FIELD PROJECT REPORTS

By

Dr. Amitav Das

(MAE- FETP Scholar 2003-2005)

Submitted in partial fulfillment of the requirements for the degree of Master of Applied Epidemiology (M.A.E) of

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

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

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

APRIL 2005

CERTIFICATION

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

Date 01-05-2005

Director

ACKNOWLEDGEMENT

Several dignitaries and institutions have extended their valuable time, advice and assistance to me during preparation of this thesis. I extend with gratitude my sincere thanks to:

Prof. M.D. Gupte, Director National Institute of Epidemiology (NIE), Chennai for his valuable guidance amidst his very tight schedule.

Prof. K. Ramachandran, Formerly Professor and Head of the Department of Biostatistics, All India Institute of Medical Sciences, New Delhi and presently Adviser to DG ICMR for Field Epidemiology Training Programme at NIE, Chennai for his valuable teaching comments suggestions and advice.

Principal Secretary Health and Family Welfare, Orissa, for his valuable supports to work,

Dr T Venkat Rao, Assistant Director, NIE, my preceptor for his close guidance and encouragement.

Dr. Vidhya Ramachandran Assistant Director, NIE and MAE-FETP course coordinator, for her close guidance and encouragement.

Dr R Ramakrishnan, Assistant Director, NIE, Dr P Manickam Research Officer for their advice

Dr. Bhagabati Charan Das, Director State Institute of Health and Family Welfare who was my local preceptor, Dr Umesh Chandra Das, Chief District Medical Officer Dhenkanal District, Dr.Bhabani Shankar Tripathy former Assistant District Medical Officer Public Health Dhenkanal district, Dr Khageswar Behera Assistant District Medical Officer Family Welfare Dhenkanal district, Dr Prasanta ku Senapati Director H&F.W.D Orissa and other officials from State of Orissa, for their constant advice as and when necessary at the field work.

I will really do injustice if I do not mention several scientists and staff of NIE like Dr. Suajata Chandersekran, WHO Consultant MAE –FETP at Chennai and Mr. S. Satish librarian and Uma Manoharan Secretary to the FETP for their constant support and guidance.

My special thanks to Dr Yvan Hutin Resident advisor WHO to NIE for his guidance and boost up for work

My family for bearing with me in this endeavor of hard work with patience.

Last but not the least all the respondents who very graciously spared me their valuable time and information in addition to extending their cooperation and generous hospitality, which rendered the entire research, endeavor a very memorable, pleasant and profitable experience.

Amitav Das.

Date 29.9.05 **DR. AMITAV DAS**

Contents

SECTION-1

FIRST FIELD POSTING

1. Description of the work situation of Dhenkanal District, Orissa 2002-2003.

1.1. Introduction:

The health system and health facilities of different states vary from each other. Health according to World Health Organization is defined, as "Health is a state of complete physical, mental and social well being and not merely the absence of disease or infirmity". To describe the work situation or the health system where we work, we have to go through all these aspects. Social condition depends on the geography of the district, population, literacy, especially female literacy, customs, per capita income of the population of the district. The physical condition depends on the health facilities available in the district and their utilization by the people. Quality of the health system depends on different factors as health care delivery system, available manpower, available resources and lastly health administration. Before working in a district we should have an over all idea about these things.

1.2. Objective of the study:

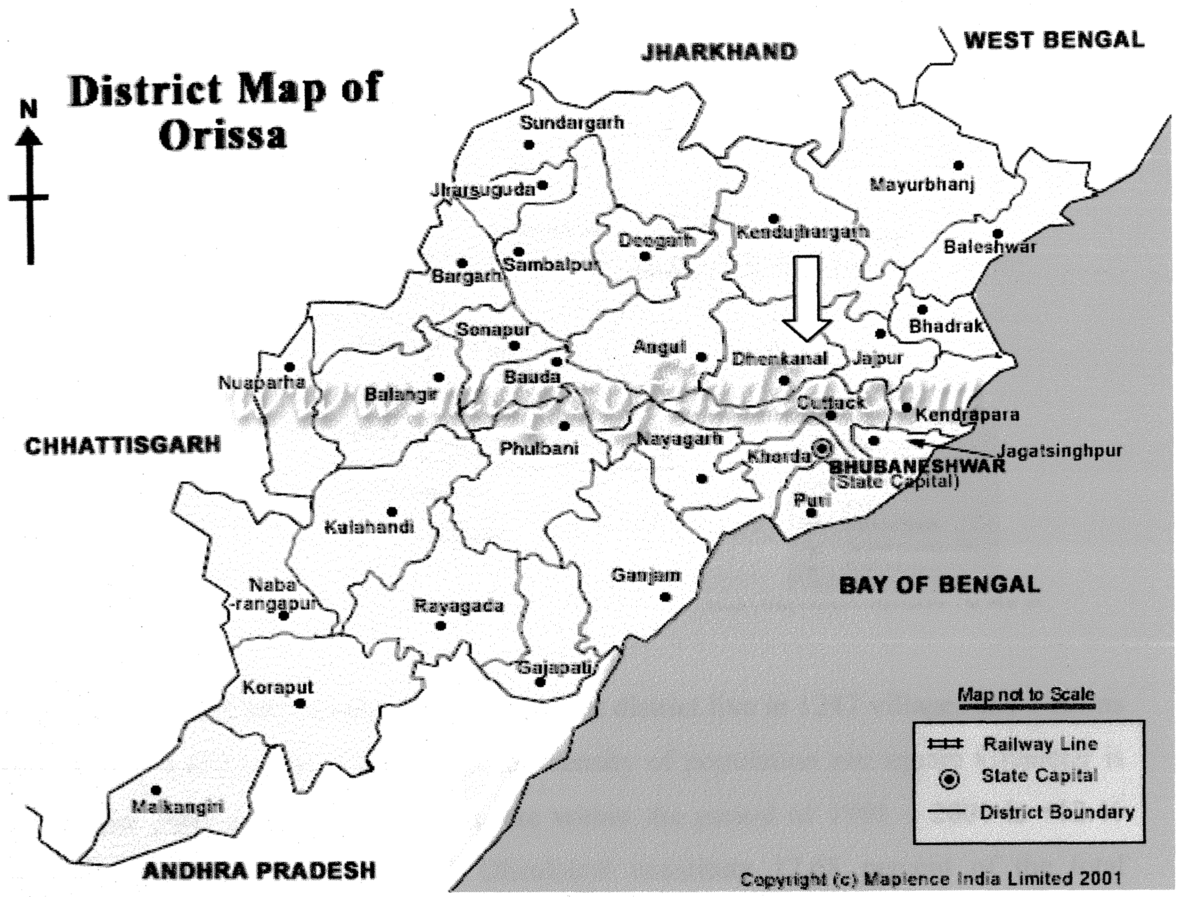
1. To know the health system of the district where we work.
2. To asses the constraints in the health system.

1.3. Methodology:

1. Looking for the data from the office of the Chief District Medical Officer and The Assistant District Medical Officer Public Health.
2. Interview of the district administrators, Medical Officer in charge of one Primary Health Center (Beltikiri PHC).

1.4.General information about the district:

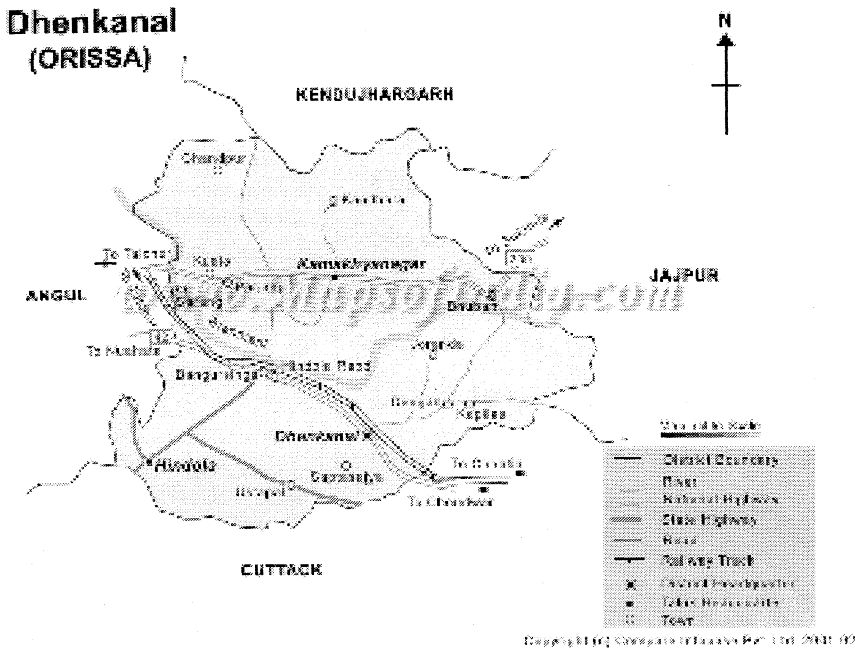
Fig: 1. 1. Map of Orissa state, 2003. The white arrow shows the Dhenkanal district



Geography: Dhenkanal was a large district ten years back. It has been divided in to two parts as Dhenkanal proper and Anugul.

Dhenkanal is not a coastal district. It is situated in the longitude of 85 degree to 86 degree in East, and latitude of 20degree 5 minute to 21 degree North. Altitude is 18 meters above the sea level. It is bounded by the district Jajpur in the east, Cuttack in the southeast, Anugul in the Northwest, and Keonjhar in the North. It is more or less a mixture of both plain and hilly areas. Total geographical area of the district Dhenkanal is 4,452 square kilometers. About 19000 metric tone of Chloromite are produced from 3 mines covering an area of 1083 hectares at Kathapal at Kankadahad Block of the district.

Fig:1. 2 Map of Dhenkanal district, Orissa, 2003



Population: 10,65,983 people of the Dhenkanal district live in 1247 villages and 3 towns spread over 4,452 square kilometers. The density of population per square kilometer is 239 as per 2001 census. The growth rate within the period of 1991 – 2001 is +12.46 percent. The tribal populations in Dhenkanal constitute 12.68 percent of the total population of the district and the 1.71 percent of the total population of the state. Out of the total population of the district the percentage of S.C. population is 16.03% and ST population is 12.68%.

Social and cultural Aspect: The various types of people under scheduled tribe live in Dhenkanal district are Gondas, Juanga, Khaira, Kandha, Kissan, Kolha, Munda, Saara and Sabar. Amongst the various religious groups the Hindus are in vast majority. Then come the Muslims, Christians and Sikhs. Oriya speaking population is about 97 percent in Dhenkanal district. Some tribal people use the tribal language Santali, Kui etc.

