hysteria and most of our exposures were about perception of students) was beyond our scope. Despite these limitations the involvement of a large number of students with largely unexplained psychogenic symptoms in a sequential manner across three villages merits due attention. In conclusion, there were three sequential outbreaks of mass hysteria in Hooghly district. We did not find any obvious cause for the outbreaks though certain factors like bad odor or perception of bad odor, hot and humid environmental condition, and apprehension due to rumors of evil spirit could be possible triggers. We recommended cleaning of the urinal or latrine areas; avoiding prolonged standing in school opening assembly prayers, particularly in summer; providing facilities for water and other liquids in between the class, particularly during hot and humid days; and psychological counseling in schools, particularly for the adolescent students.

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Table 1: Frequency of symptoms of mass hysteria among school children in Khila, Khatul and Samantakhanda villages, West Bengal, India, 2007

Symptoms	Khila (n=45)		Khatul (n=278)		Samantakhanda (n=14)		Total (n=337)	
	#	%	#	%	#	%	#	%
Headache	28	62.2	119	42.8	3	21.4	150	44.5
Dizziness	26	57.8	98	35.3	11	78.6	135	40.1
Giddiness	16	35.6	100	36.0	12	85.7	128	38.0
Dyspnoea	12	26.7	92	33.1	2	14.3	106	31.5
Body ache	8	17.8	87	31.3	3	21.4	98	29.1
Weakness	18	40.0	71	25.5	8	57.1	97	28.8
Pain chest	10	22.2	79	28.4	0	0.0	89	26.4
Leg stiff.	16	35.6	58	20.9	2	14.3	76	22.6
Convulsion	0	0.0	67	24.1	2	14.3	69	20.5
Nausea	7	15.6	46	16.5	12	85.7	65	19.3
Unconsciousness	0	0.0	55	19.8	1	7.1	56	16.6

Table 2: Class (age) sex wise attack rates of mass hysteria among school children in Khila, Khatul and Samantakhanda villages, West Bengal, India, 2007

Class	Khila			Khatul			Samantakhanda			Overall		
	# of cases	Total # of students	Attack rate (%)	# of cases	Total # of students	Attack rate (%)	# of cases	Total # of students	Attack rate (%)	# of cases	Total # of students	Attack rate (%)
I	-	-	-	-	-	-	1	15	6.7	1	15	6.7
II	-	-	-	-	-	-	1	22	4.5	1	22	4.5
III	-	-	-	-	-	-	8	21	38.1	8	21	38.1
IV	-	-	-	-	-	-	4	29	13.8	4	29	13.8
V	11	168	6.6	66	107	61.7				77	275	28
VI	5	123	4.1	22	70	31.4				27	193	14.0
VII	14	101	13.9	23	77	29.9				37	178	20.8
VIII	9	88	10.2	18	63	28.6				27	151	17.9
IX	1	96	1	24	67	35.8				25	163	15.3
X	5	94	5.3	25	42	59.5				30	136	22.1
Male				41	208	19.7	9	44	20.5	41	252	16.3
Female	45	670	6.7	137	218	62.8	5	43	11.6	182	931	19.5
Overall	45	670	6.7	178	426	41.8	14	87	16.1	223	1183	18.9

Figure 1: Cases of mass hysteria according to date of onset among school children in Khila, Khatul and Samantakhanda villages, Hooghly district, West Bengal, India, 2007