Media habits:

1. Use of Mass Media- Radio, television, Cinema and Video shows.
2. Tradition- Palla, Kirtan, Daskaathia, Ghodanacha, Ghuduki, Dandanacha.
3. Typical Mythological stories in the areas- Blind belief in Ghost, in tribal area of the district.

Ecological condition:

1. Rivers-	Bramhani, Ramiala, Sapua.
2. Dams –	Dandadhara in Kankadahad Block.
3. Constructive activities-	Right and Left Rengali Canal.
5. Industries	Small scale Industries both side of N.H.42, Shakti Sugar factory, Orissa rayon.
6. Irrigation Pattern –	Through canal system and irrigation projects.
a) Major, Medium:	Kharif – 13 hectares, Rabi –8 hectares.
b) Minor:	Kharif- 19 hectares, Rabi- 4
c) Lift Irrigation:	Kharif- 9, Rabi – 5.
7. Terrains -	Hills, Forest area 59,394 hectares.
8. Ondulating-	20% forest area.
9. Plane area-	80%, out of 80%, 40% belongs to Kankadahad Block.
10. Location of group of Population living in remote / Inaccessible areas like tribal.	10%

Meteorology: The state has 3 main climatic conditions.

1. Hot and dry from March to August.
2. Rainy season from August to September.
3. Cold from October to February.

The Southwest monsoon rains from the month of July to the end of September with an average rainfall of 1500 mm. The average rainfall in a year is 9000 to 1100 mm.

Average temperature of the district shows seasonal variation.

Rainy season- 35 degrees Centigrade.

Summer season – 42 degrees Centigrade.

Winter season – 16 degrees Centigrade.

1.5.Population profile:

Table: 1.1Population in each block of Dhenkanal district, Orissa 2003.

Blocks	Total population	Male	Female
Kankadahada	90,449	45,769	44,680
Bhuban	92,407	46,967	45,440
K. Nagar	108,622	56,113	53,503
Parjang	120,859	60,626	60,233
Odapada	126,855	65,369	61,436
Hindol	159,021	79,343	79,678
Sadar	137,499	71,285	66,214
Gandia	137,484	70,110	67,374

Table:1. 2 A comparison of Dhenkanal district and State of Orissa as per census data 2001 (provisional)

		Dhenkanal	Orissa	Remark.
Population	Total	11,28,000	36,706,920	
	Male	5,43,439	18,612,340	
	Female	5,22,544	18,094,580	
Child population	Total	141,053	5,180,551	
	Male	73,516	2,056046	
	Female	67,537	2,524,505.	
Decadal growth rate	1991-2001	12.46	15.94	
Sex ratio female /1000 male	2001	980	972	
Population density		239	236	Ranking 383 in India.
Literacy rate	Total	70.11	63.61	Dkl – 75.18
	Male	81.31	75.95	Bhuban-70.68
(Ranking 11th in the state.)	Female	58.55	50.97	Parjang-70.48
	Rural	68.67		Gandia –68.63
	Urban	84.83		Hindol- 66.02
				K nagar-66.34

Table: 1.3 Demographic profile, Dhenkanal district Orissa.

Total area	4,452 square kilometers
Population of the district	10,65,983
Male	5,43,439
Female	5,22,544
Sex ratio	980 female / 1000 male
Scheduled cast	1,66,293
Scheduled tribe	1,50,303
General	7,49,387
Population density	239
Subdivision	3 (Dhenkanal, Kamakhyanagar, Hindol.)
Blocks	Kamakhyanagar, Kankadahad, Birasal, Bhuban, Odapada, Parjang, Gandia, Dhenkanal sadar, 8 in number.
ICDS Blocks	6
Gramapanchayata	199
Villages	1247
Holding	1,90,911
Municipality	1 (Dhenkanal)
Notified Area Council	2 (Kamakhyanagar, Bhuban)
Tahasil	4
Police station	11
EMCP Block	1(Kankadahada)
Zilla parishada	27
Panchayat samiti	8

Table: 1.4 Some other informations of Dhenkanal District:

Name of the district.	% Of total population of the state		% Of rural population of the state		% Of urban population of the state		Decinial growth		
	1991	2001	1991	2001	1991	2001	Total	Rural	Urban
Dhenkanal	2.99	2.9	3.17	3.12	1.84	1.69	12.46	11.89	18.79

Table: 1.5 Health institutions of Dhenkanal district, Orissa state, 2003:

District Headquarter Hospital	1 Dhenkanal
Sub divisional Hospital	1 (Kamakhyanagar)
Postpartum center (PPC)	4 (Dhenkanal, Kamakhyanagar, Bhuban, Sriramchandrapur)
Community Health Center (CHC) 1	1 (Hindol)
Community Health Center (CHC) 2	4 (Anlaberini, Parjang, Sriramchandrapur, Jirala)
PHC	5 (Beltikiri, Odapada, Mathakaragola, Birasal, Khajuriakata)
PHC (N)	28
FRU (First Referral Unit)	3 (Hindol, Kamakhyanagar, Birasala)
Hospital	7
Sub center	165
Project Institution	5(Dhenkanal, Hindol, Kamakhyanagar, Bhuban, Mathakaragola)
Leprosy Elimination Units	2
Eye ward	3 (Dhenkanal, Kamakhyanagar, Hindol)
DDC	894
FTD	103
MLU	50 groups
Blood banks	3 (Dhenkanal, Kamakhyanagar, Hindol)
Ambulance	8
Postmortem center	5
Indoor beds	391
Ayurvedic dispensary	20
Homeopathic dispensary	19

Table: 1.6 Health Administrations in the Dhenkanal district, Orissa, 2003:

District headquarter	Chief District Medical Officer Additional District Medical Officer (Public Health / Malaria / Filaria) Additional District Medical Officer (Medical) Additional District Medical Officer (Family welfare / Immunization) Additional Health Officer
Subdivision	Sub divisional Medical Officer
Primary Health Center and Community Health Center	Medical Officer in charge Assistant surgeon
Dispensary / PHC (New)	Assistant surgeon
Sector	Health supervisors (male and female)
Sub-center	Health workers (male and female)

6. Working pattern and Administration:

Chief District Medical Officer is the medical officer in charge of the district. Under the CDMO there is one Additional CDMO and three Additional District Medical Officers. ADMO medical controls the hospital wing. He also is in charge of RNTCP. ADMO family welfare controls the family welfare and immunization and other Reproductive and Child Health activities. The ADMO public health is in charge of the public health and controls the epidemic situation of the district. He is in charge of the Malaria, Filaria, and District task force of the district. Then the district comprises of some subdivisions. There is one SDMO, Sub divisional medical officer in each subdivision. The subdivision is divided in to some blocks. In each block there is one PHC or CHC. In each PHC there is one medical officer in charge and one second medical Officer. The second medical officer is in charge of Family welfare. If it is an integrated child development scheme (ICDS) block he is in charge of ICDS. In CHC there are four medical officers. Two of them are specialists, one is of pediatrics and another one is

Obstetrics and Gynecology. Then the PHC area is divided in to a number of sectors. There is one PHC (N) in each sector. In the PHC (N) there is one medical officer and one health supervisor. The health supervisor takes care of the public health totally. Under each sector there are sub centers. In each sub center there is one health worker male and one health worker female or ANM. They do the public health works, immunization and active and vertical disease surveillance. Each sub center comprises of a number of villages where the total population is 5000 to 10000 and within each 1000 population there is Anganwadi center. There is one Anganwadi worker and one Anganwadi helper for the ICDS programme. They help the health worker male and health worker female. They take care of the expectant mothers and the children below 5 years.

7. Distribution of hospitals:

In the district headquarter there is one District Headquarter Hospital (DHH). There is one Sub divisional Hospital in the Kamakhyanagar Subdivision. There are three area Hospitals. In each administrative block or approximately among one to one and half lakh population there is one Primary Health Center (PHC) or Community Health Center (CHC). Under each block there are 5 to 7 sectors, having 20,000 to 30,000 population and under each PHC or CHC there are a number of sector Hospitals or PHC (N) in each sector. Under each sector there are a number of sub centers having 5,000 to 15,000 population. One sub-center comprises of 3 to 8 villages depending upon population. In each sub center there is one Health worker male and one Health worker female. These Health worker male and one Health worker female are the grass root level workers of the health system. There is one sub-center building in each sub-center area. They deliver the health care in the sub-center area.

Table 1.7. List of the Primary Health Centers and the sectors in Dhenkanal district, Orissa, 2003

Belatikiri PHC. No of Sectors- 5.

1. Government Hospital, Bhapur.
2. PHC (N), Shankarpur.
3. PHC (N) Dhirapatna.
4. PHC (N) Banasingha.
5. PHC (N) Tarava.

Khajuriakata PHC. No of Sectors-6.

1. PHC (N) Rasola.
2. PHC (N) Paika purunakota.
3. PHC (N) Hatura.
4. PHC (N) Dudurkota.
5. PHC (N) Bedapada.
6. CHC Hindol.

Anlaberini CHC. No of Sectors-4.

1. PHC (N) Sirimula.
2. PHC (N) Guneibili.
3. PHC (N) Kantiokateni.
4. Subdivisionalhospital Kamakhyanagar.

Sriramchandrapur CHC. No of Sector 5.

1. PHC (N) Pingua
2. PHC (N) Karamul
3. PHC (N) Deogaon
4. PHC (N) Joranda
5. PHC (N) Khankira
6. PHC (N) Kendupada.

Dhenkanal Municipality.

1. District Headquarter Hospital.
2. Police Hospital,
3. Jail Hospital.

Odapada PHC. No of Sectors-4.

1. PHC (N) Kalanga.
2. PHC (N) Balrampur.
3. Government hospital Meramundali.
4. PHC (N) Nimidha.

Mathakaragola PHC. No of Sectors-4.

1. CHC Jirala.
2. SHC Marthapur.
3. PHC (N) Odisa.
4. PHC (N) Mahulapala.
5. Government Hospital Bhubana.
6. PHC (N) Barua.

Parajang CHC. No of Sectors-4.

1. PHC (N) Muktapashi
2. PHC (N) Dadaraghati
3. PHC (N) Kumushi

Birasala CHC. No of Sectors-4.

1. Birasala CHC
2. Government Hospital Mahabirod.
3. Kantapal Colony PHC
4. Government Hospital Kankadahada

Table: 1.8. Health personnel in the Dhenkanaldistrict, Orissa state, 2003:

Sl No.	Name of the post	Sanctioned strength	In position	Vacancy
1.	Chief District Medical Officer (CDMO).	1	1	Nil
2.	Addl. CDMO	1	1	Nil
3.	Additional District Medical Officer (ADMO).	3.	2	1
4.	Sub divisional Medical Officer (SDMO).	2	2	Nil
5.	Medical Officer In Charge CHC (Jr. Class-1)	4	4	Nil
6.	Specialist (Sr. Class- 1)	4	1	3
7.	Specialist (Jr. Class-1)	7	7	Nil
8.	Asst surgeon	88	75	13
9.	Principal Tutor	1	1	Nil
10.	DPHN	1	1	Nil
11	Dy. MEIO	1	1	Nil
12.	Tech Store Keeper	1	0	1
13.	Pharmacist	59	53	6
14.	Asst Matron	1	0	1
15	Nursing Sister	5	5	Nil
16	Staff Nurse	70	65	5
17.	Health Asst.	5	5	Nil
18	Lab. Technician	37	35	2
19	Radiographer	6	6	0
20	POT/ MRA/EMP. Dhy.	4	4	0
21	Health Visitor (TB)	2	0	2
22	Clerk	48	36	12
23	Vital Statistics Clerk	11	11	0
24	Food Inspector	1	1	0
25	Para Med. Asst.	2	0	2
26	Sanitary Inspector	2	2	0
27	Ophthalmic Assistant.	8	8	0
28	Multi Purpose Health Supervisor (Male)	38	24	14
29	Filaria inspector	2	2	0
30	Para Medical Worker	32	19	13
31	Health educator	1	1	0
32	Statistical Asst	10	8	2
33	NMS	9	7	2
34	Refrigerator mechanic	1	1	0
35	Projectionist	1	1	0
36	Artist	1	0	1
37	Foreman	1	0	1
38	Steno	1	1	0
39	Block Extension Educator	8	8	0

40	Mechanic	2	2	0
41	Lady Health Visitor	29	29	0
42	Health worker female	189	185	4
43	Multi Purpose Worker male	126	86	40
44	Driver	32	26	6
45	Sister tutor	2	2	0
46	PHN	6	5	1
47	4th Grade	340	304	36

Table: 1.9 Information about Revised national Tuberculosis Control Program (RNTCP), Dhenkanal district, Orissa. 2003.

Treatment units (TU)	1. Dhenkanal, 2.Kamakhyanagar
Dhenkanal Treatment Unit	PHIs- 6 1.Beltikiri, 2. Sriramachandrapur, 3. Odapada, 4.Hindol, 5.Khajuriakata, 6.Rasol
Kamakhyanagar Treatment Unit	PHIs- 5. 1.Anlaberini, 2.Mathakaragola, 3.Parjanga 4.Birasala, 5.Bhubana.
Medical Officer with TOT	3 in number
Medical Officer PHI	10 in number
Medical Officer	Proposed 107, Trained 104
DOT Providers	Proposed 750, Trained 670
Laboratory Technicians	Proposed 15, Trained 10
STS	Proposed 2, Trained 2
STLS	Proposed 2, Trained 1
Assets and Equipments	1. Marshal Jeep 1No. 2. Color TV. 1No. 3. Music system 1No. 4. VCD 1No. 5. Overhead Projector 1No. 6. Xerox machine 1No.

8. Details of the blocks, health facilities and health personnel of Dhenkanal district.

Table:1.10. Information about the Sadar Block, Dhenkanal Orissa 2003.

Name of the block	Name of PHC (N) present	Name of the sectors.	Number of villages	Mid year Population	Anganwadi workers.
Dhenkanal	Beltikiri	1.Beltikiri	46	34,869	AWW = 123
sadar	PHC	2. Tarava	42	28,699	No of HW Male-
Total	Shankarpur	3. Gobindapur	21	25,042	sanctioned =16
population-	PHC (N)	4.Shankarpur	32	21,232	Position = 15
140,425.	Dhirapatna				No of HW Female
SC-14150.	PHC (N)	5. Bhapur	33	30,158	sanctioned =23
ST-3674.	Bhapur				Position = 23
Female- 69581.	hospital.				No of HS Male =
GP- 27.	Banasingh				Sanctioned =5
Sub center-23.	PHC (N).				Position = 4
	Tarava PHC				No of HS female,
	(N).				sanctioned =3
					Position =3

Table:1. 11 Information about Parjang Block.,Dhenkanal, Orissa, 20003

Name of the block	Name of PHC (N) present	Name of the sub centers.	Number of villages	Mid year Population	Anganwadi workers
Parjang	1.Kumusi.	Parjang	4	5252	AWW-112.
Total	2.Muktapashi	Khairamunda	6	4385	No of-HWM-
population-	3.Dadaraghati	Saranga	3	7883	sanctioned=15
122859.	4.Parjang	Kandarasingha	6	6941	Position= 6
No. Of	CHC	Kantor	6	8037	No of-HWF-
GP-26.		Kualo	6	7733	sanctioned=19
No of sub		Kulei	5	3487	Position= 17
center- 19.		Manikmara	6	3948	No of HS M=
		Kadapada	4	4247	Sanctioned=3
		Rangathali	9	5105	Position=3
		Muktapashi	5	8242	No of HS
		Barihapur	4	9275	female,
		Basoi	2	8082	sanctioned=3
		Saanada	4	9205	Position= 3
		Patarapada	3	7132	
		Kumushi	7	6065	
		Chandapur	5	4068	
		Roda	5	7108	
		Lodhani	3	6664	

Table: 1.12 Information about Sriramchandrapur Block Dhenkanal, Orissa.

Name of the block	Name of PHC (N) present	Name of the sub centers.	Number of villages	Mid year Population	Anganwadi workers, HW M, F HS- Male female
Sriramachandrapur	1.Deogaon,	Gandia	9	8704	AWW-148
Population-139052	2.Joranda	Santhapur	5	4880	No of-HW (M)- sanctioned=16
GP-27.	3.Kendupada	Sorisiapada	18	5236	Position= 10
SC-22	4.Karamula	Raitela	6	4200	No of-HW (F) sanctioned=25
	5.Pingua	Sadangi	11	11748	Position= 21
	6.Khankira.	Mandar	12	5645	No of HS Male Sanctioned=5
		Kasipur	10	5825	Position=5
		Khandabandha	5	6416	No of HS female, sanctioned=3
		Pingua	10	4818	Position= 3
		Nihalprasad	10	8681	
		Laulai	12	6410	
		Ratnapur	17	6385	
		Bega	6	4048	
		Deogaon	9	5473	
		Bidharpur	9	8012	
		Neulapoy	5	5300	
		K.madhapur	8	6120	
		Joranda	7	6611	
		Baisingha	9	6023	
		Kaluria	8	6883	
		Khankara	9	5502	
		Karamula	7	6573	

Table: 1.13 Information about Kankadahada Block Dhenkaanal district Orissa, 2003.

Name of the block	Name of PHC (N) present	Name of the sub centers.	Number of villages	Mid year Population	Anganwadi workers
Kankadahada Mid year population-90449. Grama Panchayat-21 Sub center-20	1.Kantapal 2.Mahabirroad 3.Birasal area Hospital.	Birasal	10	6724	AWW-105 No of-HW Male-sanctioned =13 Position= 5 No of-HW Female sanctioned =20 Position= 18 No of HS Male= Sanctioned =4 Position=1 No of HS female, sanctioned =3 Position= 2
		Maruabili	16	5988	
		Sedasar	6	5323	
		Makuakateni	7	3769	
		Raibola	7	4298	
		Batagaon	10	7025	
		Balikuma	9	4004	
		Kankadahada	7	7131	
		Kantapal	8	5254	
		Kantola	7	3202	
		Kerjuli	9	4172	
		Bam	5	4802	
		Mahabir road	5	5904	
		Chaudapur	3	4338	
		Pangatira	6	6928	
		Gharapalasuni	7	6241	
		Biribili	4	3741	
		Ghagaramundi	8	3966	
		Jhili	4	3905	
		Kargola	5	4400	

Table: 1.14 Information about Khajuriakata Block Dhenkanal district, Orissa 2003.

Name of the block	Name of PHC (N) present	Name of the sub centers.	No of villages	Mid year Population	Anganwadi workers
Khajuriakata	1.Rasola	Babanadha	6	5647	AWW-145
Population-	2.Dudurkota	Belapada	2	5348	No of-HW
174007.	3.Hatura	Khanditiri	5	5245	Male-
Sc –31653	4.Paikapuruna	Bramhanipal	6	5935	sanctioned
St- 9864	kota	P.P.kota	5	8133	=19
Female-86578	5.Bedapada	Galapada	5	7324	Position=
No of GP-36	6.AreaHospita	Khalibarina	5	4783	10
No of SC-26	7 Hindola.	Saujapada	4	5118	No of-HW
		Hatura	9	6922	Female
		Gelehei	9	6700	sanctioned
		Dudurkote	4	6262	=26
		Patala	12	6671	Position=
		Khajuriakata	5	7695	25
		Chitalpur	2	5332	No of HS
		Nua	5	9065	Male=
		Karando	3	6601	sanctioned
		Rasola	2	9000	=6
		Chatapada	8	8000	Position=3
		Kunua	10	8013	No of HS
		Gaudanali	10	7508	female,
		Khalibareni	8	6099	sanctioned
		Rajmohanpur	9	4416	=4
		Madhapur	8	4694	Position=4
		Bauniapokhari	11	4616	
		Nuakota	6	4290	
		Kanasara	5	5316	
		Hindol	16	10746	

Table: 1.15 Information about Odapada Block Dhenkanal district, Orissa 2003..

Name of the block	Name of PHC (N) present	Name of the sub centers.	No of villages	Mid year Population	Anganwadi workers, HW HS- Male female
Odapada	1. Kalanga	Kamalanga	7	3702	AWW-133
Population-	PHC N).	Manapur	2	3783	No of-HW
134000	2.Balrampur	Kananati	5	4102	Male-
SC	PHC (N).	Khadagaprashad	4	7882	sanctioned=
population-	3.Govt	Chintamani	6	4885	13
25351	hospital	prasad			Position= 7
ST	Meramundali.	Bailo	4	4131	No of-HW
population-	4.Nimidha	Nimidha	2	6034	Female-
6014	PHC (N).	Badalu	7	4911	sanctioned=
Female		Dhalapur	8	4905	23
56432		Balaramprasad	5	4674	Position=
No of GP-		Bangarising	4	4615	23
25		Odapada	2	5194	No of HS
No of SC-		Gunadi	5	4327	Male=
23		Baulapur	6	6696	Sanctioned
		Gadasila	9	5625	=3
		Kandabindha	3	5277	Position=1
		Balarampur	3	4856	No of HS
		Sadasibpur	5	6498	female,
		Bisalia	7	5139	sanctioned=
		Indipur	5	6851	3
		Ghatipir	6	6546	Position=3
		Kalangi	4	5337	
		Kotam	4	4370	

Table: 1.16 Information about Bhubana Block Dhenkanal district, Orissa 2003.