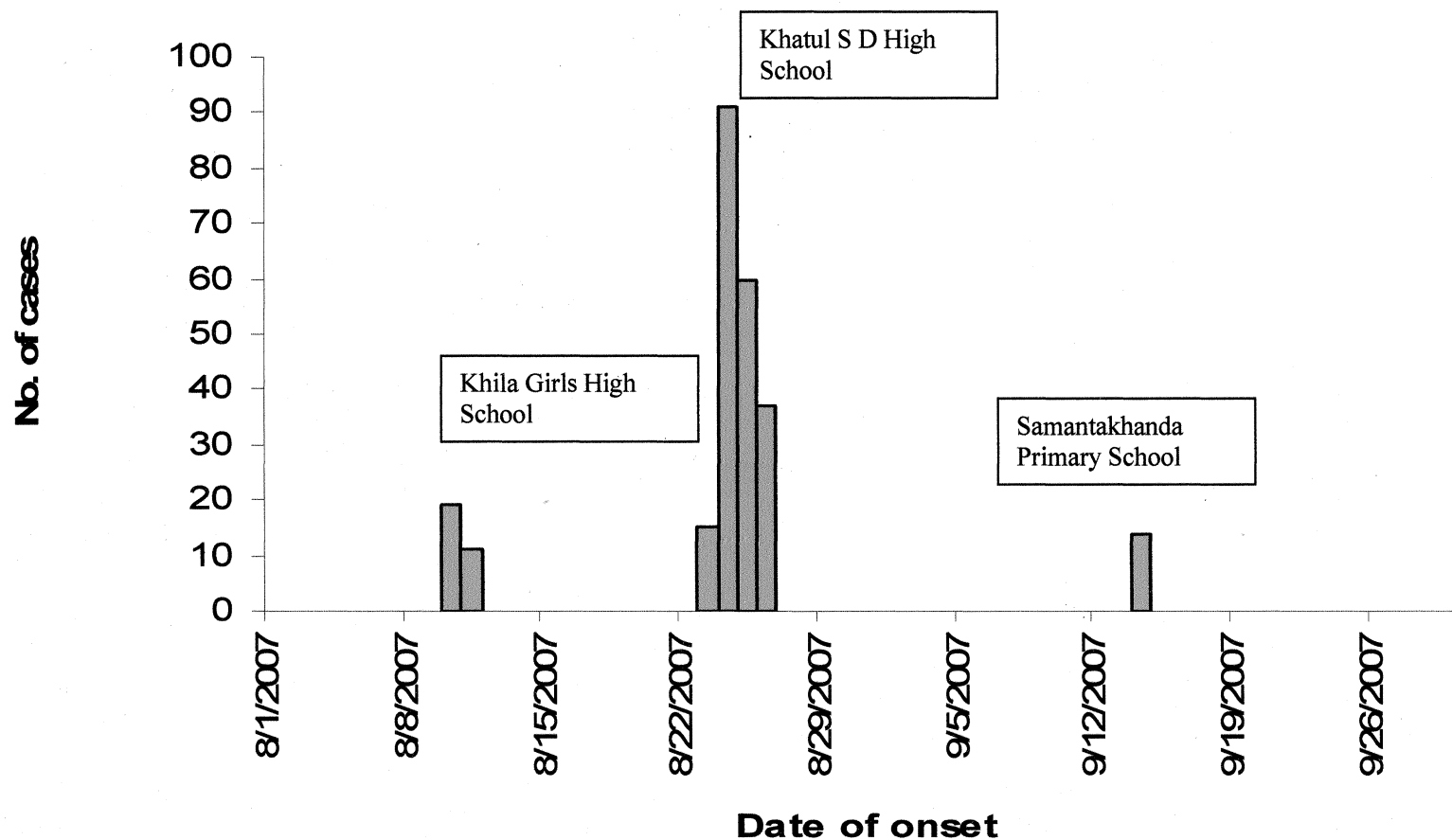


Figure 2: Distribution of cases of mass hysteria according to place of onset among school children in Khila, Khatul and Samantakhanda villages, West Bengal, India, 2007