Name of the block	Name of PHC (N) present	Name of the sub centers.	Number of villages	Mid year Population	Anganwadi workers, HW HS- M/F
Bhuban Population-94482 No of SC population-14300 ST popu-11604 No of GP-17, No 0f SC-15	1.Marthapur 2.Mahulapal 3.Barua 4.Odisa	Mathakargola	5	5965	AWW-106 No of-HWM-sanctioned=12 Position= 6 No of-HW Female-sanctioned=15 Position= 13 No of HS Male= Sanctioned=4 Position=2 No of HS female, sanctioned=2 Position=2
		Jamunakota	3	3477	
		Surapratappur	7	6966	
		Dayanabili	4	3670	
		G.N.prasad	8	4888	
		Barua	18	8485	
		Dhalapada	8	7054	
		Kingala	10	7692	
		Balibo	12	7594	
		Ektali	8	6206	
		Mahulapala	4	7791	
		Jirala	2	4880	
		Arakhapatana	6	4840	
		Marthapur	7	9154	
		Goradia	8	5820	

Table: 1.17 Information about Kamakhyanagar Block Dhenkanal district, Orissa 2003.

Name of the block	Name of PHC (N) present	Name of the sub centers.	No of villages	Mid year Population	Anganwadi workers, HW HS- Male female
Kamakhya nagar Population-106751 No GP- 20 No SC-18	CHC Anlaberini. 1.Sirimula.PHC (N) 2.Guneibili PHC (N) 3.Kantiokatei PHC (N) 4.Subdivisioal Hospital Kamakhyangar	Anlaberini.	8	5840	AWW-100 No of-HWM-sanctioned=14 Position= 8 No of-HWF-sanctioned=18 Position= 18 No of HS Male= Sanctioned=4 Position=2 No of HS female, sanctioned=3 Position= 3
		Rainarsighpur	7	4690	
		Kotagara	7	4734	
		Sogar	6	5597	
		Tumusinga	3	5657	
		Kantioputasahi	3	5147	
		Kantiokateni	2	5021	
		Kantapala	3	5200	
		Kadua	5	5836	
		Mahulpala	4	5339	
		Baisinga	6	6870	
		Kasipura	6	6629	
		Sibilapasi	5	5759	
		Guneibili	7	8749	
		Ichabatipur	6	6393	
		Kangeilo	5	6760	
		Jagannatrhpur	5	4755	
		Badasuanlo	8	8256	

Table:1. 18 Information about Dhenkanal Municipality Dhenkanal district, Orissa 2003.

Name of the Municipality	Name of PHC (N) present	Name of the wards	Mid year Population	Anganwadi workers, HW HS- Male female
Dhenkanal Population-53431 SC-8548 ST-2137 Female-23509	1.District headquarter hospital Dispensary: 1.Kungakanta dispensary. 2.Policeline dispensary- 3.Municipalty homeopathy dispensary 4. Municipality Ayurbedic dispensary	No of wards-21	Dhenkanal Population - 53431 SC-8548 ST-2137 Female-23509	AWW-NIL No of-HW-Sanctioned=3 Position= 2 No of HS Sanctioned=4 Position=1

Table:1. 19 Information about Kamakhyanagar and Bhubana Notified Area Council Dhenkanal district, Orissa 2003.

Name of the NAC	Name of PHC (N) present	Name of the sub centers.	Mid year Population	Anganwadi workers, HW- M, F HS- Male female
Kamakhya nagar	PHC (N) -Nil 1.Subdivision al headquarter Hospital Kamakhyanag ar	Nil	Total-15370 SC-1520 ST-1135 Female-6945	AWW-NIL No of-HWM-sanctioned=1 Position= 1 No of-HWF- sanctioned=1 Position= 1 No of HS Male sanctioned=1 Position=1 No of HS female, sanctioned=1 Position=1

Table:1. 20 Information about Bhubana Notified Area Council Dhenkanal district, Orissa 2003.

Name of the NAC	Name of PHC (N) present	Name of the sub centers.	Mid year Population	Anganwadi workers, HW- M, F HS- Male female
Bhubana	PHC (N) –Nil 1.Area Hospital Bhuban.	Nil	Total-21763	AWW-NIL No of-HWM-sanctioned=1 Position= 1 No of-HWF- sanctioned=1 Position= 1 No of HS Male sanctioned=0 Position=0 No of HS female, sanctioned=1 Position=1

9. Health indicators of the District Dhenkanal.

Table:1. 21 Percentage of available health facilities of the state of Orissa 2003.

Sl No	Name of the health institutions	Orissa	Dhenkanal	Proportion In percentage
1.	Medical college Hospital	3	0	0
2.	District Head Quarter Hospital	31	1	3.22
3.	Sub- Divisional Hospital	21	1	4.8
4.	Community health center [CHC]	158	5	3.16
5.	Primary health center [PHC]	183	5	2.7
6.	PHC [New]	1166	28	2.4
7.	Mobile Health Units [MHU]	13	1	7.7
8.	Sub centers	5927	166	2.8

Table: 1.22 Health Indicators of Dhenkanal District,Orissa, 2003.

Year	Crude Birth Rate		Crude Death Rate		IMR		MMR	
	Dhenkanal	Orissa	Dhenkanal	Orissa	Dhenkanal	Orissa	Dhenkanal	Orissa
1999	19.58		7.58		40.06		1.03	
2000	18.85	24.3	9.25	10.5	38.68	95.00	0.98	
2001	18.59		7.86		38.14		0.85	
2002	18.32		8.14		37.98		0.86	

10. Blood bank facilities in Dhenkanal district.

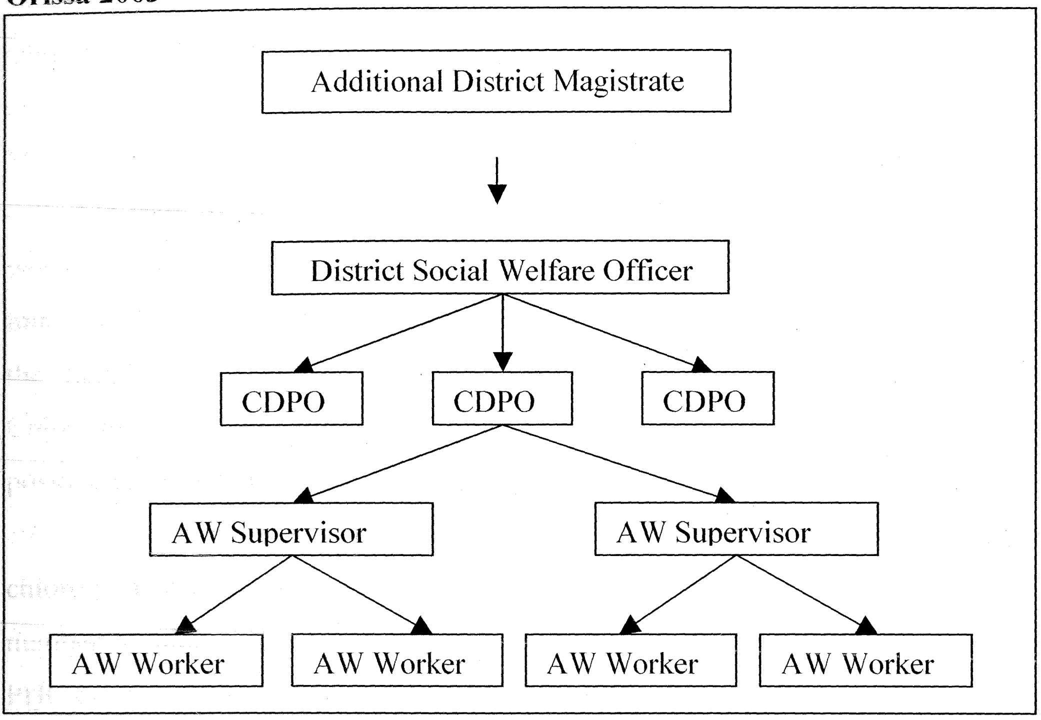
Following Blood Banks are functioning in the district of Dhenkanal.

1. District Headquarter Hospital, Dhenkanal.
2. Sub divisional Hospital, Kamakhyanagaar.
3. Community Health Center-1, Hindola.

11. Integrated child development scheme [ICDS]

In every 1000 population there is one Anganwadi Center. An Anganwadi worker and one Anganwadi helper run it. They are the local people of the village. They take care of the children below 5 years and the expectant mothers. In the Anganwadi center they teach the children below 5 years and they give some food to the mall children. They measure the weight of the children below 5 years mainly the newborns and the children within 2 years of age. They take the weight regularly of the malnutrition children. There is one Anganwadi supervisor to supervise the AWW of one sector. So there is one AW supervisor in one sector. There is one CDPO, Child Development Project Officer. Is in charge of one community Block having 80,000 to 100,000 populations. District Social Welfare Officer is the nodal officer for the whole district. The ADM, Additional District Magistrate is in charge of the ICDS of the district.

Fig:1. 4 The organogram of the Integrated Child Development Scheme,Dhenkanal, Orissa 2003



AWW- Anganwadi worker covers 1000 population in rural and urban areas and 700 population in tribal areas.

AWS – Anganwadi Supervisor supervises 20-to 25-anganwadi centers usually one sector.

CDPO – [Child Development Project Officer] – she is in charge of one block having 80,000 to 100,000 populations. She supervises 8 to 10 AW supervisors.

DSW [District Social Welfare Officer- He is the nodal Officer for the district.

12. Laboratory facilities in the district

Laboratory facilities in the district are very important for diagnosis, treatment and outbreak investigation. The situations of laboratories in the district should be included as laboratory has great role in the working conditions.

Laboratories in the district are divided in to these laboratories.

1. Peripheral laboratories.
2. District laboratories.
   - i. District headquarter laboratory
   - ii. Blood bank laboratory
   - iii. District malaria / Filarial / Leprosy laboratory.

1.Periphery laboratories: The periphery laboratories are situated in Primary Health Center, Community Health Centers and Sub divisional hospitals of the district. Two laboratory technicians are posted in a P.H.C. One of them is Malaria technician, and the other is laboratory technician.

Malaria technician: The malaria technician looks after the blood slides for malaria collected from the hospital, the P.H.C. (N), from the sub centers collected by the health worker male and female. He stains these slides, examines and gives the reports immediately to the hospital. The reports are sent to the sub centers and the P.H.C. (N), by the health supervisors on Monday. He supplies the radical treatment doses i.e. Chloroquine and Primaquine to the health supervisor for the distribution to the malaria positive cases. He maintains all the records about the malaria. He keeps all the slides for a cross check up by the District Malaria laboratory. He maintains the stock and store of the chloroquin, primaquine tablets, and other spray articles, slides. He reports about the number of slides collected from each sub center, to the medical officer in charge of the PHC every month. He maintains a record about the slides collected village wise and how many cases are found positive.

Laboratory technician proper: He looks after all the tests written above. He maintains records about the laboratory works. He looks after the Sputum slides for Acid Fast Bacilli. He maintains a separate record for it. This programme comes under Revised National Tuberculosis Control Program.

2. District laboratories.

i. District headquarter laboratory
ii. Blood bank laboratory
iii. District malaria / Filarial / Leprosy laboratory.

i. District headquarter laboratory: There are six technicians and one pathologist posted in the district laboratory. Out of the six technicians one examines the sputum for AFB in the RNTCP programme. The other five technicians do all the other tests. In the blood bank one technician is called the Veneral disease technician and he examines the VDRL, HBCAg, HBSAg (Australia Antigen) HIV. The other one tests the grouping Rh typing, cross matching and Malaria parasite.

ii. Blood bank laboratory: One doctor, and two laboratory technicians are posted in the Blood bank. One laboratory technician does all the Veneral disease tests, called the VD technician and does the tests for HIV, HBSAg, HBCAg, the other one does all the other tests as blood grouping, Rh typing, Cross matching.

iii. District malaria / Filarial / Leprosy laboratory: The district malaria laboratory collects the blood slides from PHC and CHC for cross checking and sends all the slides to the state malaria laboratory for the same purpose. The blood slides collected from the district head quarter hospital are investigated for malaria parasite. In the leprosy laboratory skin clipping and the nasal mucosa smear is done to examine the mycobacterium leprae. In the Filaria laboratory the blood slide is examined for Microfilaria. For Malaria, there is one malaria technician, one field worker, for Filaria there are one laboratory technician, seven insect collectors, one laboratory attendant, for leprosy two leprosy technicians in the district malaria/ filarial/leprosy laboratory. They do the laboratory tests along with maintenance of records.

2. Laboratory facilities available for Outbreak investigation in Dhenkanal district and Referral Laboratories in the state of Orissa 2003.

Introduction:

We require laboratory investigation mostly for treatment of the patients. It has also a great role for outbreak investigation. If we conform the causative organism responsible for the outbreak it is easier to control the outbreak. It is also important for the conformation of the mode of spread of the microorganism. The laboratory investigation for outbreak investigation has three steps.

- Collection of clinical specimens for laboratory diagnosis.
- Transportation of the clinical specimens.
- Laboratory diagnosis proper.

For Isolation, identification, and characterization of pathogen appropriate laboratory infrastructure of equipments, reagents, manpower development, and training programs are essential. Integration of laboratories at various levels is needed to have complete information at the state level and to use the relevant information efficiently for control and prevention of an outbreak and feedback.

Types of laboratories in the state of Orissa:

In a state there are laboratory facilities from the lower level which starts from the laboratories of P.H.C (N) i.e. dispensary to the referral laboratories such as Medical college laboratories, laboratories of specialized referral hospitals and some state referral laboratories. There are also a lot of private laboratories in the state. Some of them do sophisticated laboratory investigations.

Description of the laboratories:

Broadly we can divide the laboratories in to two types according to their management.

1. Government laboratories.
2. Private Laboratories.

1.Government laboratories

1.1 Peripheral Laboratories:

- Primary Health Center laboratories.
- Community Health Center laboratories.

1.2 District Level Laboratories:

- District Hospital Laboratories.
- District Malaria/Filarial/ Leprosy Laboratories.

1.3 State Level Referral Laboratories:

- Medical College Laboratories.
- State Pathology Laboratory.
- State Malaria laboratory.
- State public health laboratory.
- Regional Medical Research Center (ICMR).
- Laboratories of different specialized institutions.

2. Private Laboratories:

2.1 Small laboratories.

2.2 Specialized Laboratories

2.3 Referral Hospital Laboratories -Kalinga Hospital, Nilachal Hospital.

1. Government laboratories:

1.1 Peripheral Laboratories:

1.1.1 The periphery institutions laboratories:

these are found in all the periphery health institutes

Sub divisional hospitals: 1 in number, Kamakshyanagar.

Primary and Community Health Center: 9 in numbers.

Other hospitals:

1. Police Hospital.
2. Jail Hospital.
3. Temporary Health Word for Leprosy patients.
4. Govt. Hospitals, Bhuban, Meramundali, Bhapur.

Table 2. 1. Laboratory Investigations done in Periphery Laboratories

Sub Divisional hospital, Primary Health Center and Community Health Center Laboratories, Dhenkanal, Orissa 2003.

Sl No	Nature of Work	Function	Reagents used
1.	Microscopy	Blood: Differential count Total WBC count Total RBC cunt B!eeding time & clotting time. Malaria parasite Urine	 Gram stain. W.B.C.fluuid. R.B.C. fluid. Capillary tube. G.S.B.stain 1&2.
		AFB staining of sputum.	Carbol Fuchsine, Ethanol [Zeil- Nelson stain]
		Stool for cysts, helminthes.	
2.	Clinical tests	Urine: Urine sugar, albumin, bile salt, bile pigment, Specific gravity. Blood: Hemoglobin % ESR	 Benedict's reagent, Glacial acetic acid, Sulpher powder. Sodium Hydroxide. Sodium fluoride.
3.	Referral work	Serological tests, Biochemical tests, HIV tests, Australia antigen, Hepatitis C-antigen.	

In addition to the above investigations, in the blood bank of the sub divisional hospitals, Grouping, cross matching, Rh typing, HIV test, test for Hepatitis B and C, V.D.R.L., Malaria Parasite are done.

1.1.2 Manpower:

Two laboratory technicians are posted in a Primary Health Center. One of them is Malaria technician, and the other is laboratory technician proper.

a) Malaria technician: The malaria technician looks after the blood slides for malaria collected from the Primary Health Center hospital, the P.H.C (N) and from the sub centers collected by the health worker male and female. He stains these slides, examines and gives the reports immediately to the hospital. The reports are sent to the sub centers and the P.H.C (N) by the health supervisors on Monday at the supervisors meeting. He supplies the radical treatment doses i.e. Chloroquin and Primaquine to the health supervisor for the distribution to the malaria positive cases in the sub-center area. He maintains all the records about the malaria. He keeps back all the stained blood slides for a cross check up by the District Malaria laboratory and the State malaria laboratory. The State and District laboratories ask for the slides, whose number start or ends in particular digit. They cross check the sample slides. He maintains the stock and store of the chloroquin, primaquine tablets, and other spray articles. He reports about the number of slides collected from each sub center, to the medical officer in charge of the P.H.C. every month. He maintains a record about the slides collected village wise and how many cases are found positive.

b) Laboratory technician proper: He looks after all the tests written above. He maintains records about the laboratory works. He looks after the Sputum slides for Acid Fast Bacillus. He maintains a separate record for it. This program comes under Revised National Tuberculosis Control Program.

1.1.3 Laboratory Instruments used: Microscope, Total R.B.C. and W.B.C. counting chamber, hemoglobinometer, capillary tubes, slides, ESR stand, test tubes, spirit lamps and other relevant reagents are available in the primary health centers.The PHC (N) or dispensaries are provided with one microscope. The medical officer himself does some investigations as blood D.C., urine and stool routine and microscopy. There is no laboratory technician posted in the P.H.C. (N) or dispensaries. The jail hospital, police hospital, and the T.H.W. have the same facilities as that of P.H.C., but the T.H.W. have the extra facility for the test for skin smear.

1.1.4 Constrains and Recommendations:

The laboratory technicians should be reoriented for collection, preservation and transportation of clinical samples during an outbreak.

P.H.C.S should be provided with another laboratory technician for R.N.T.C.P. program. The sub divisional hospital laboratories should be upgraded as that of district hospital laboratories, manpower should be increased and instruments should be supplied accordingly.

1.2. District hospital laboratories:

There are two laboratories in the district headquarter hospital.

1. Laboratory proper.
2. Blood bank laboratory.
3. District malaria / Filaria / Leprosy laboratory.

A. Laboratory proper.

1.2.1 A. Laboratory investigations done

Table: 2.2 Laboratory Investigations done in District hospital Laboratories, Dhenkanal Orissa 2003:

Sl No.	Nature of tests	Function	Reagents used
1.	Microscopy	Blood: Differential count Total WBC Total RBC Total platelet count Bleeding time & clotting time Malaria parasite Urine	 Gram stain W.B.C. fluid R.B.C. fluid Capillary tube G.S.B. stain 1&2
		AFB staining of sputum	Carbol Fuchsine, Ethanol [Zeil- Nelson stain]
		Stool for cysts, ova and occult blood	Benzidine powder, glacial acetic acid, hydrogen peroxide
		Seminal fluid analysis Sperm count, morphology	
2.	Clinical	Urine: Bile salt and Bile pigment Albumin, Sugar, Phosphate. Beta Gravindex test for pregnancy Blood:	 Benedict's reagent, Glacial acetic acid, Sulpher powder. Strip method.

		Hemoglobin % ESR Australia antigen, HBS Ag V.D.R.L. Widal, ASO titer R.A.Factor. Sickling test.	Sodium Hydroxide Sodium fluoride Strip method Kit method Kit method Kit method
3.	Biochemical	1. Blood Sugar Fasting blood sugar Post prandial blood sugar Random blood sugar Post glucose blood sugar 2. Serum Urea 3. Serum Creatinine 4. Serum protein, Serum albumin, Serum Globulin, 5. Serum Cholesterol. 6. Serum bilirubin total and Serum bilirubin direct.	Colorimeter and Glucose kit is used. It contains Glucose reagent and Glucose standard Colorimetry is done. Urea kit is used, which contains urea reagent, DAM Reagent, Standard (30mg%) Creatinine kit is used. Alkaline Picrate method. It contains Picric acid Reagent, Sodium Hydroxide, Creatinin Standard. Specific kits are used. Cholesterol kits are used. It contains Enzyme Reagent, Buffer solution, Standard 200mg%. Specific kit is used.

1.2.2. A Instruments used:

In case of District Hospital laboratory colorimeter, microscope, centrifuge machine are the most important instruments and other relevant instruments as slides, spirit lamp, specific kits and other instruments as used in P.H.C. Laboratory are also used.

1.2.3.A Manpower: There are one pathologist and six technicians posted in the district laboratory. Out of the six technicians one examines the sputum for AFB in the RNTCP program. The other five technicians do all the other tests. In the blood bank one technician is called the Veneral disease technician and he examines the VDRL, HBCAg, HBSAg (Australia Antigen) HIV. The other one tests the grouping Rh typing, cross matching and Malaria parasite.