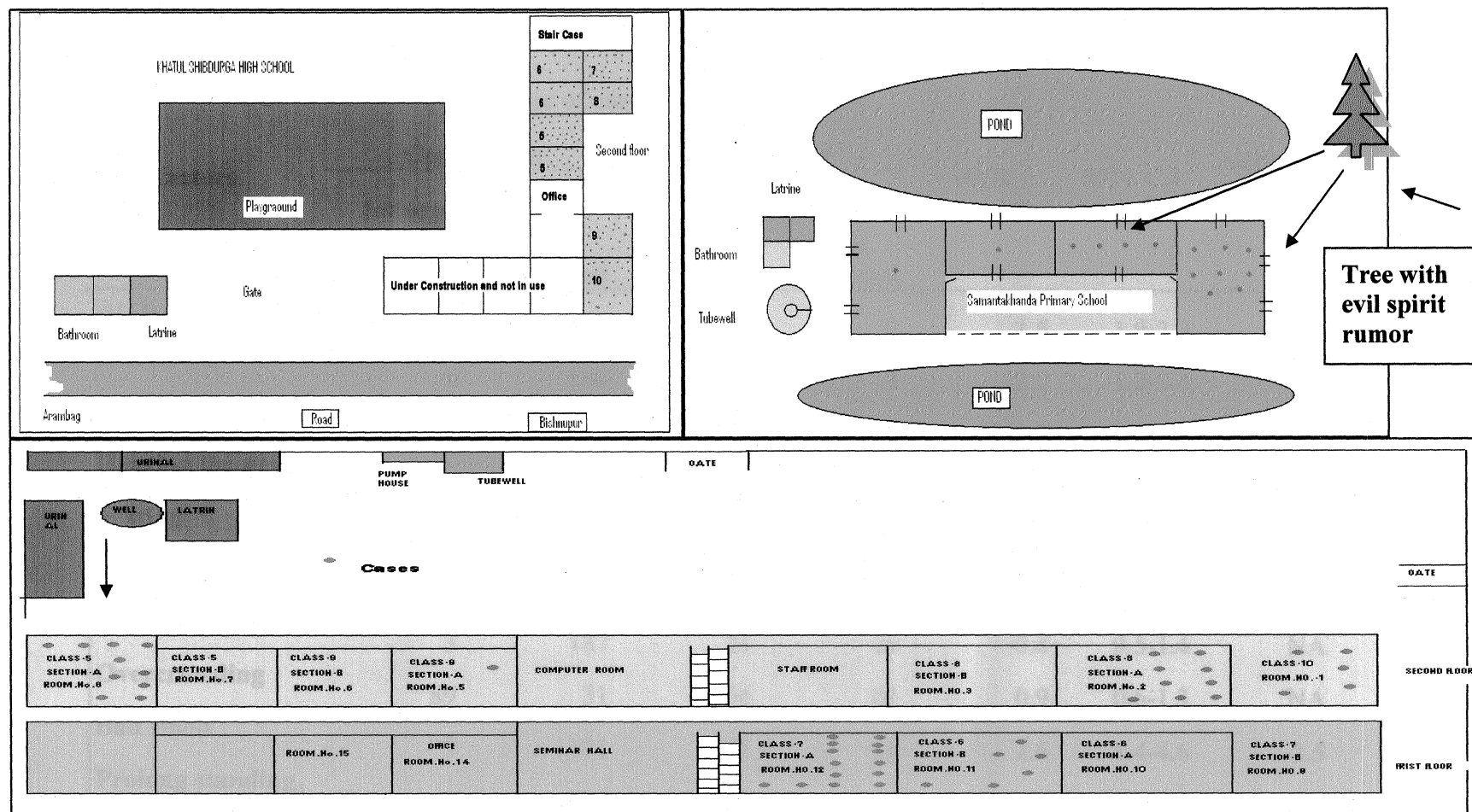


Table 3: Over all distribution of mass hysteria cases and control sets according to exposure status in three schools of Hooghly district, West Bengal, India, 2007

Risk factors	Number of case control sets				O R	95% C I	Adjusted O R	95% C I
	Concordant		Discordant					
	for exposure status		for exposure status					
	Exposed	Unexposed	Case exposed	Case unexposed				
Arrival exertion	22	117	59	39	1.5	1.0-2.3	1.3	0.9 - 2.0
Evil power	14	164	40	19	2.1	1.2-3.6	2.0	1.1 - 3.5
Fear	22	121	52	42	1.2	0.8-1.9	NA ^{††††}	NA
Hearing the news	50	89	50	48	1.04	0.7-1.6	NA	NA
Fasting	4	168	40	25	1.6	1.0-2.6	NA	NA
Hot humid	173	8	38	18	2.1	1.2-3.7	2.1	1.2 - 3.7
Past illness	3	187	21	26	0.8	0.5-1.4	NA	NA
Overcrowding	89	31	56	61	0.9	0.6-1.3	NA	NA
Bad smell	9	171	41	16	2.6	1.4-4.6	2.5	1.4 - 4.6
Prolong standing	5	176	28	28	1	0.6-1.7	NA	NA

^{††††} NA: not adjusted with multiple logistic regression analysis

Table 4: Over all distribution of mass hysteria cases and control sets according to exposure status in three schools of Hooghly district, West Bengal, India, 2007

Risk factors	Khila								Khatul								Samantakhanda							
	Number of case control sets				O R	95% C I	Adj OR	95% C I	Number of case control sets				O R	95% C I	Adj OR	95% C I	Number of case control sets				O R	95% C I		
	Concordant for exp status		Discordant for exp status						Concordant for exp status		Discordant for exp status						Concordant for exp status		Discordant for exp status					
	Un exp	Case exp	Case unexp	Un exp					Case exp	Case unexp	Un exp	Case exp					Case unexp	Un exp	Case exp	Case unexp				
	Exp	Un exp	Case exp	Case unexp					Exp	Un exp	Case exp	Case unexp					Exp	Unexp	Case exp	Case unexp				
Arrival exertion	9	13	16	7	2.3	0.9-5.6	NA	NA	13	89	44	32	1.4	0.9-2.2	NA	NA	0	10	4	0	Undefined			
Evil power	1	0	0	1	Undefined		NA	NA	4	131	23	20	1.2	0.6-2.1	NA	NA	6	1	7	0	Undefined			
Fear	1	28	8	8	1	0.4-267	NA	NA	18	91	36	33	1.3	0.8-2.1	NA	NA	3	2	8	1	8	1.3-17.9		
Hearing the news	7	23	3	12	0.3	0.1-0.9	0.3	0.04-1.7	39	63	43	33	1.3	0.8-2.1	NA	NA	4	3	4	3	1.3	0.3-6.0		
Fasting	1	29	10	5	2	0.7-5.9	NA	NA	3	126	29	20	1.5	0.8-2.6	NA	NA	0	14	0	0	Undefined			
Hot humid	29	1	12	3	4	1.1-14.2	4.6	0.8-25.9	137	6	25	10	2.5	1.2-5.2	2.7	1.3-5.6	12	1	1	0	Undefined			
Past illness	1	34	2	8	0.3	0.1-1.2	NA	NA	2	144	19	13	1.5	0.7-2.9	NA	NA	0	9	5	0	Undefined			
Overcrowding	20	0	5	20	0.3	0.1-0.7	0.4	0.1-1.2	66	31	51	30	1.7	1.1-2.7	1.5	1.0-2.5	1	0	0	3	Undefined			
Bad smell	0	38	6	1	6	0.7-49.8	7.7	0.6-98	7	121	34	16	2.1	1.2-3.9	2.1	1.1-3.8	0	12	1	1	1	0.1-16.0		
Prolong standing	0	41	1	3	0.3	0.03-3.2	NA	NA	5	126	23	24	1	0.5-1.7	NA	NA	0	11	2	1	2	0.2-22.1		