B. Blood Bank laboratory:

1.2.1.B Laboratory investigations done:

1. Grouping Rh typing and Cross matching: for grouping Rh typing specific Antigens are used.
2. HIV- One step Anti HIV ½ 3.0 tests are used. It is an ELISA Method. The SD BIOLINE HIV ½ 30 Test contains a membrane strip, which is precoated with recombinant HIV 1 capture antigen (gp 41, p24) on test band 1 region and with recombinant HIV2 capture antigen (gp36) on test band 2 regions respectively. The recombinant HIV1/2 antigen (gp41, p24and gp36) – colloid gold conjugate and serum sample moves along the membrane chromatographically to the test region (t) and forms a visible line as the antigen-antibody–antigen gold particle complex forms with high degree of sensitivity and specificity.
3. HBsAg: Hepatitis B Surface antigen test. It is done by HBsAg test strip method. The test strip contains mouse anti HBs Ag antibody-colloidal gold conjugate and polyclonal anti-HBs Ag antibodies coated on the membrane. It also contains the assay diluents.
4. HCV: Hepatitis C Virus is tested by the test strip method. The strip contains a membrane coated with recombinant HCV capture antigen (core, NS3, NS4, NS5) on test band region. It also contains the assay diluents.
5. VDRL: It is done by specific reagents for V.D.R.L..
6. Malaria Parasite: In the blood bank before blood transfusion blood slide is tested for malaria parasite.

1.2.2.B Equipments used: Insulator, Centrifuge machine and other general equipments.

1.2.3.B Manpower: One doctor, and two laboratory technicians are posted in the Blood bank. One laboratory technician does all the Veneral disease tests, called the VD technician and does the tests for HIV, HBSAg, HBCAg, the other one does all the other tests as blood grouping, Rh typing, Cross matching.

1.2.4.B Discussion: Staffs are less in number. The blood bank should be opened twenty-four hours a day. So adequate staffs should be posted for rotational duty.

C. District malaria/filarial/ leprosy laboratory:

1.2.1.C Laboratory Investigations done: The state Malaria laboratory sends one digit, which should be the last digit of the numbers allotted to the blood slides. This information comes to the district malaria laboratory every month. The district malaria laboratory sends this digit to all the P.H.C. laboratories. From the P.H.C. laboratories the blood slides come to the district laboratory and the district laboratory sends all the slides to the state malaria laboratory for cross checking. In the district malaria laboratory, blood slides from the district hospital are examined.

Leprosy laboratory: In the leprosy laboratory skin clipping and the nasal mucosa smear is done to examine the mycobacterium leprae.

Filarial laboratory: In the Filarial laboratory the blood slide is examined for Microfilaria.

Table 2.3. Laboratory investigations done in District malaria/ filarial/ leprosy laboratory.

Sl. No.	Functionings	Reagents used
1.	Blood slide for malaria.	JSB stain 1&2.
2.	Blood slide for Microfilaria.	JSB 1stain.
3.	Skin clipping and nasal mucosal smear for AFB	Z.N. stain.

1.2.2 C Manpower: For Malaria, there is one malaria technician, one field worker, for Filaria there are one laboratory technician, seven insect collectors, one laboratory attendant, for leprosy two leprosy technicians in the district malaria/ filarial/leprosy laboratory. They do the laboratory tests along with maintenance of records.

1.3. State level laboratories:

The state level laboratories include all the apex hospital laboratories and other apex referral hospital laboratories. These include three Medical college Hospital Laboratories, State Pathology Laboratory, State Malaria Laboratory, Regional Medical Research Center (ICMR), and other specialized laboratories.

1.3 (A) Medical college hospital laboratory:

This includes three Medical College Hospital Laboratories, S.C.B. Medical College, Cuttack, M.K.C.G. Medical College, Berhampur, V.S.S. Medical College Burla.

In Medical Colleges there are three departments, which contain the laboratories.

- Pathology Department.
- Microbiology Department.
- Medicine Department.

1.3.A a) Pathology Department

1. Pathology Department itself.
2. Medical College Hospital Outdoor Laboratory.
3. Central laboratory
4. Cytopathology outdoors.

1. **Pathology department itself:**

   Histopathology section – Biopsy is taken and two types of staining are done here and the histopathology is studied.

   (a) Hemotoxiline and Eosin stain,

   (b) Specialized Stains- PTAH, Reticulin, Mucicarmine, Alican Blue, Massen Tricare, PAS.

   Hematology section- Advanced hematology is studied here.

   (a) Bone Marrow study: Bone marrow is aspirated and the morphology is studied.

   (b) Special stains.

   (c) Advanced hematological Tests. It includes, Peroxidase stains and PAS stains for Leukemia, G6PDdeficiency tests, Hemoglobin Electrophoressis, Fetal Hemoglobin estimation (HbF estimation) Reticulocyte count, Osmotic Fragility Test, Sickling test.

   (d) Cerebrospinal fluid examination. It includes cytology, leucocyte count, biochemical studies.

   Biochemical section- All biochemical tests are done except few enzyme assays and some hormonal assays

Table2. 4 Biochemical tests:

Sl.no	Tests	Reagents used
1.	Diabetic panel Fasting blood sugar. Postprandial blood sugar. Random blood sugar. Post glucose blood sugar. Fructosamine. Oral glucose tolerance test. Qualitative test for ketone body in urine	Colorimetric method. Glucose reagent, glucose standard. Dextrostrix method. Semi autoanalyser. Sodium sulphate iodoacetate, or Fericyanide, Cyanide saline diluents. Ketostix. Rothera's Nitroprusside test.
2.	Kidney function test. Plasma protein Myoglobin in urine Bence jone's protein. Blood urea Urea clearance test. Creatinine.	Electrophoresis. Urease Neselerization method. Reagentas- powdered soyabean meal,Isotonic sodium sulphate solution, sodium tungstate, 2/3N Sulphuric acid. Solution of gumghati. Semiautoanalyser method. Sample diluent-0.9%NaCl. Acid reagent, diacetyl monoxime, Brij, standard urea solution. Urea kit- urea reagent, DAM Reagent, standard. Creatinine kit. Alkaline picrate method. Picric acid reagent, sodium hydroxide, creatinine standard.
3.	Electrolyte panel of blood, CSF Sodium, Potassium, Calcium, Inorganic phosphate, chloride	
4.	Thyroid panel T3, T4, TSH.	Radio Immune assay
5.	Lipid profile. Total Cholesterol, HDL Cholesterol LDL Cholesterol, VLDL Cholesterol Triglyceride.	Cholesterol kit. It contains Enzyme reagent, Buffer solution, Standard 200 mg.

Biochemical tests continued.

Sl.no.	Tests	Reagents used.
6.	Liver function test. Bilirubin total, Bilirubin direct, SGOT, SGPT, GGT. Alkaline phosphatase.	
7.	Anemia profile. Iron, Total iron binding capacity, Vitamin B12	 BIO BIO CLIA.
8.	Enzyme. Serum Amylase, Lipase. Acid phosphatase	
9.	TORCH profile, Cytomegalo virus- IgG, IgM. Herpes simplex virus- IgG, IgM. Rubella virus IgG,IgM. Toxoplasma gondi- IgG, IgM.	 ELISA
10.	Hormonal assay. T3, T4, TSH. LH, FSH, Estrogen, Androgen, Progesterone	 RIA
11.	Cerebrospinal Fluid Analysis Glucose Chloride Proteins	 Silver nitrate, Potassium chromate. Colorimetric method is Used.

1. **Medical college hospital Out Patient Department:**
   Routine hematological investigations stool and urine examinations are done here. The routine hematological investigations include D.C., T.L.C., T.W.B.C., T.R.B.C., E.S.R., B.T., C.T., Widal, total platelet count, hemoglobin percentage, malaria parasite, stool and urine examination as in district laboratory.
2. **Central Laboratory**: In the central laboratory, routine stool, urine, blood tests are done. Along with these V.D.R.L., Widal, fasting blood sugar, postprandial blood sugar, random blood glucose, serum urea, serum creatinine, serum cholesterol, serum triglyceride, Routine C.S.F. study as cytology, protein, leucocytes count, seminal fluid analysis are done.
3. **Cyto pathology out patient department:** Here fine needle aspiration cytology is done

1.3.2 (A) a. Manpower: In this department there are one-professor, associate professor, assistant professors, and junior teachers, postgraduate students, technicians.

1.3. (A) b) Microbiology department:

1) Serology
2) Bacteriology
3) Mycology

1) Serology: RAFactor, Widal, V.D.R.L., C.R.P., ASO Titer, Toxoplasma, ANA, Gravindex test, ICT for malaria, Brucella Agglutination tests are done here. All these tests are done by specific kit method.

2) Bacteriology:

2.1.Culture, sensitivity: Here culture and sensitivity of blood, urine, pus, throat swab, conjunctival swab, vaginal swab, peritoneal, pleural fluid, C.S.F are done. For this purpose Agar medium, plain, enriched or enrichment mediums are used and for sensitivity specific antibiotic disks are used.

2.2 Gram Stain: Gram stains and hanging drop method is used for identification of the bacteria.

2.3 Albert stain: This is also used for the staining of the organisms for their identification. 4. AFB- zeil nelson stain is used.

3) Mycology: Fungus culture for nail, skin, hair and all other fungal diseases are done in Sabaurauda's medium. KOH mount is also done here.

4) Spirochetes: Tests are done for Leptospirosis, Treponema palidum, Nisseria gonorrhae 9Fluorescent antibody test).

Microbiology Laboratory of S.C.B. Medical College is the referral center for

i. VTCT (Voluntary blood testing and counseling center sponsored by NACO).
ii. Anthrax.
iii. Vibrio cholerae.

Special Tests: C.F.T.for J.E.virus, Haem agglutination tests for Influenza, J.E. and other Arbo viridae.

Staining procedures available in the Laboratory: Gram stain, Z.N. stains, L.C.B. stain (Lacto phenol Cotton blue), Negative staining and Albert stain.

1.3.2 Instruments available in the Microbiology Laboratory: Incubator, ELISA reader, ELISA machine for hepatitis investigation, incipirator, autoclave, vertical laminar flow, colony count instrument, dark ground illumination microscope, fluorescent microscope, type 2 safety unit for Anthrax investigation, facility for CD4, CD8 cell count for HIV and AIDS treatment monitoring.

1.3.3 Man power: Senior Microbiologist -4, postgraduate students, Laboratory technicians-6, Laboratory attendant-6, Sweeper-6 in number work in this laboratory.

1.3.2. (A) c) Medicine Department:

i. Routine and advanced hematological investigations are done here.

ii. Anti nuclear antibody, L.E. Cell investigation is also done here.

1.3 (B) State pathology laboratory

In Orissa there is only one state pathology laboratory set up since 1948 situated in the campus of SCB Medical College, Cuttack. Besides the Pathological and Microbiological investigations this laboratory was also conducting vaccine testing that is not being done now. This laboratory functions as the referral laboratory of the whole state. Here the routine hematological tests, seminal fluid analysis, Blood sugar tests, Serological tests as VDRL, WIDAL, Serum cholesterol, Serum urea, Serum creatinine, Serum bilirubin is done. Culture sensitivity and isolation of organisms are done from throat swab, urine, C.S.F. pus, blood etc.

Manpower: State bacteriologist and pathologist -1, Assistant to state bacteriologist and pathologist –1, Mobile medical officer-1, medical officer for biochemistry- 1, senior microibiologist-2. Junior microbiologist -2, media maker -1, senior laboratory technician -1, junior laboratory technician-3, peon-1, sweeper-4, watch man-1.

Constrains and Recommendations: Though it is the referral laboratory of all the periphery laboratories, it is facing much difficulties starting from financial point of view to manpower. Now antigen typing test of Salmonella, Shigella, Vibrio cholera, etc is not done. But for the infectious diseases in the state of Orissa, this laboratory has its relevance and it needs to be strengthened. Samples should be sent to this laboratory during the epidemics for culture, sensitivity and other appropriate investigations for epidemic investigation. Modern Laboratory equipments like ELISA reader, Autoanalyser, sprectrophotometer are required for this laboratory.

1.3. (C) State malaria laboratory.

State Malaria Laboratory is situated in Bhubaneswar. Cross checking of the malaria slides from the periphery laboratories and blood slides from the patients from the local hospitals are examined in this laboratory.

From the laboratory, every month one digit is sent to all the periphery laboratories as the first digit or the last digit of the numbers allotted to the blood slides examined in the laboratory. By this method, random samples of blood slides are received and cross checked. Some technicians are deputed to periphery laboratories for malaria slide examination.

Manpower: There are eleven laboratory technicians posted in the State Malaria Laboratory. Deputy Director Malaria, and other medical officers are in charge of this laboratory.

Communication: It is well communicated with the Director Health Services, and other laboratories by telephone, fax and internet but not with other referral and specialized laboratories of the country.

Instruments used: Microscopes are the only instruments used there.

Recommendations: Improved microscopes should be supplied to this laboratory and there should be some research works done in the laboratory.

1.3. (D) State public health laboratory

This laboratory is present in the same building of the state malaria laboratory. Here water analysis is done. Only the N.P.N. and presence of coliform organisms of the water samples is investigated.

Discussion: Culture and isolation of the organisms should be done here. Viral diseases as Hepatitis, bacterial diseases as cholera and other water borne diseases should be investigated here. The laboratory should be upgraded. There should be facilities for culture and isolation of organisms from infected food materials, and facilities to supply of the required transportation media and other sterile containers to the district laboratories for collection and supply of the samples when there is any outbreak in the district. They should do the proper arrangements to transport the samples to the referral laboratories outside Orissa. The laboratory should have link and communications with other specialized and referral laboratories of the country, which they lack.

1.3 (E). Regional medical research center (RMRC):

R.M.R.C. Bhubaneswar is a branch of I.C.M.R. It has a well-equipped laboratory.

Laboratory investigations done:

I. Pathology- Stool test, Urine test, Anemia profile, Blood analysis for different types of hemoglobin.

II. Microbiology- ELISA, SPOT test are done for AIDS.

Cholera- Phase typing of Vibrio Cholerae is done here.

Strain typing, Antibiogram, and Molecular characterization are done for Cholera. In Molecular characterization, following tests are done.

a. Ribb typing,

b. Restriction fragment length polymorphism of various virulence genes, by PCR based DNA finger printing.

Isolation of Shigella is also done here.

III. Clinical- Malaria and Filaria. Antibody to the sheath of Microfilaria is done here. According to the sheath antigen the types of microfilaria is detected and sheath antibody is detected for the immunology purpose.

IV. Immunology- IGg and IGm of Leptospira.

Study of genetic diseases in various hereditary hematological disorders is done.

V. Human Genetics- Sickle cell anemia, Thalasemia, G6PD. These are done by Electrolphoresis method.

VI. Molecular biology- Anthrax.

VII. Laboratory animals- Effect of drugs, isolation of organisms after inoculation are tested here.

VIII. Blood biochemical test: Hemoglobin level estimation and others. It is the refferal laboratory for these.

IX. Water sample: Study of microorganisms in water samples, NPN, choliform organisms.

This laboratory does its research programmes through out the year. Usually this laboratory does research about the thalasemia, sickle cell anemia, Filaria, which are big problems in Orissa. During epidemic situations the help of this laboratory is taken for supply of different culture media, and testing the samples. During all the large epidemics the laboratory sends its research officers for the investigations.

Manpower: It has its own Director, Deputy Director, Asst Director, Research Officers, Technicians, and other subordinate staffs. It is an autonomous body.

1.3.(F). Laboratory of specialized institutions. -

There are some specialized institutions in the state.

- Acharya Harihar Cancer Institute, Cuttack.
- An extension of A.I.I.M.S. (proposed).

Acharya Harihar Cancer Institute.

All the pathological tests as in medical colleges are done here. Histopathological tests and blood tests are predominantly done. Biochemical tests and serology is not done. It is an autonomous institute. It has its own staffs. It keeps correlations with the medical colleges. They also do pathological tests taking samples from the periphery areas doing camps for cancer detection.

(2) PRIVATE LABORATORIES.

1. Small laboratories.
2. Large specialized laboratories.
3. Laboratory of referral hospitals.

1. **Small laboratories:** These laboratories are not suitable for the investigation of outbreak. Here all the pathological tests and biochemical tests can be done.
2. **Large specialized laboratories:** There are some large private laboratories in Orissa. In some laboratories all the tests like Medical Colleges are done. These are specialized laboratories like Biochemical laboratories only and Histo pathology laboratories only. All the tests like medical colleges are done in these laboratories. These can be utilized during the epidemic situations and during any unknown outbreaks.

There are some branches of the laboratories like Ranbaxy Laboratory, Mumbai, Thyrocare Laboratory and Dr Lal in Cuttack and Bhubaneswar. They deal with Biochemical, Serological tests only.

Tests done:

a. **Anemia profile:** Iron, Feritin, Folic acid, G6PD, Percent Transferrin Saturation, and Total Iron binding capacity, Vitamin B12.

b. **Autoimmune profile:** Anti cardiolipin, Anti Double Stranded D.N.A., Anti Nuclear Antibody, Anti Streptolysin O, GBM Antibody, Histone Antibody, Ig A, Ig G, Ig M, JO-1 Antibody, LKM-1antibody, M2antibody (Anti Mitochondrial Antibody), MPO-ANCA, Parietal cell Antibody, PRT-ANCA, Rheumatoid factor, RMP Antibody, Ro Antibody, Scl-70 Antibody, Sm Antibody.

c. **Cardiac Profile:** Apolipoprotein-A1,B. C- Reactive protein, Hemocytine, Lipoprotein-a.

d. **Diabetes:** Anti Insulin Antibody, C-peptide, Hb AIC, Insulin, Urinary Albumin.

e. **Drugs:** Lanoxin, Digitoxin, Valproic Acid, Tegritol, Carbamazepin, Theophylin.

f. **Hepatitis:**

Anti Hepatitis A- IgM,Total.

Anti Hepatitis B- Core Ag- IgM, B Core Ag, Envelope Ag, Surface Ag.

Anti Hepatitis C virus- Total.

Anti Hepatitis E virus- IgM.

g. **Infertility:** 17-alpha Hydroxy Progesteron, Alpha fetoprotein, Androstenidion, Anti sperm Antibody, Beta human chorionic Gonadotrophin, Dihydro epiandrosteron sulphate, Estradiol, Folicle stimulating hormone, Pretestosteron, LH, Progesteron, Prolactin, Sex hormone binding Globulin, Total Testosteron, Uncongugated Oestriole.

h. **Miscellaneous:** 25-OH- Vit- D3, Amylase, Cerulospasmin, Complement 3,4. cortisole. Human Growth Hormone. Intact Parathyroid Hormone. Lipase. Total IgE. Infectious Dengue- IgG, IgM. H.pylori- IgG, IgM.

Infection- HIV-ELISA, Leptospirosis- IgM.

i. **Tuberculosis:** Anti TB antibody- IgA, IgG, IgM, Anti microsomal antibody, Anti thyroglobulin antibody.

j. **Thyroid:** Thy-c free Thyroxin, Triiodo thyronine, TSH, Thyroxine index, Total Thyroglobulin, TSH, Tri iodothyronine.

k. **Torch profile**: CMV, Herpes simplex, Rubella, Toxoplasma gondii.

l. **Others:** Alpha fetoprotein, Beta Human Chorionic Gonadotropin, Cancer antigen 125, Ca Ag-15.3, Ca Ag- 19.9, Carcino Embrionic Ag, Prostate specific Ag, Prostatic acid phosphatase. Blood sugar, Glucose tolerance test, Tests for investigating hypoglycemia, Urea and Ketone body of blood, urine, Non protein nitrogen, Plasma proteins, Enzymes, Lipids, Tests of Gastric function as Occult blood, tests for Liver and biliary tract, tests in pancreatic diseases, Calcium, Phospherous, Phosphatase, Iodine, iron, Copper, Sulpher, Magnesium, Chloride, Sodium, Potassium, Basal Metabolism, Blood oxygen tests are done here.

Conclusion: After all, the Laboratory facility in the state is very important for outbreak investigation. Now under Integrated Disease Surveillance Project all the laboratories especially the district laboratories will be strengthened by which we can collect, transport and isolate the causative organisms where ever possible immediately, so that we can control the outbreak promptly and efficiently. We can transport the clinical samples to any referral laboratory easily wherever necessary and we can know the cause of the outbreak.

3. Description of the Disease Surveillance systems of Dhenkanal district, Orissa, 2003.

1. Introduction:

Surveillance: Surveillance is defined as the "Ongoing systemic collection, compilation, analysis and interpretation of data; and the dissemination of information to those who need to know in order that action may be taken."

Importance of disease surveillance system- The main purpose of surveillance is to detect changes in trend or distribution in order to initiate investigative or control measures. Surveillance must also follow the control measures. It also goes beyond the passive reporting of cases. It includes laboratory conformation of presumptive diagnosis, finding out the source of infection, routes of transmission, identification of all cases and susceptible contacts and still others who are at risk in order finally to prevent the spread of disease. Surveillance may comprise

(a) Individual surveillance.
(b) Local population surveillance.
(c) National population surveillance.
(d) International surveillance.

2. Background:

Communicable disease Surveillance in India: The earliest surveillance system is Intensive single disease surveillance system like Small pox. There were single disease surveillance systems for separate major infectious diseases like Malaria, Tuberculosis, and Leprosy.

The first surveillance system for multiple diseases in the country was the National Surveillance Program for Communicable Diseases (NSPCD). This program was started in 5 districts in 1997-1998, and now it extends to 100 districts in 28 states in India. It includes reporting and responding to outbreaks in the selected districts. Now The Integrated Disease Surveillance Program (IDSP), which includes both communicable and non-communicable diseases, is being considered to be implemented in a number of states. It includes laboratory data, to differentiate the cases to suspected, probable and conformed. The medical college hospitals, urban government health facilities, NGO health sectors, private health sectors would be included in to this surveillance systems.

Surveillance System of Orissa: In the state of Orissa a number of surveillance systems are working. Most important is the Orissa Multi Disease Surveillance System. The other systems include a number of vertical programs. IDSP is likely to be implemented in Orissa in 2005. The OMDSS covers most of its components of IDSP.

Additional activities are being planned in the future are

1. Strengthening the district and state level laboratory facilities.
2. Engaging the private health sectors in diseases surveillance.
3. Integrating the surveillance data from the various vertical disease control programs.

3. Types of surveillance system in Orissa and Districts.

(A) Multiple Disease Surveillance System.

1. Orissa Multi Disease Surveillance System.

(B) Vertical surveillance system.

1. Surveillance of Malaria under the program of NMAP.
2. Surveillance of Leprosy under the Leprosy eradication program.
3. Surveillance of Tuberculosis under the RNTCP.
4. Surveillance of different diseases treated in the hospitals.
5. Surveillance of HIV/AIDS.
6. Surveillance of Blindness – Blindness control program.
7. Surveillance of Acute flaccid paralysis.

2. Health Administration of Orissa:

Table:3.1 Health Administration of Orissa:

State	Director Joint director Public Health Joint director Family Welfare Joint director Medical Joint director Malaria, Filaria
District	Chief District Medical Officer Asst District Medical Officer Public Health Asst District Medical Officer Medical Asst District Medical Officer Family Welfare.
Subdivision	Sub divisional Medical Officer.
Community health center / Primary health center/ area hospitals	Medical Officer in charge.
Sector PHC (N) / Additional PHC	Medical Officer PHC (N) Health supervisor, male /female
Sub-center Villages	Health worker male / female. Paramedical workers for leprosy. Anganwadi workers.

5. Basic principles of Disease Surveillance.

Data:

1. Disease/Syndrome.
2. Collected on the basis of case definition and suspected cases are conformed later by laboratory diagnosis.

Data Sources:

1. Out Patient Department / In Patient Department of government health services.
2. Out Patient Department / In Patient Department of private and public sectors.
3. Registers of multi purpose health workers male / female.

Reporting:

1. Weekly during normal times, daily during an emergency situation, an outbreak or an epidemic and seasonally for heatstroke.
2. Reporting usually manually or through telephone, fax, e-mail.
3. Transmission.

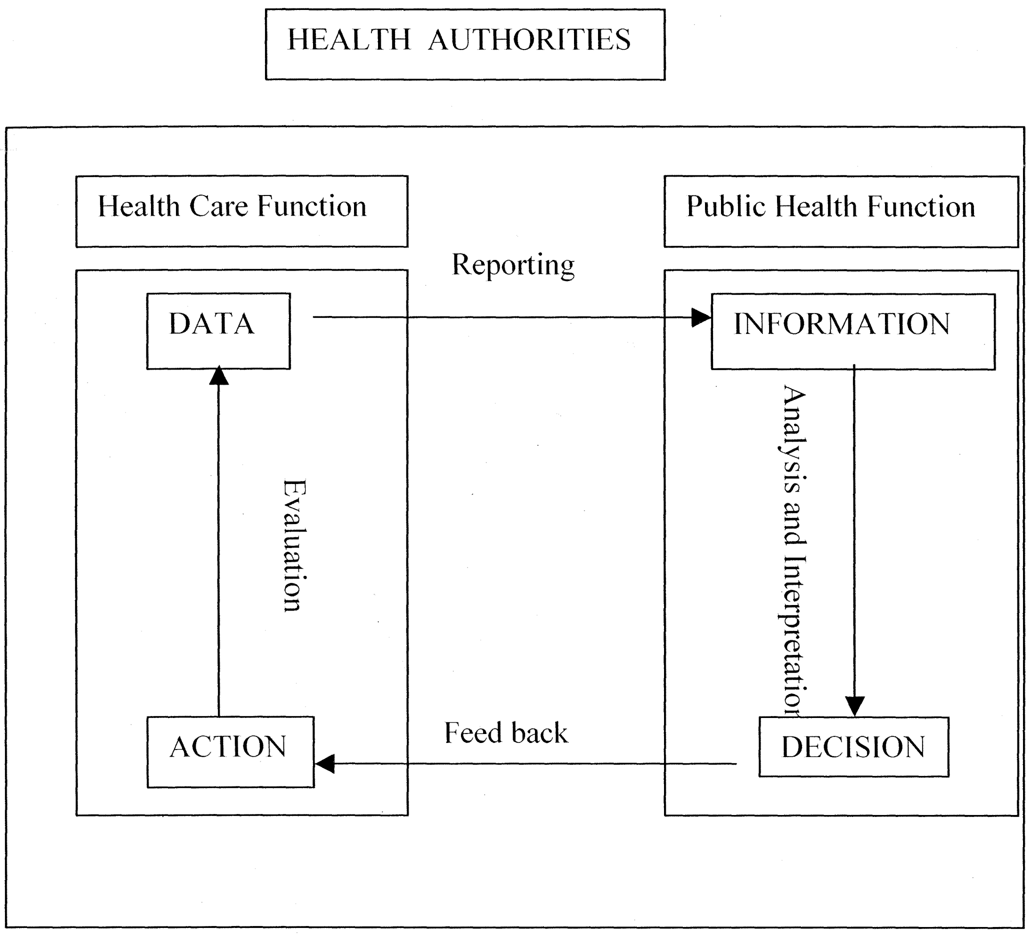
Analysis and Interpretation:

1. Validity of data (missing value, expected /unexpected frequencies, cross tabulation, bias, duplication.)
2. Descriptive analysis (with respect to time, place, person)
3. Generation of hypothesis.

Feedback and Response:

1. Control- rapid response, case management, prevention.
2. Reports- Monthly bulletins, investigation reports.
3. Policy- using OMDSS data to initiate mass immunization programs.

Figure: 3.1. Monogram of the Surveillance system.



Monitoring and Evaluation:

1. Evaluation of objectives of surveillance.
2. Evaluation of methods.
3. Evaluation of operational aspect of the system inputs and output.
4. Evaluation of usefulness of surveillance.
5. Economic evaluation of the system.

A. MULTIPLE DISEASE SURVEILLANCE SYSTEM.

(A). 1 Orissa Multi Disease Surveillance System:

A.1.1 Introduction: It is a multi disease surveillance system and it was designed for the surveillance of communicable diseases after the super cyclone in Orissa during 1999. After looking its efficacy it was introduced as the general surveillance system of the state of Orissa. Now it is the major surveillance system of the state of Orissa.

A.1.2 Objectives of Orissa Multi Disease Surveillance System:

1. Epidemic detection and intervention.
2. Prediction of outbreak.
3. Monitoring trends in endemic illness.
4. Monitoring progress towards a control objective.
5. Monitoring program performance.
6. Evaluation of an intervention.
7. Estimating future disease impact.

A.1.3. List of various diseases under Surveillance:

These are the diseases listed which are under surveillance under OMDSS.

Diseases/ Syndromes:

- Simple diarrhea,
- Severe diarrhea,

- Bloody diarrhea,
- Suspected malaria,
- Acute Respiratory Infection,
- Measles,
- Neonatal Tetanus,
- Acute Jaundice Syndrome,
- Suspected meningitis,
- Unusual Syndromes like, some infectious diseases spreading in the community, food poisoning, some chemical poisoning.
- Seasonal disorders,
    - During Summer = Heat disorder,
    - During flood and cyclone = Skin infection like scabies, impetigo; Snake bite.

A.1.4 Methodology of Orissa Multi Disease Surveillance System.

Components of surveillance:

(1) Case detection.

(2) Data recording and collection, reporting or transmission and compilation.

(3) Analysis and interpretation.

(4) Investigation of an outbreak and follow up.

(5) Laboratory conformation.

(6) Feed back.

(7) Supervision and monitoring

(8) Training.

A.1.4 (1): Case detection:

Case detection is done according to the clinical case definition.

Case definitions of these diseases under surveillance:

Simple Diarrhea: Acute watery diarrhea (Passage of three or more loose or watery stools over a period of 24 hours) **without dehydration**.

Severe Diarrhea: Acute watery diarrhea **with dehydration**, with or without vomiting.

Common symptoms and signs of Dehydration: Dry mouth and dry tongue; shrunken dry eyes; wrinkled or blotchy skin; scanty (less than six times per day in infants) dark yellow urine; lethargy; irritability; cold hands and feet; cramps in muscles of arms and legs; shrunken fontanels in infants in severe cases.

<u>Bloody Diarrhea:</u> Acute watery diarrhea **with visible blood** in the stool.
(Patient or attendant must conform that blood was visible in the stool.)

<u>Neonatal tetanus:</u> A neonate (less than one month old) with normal sucking and crying in first two days of life who develops difficulty in sucking; cries weakly; becomes stiff or has **convulsions** or both between the third and 28th day of life (both inclusive) is considered a case of neonatal tetanus.
(While detecting the case, whether the mother was immunized with tetanus or not during her pregnancy need not be taken in to account).

<u>Acute jaundice syndrome:</u> Acute onset of jaundice (yellow coloration of eyes) typically including deep yellow urine, anorexia (loss of appetite), generalized body aches and extreme tiredness with or without fever.

<u>Acute Respiratory Infection (ARI):</u> Acute Respiratory Infection includes both upper respiratory tract infections (URTI) and lower respiratory tract infections (LRTI).

- **A case of fever** and running or stuffy nose; or sore throat; or ear discharge; or cough with or without expectoration (production of sputum) for less than three weeks can be labeled as Upper Respiratory Tract Infection.
- **A case of fever** and cough with acute onset of wheeze or chest in drawing or rapid breathing as defined below indicates lower respiratory tract infection, especially pneumonia.

Age	Rapid Breathing
Less than 2 months	More than 60 per minute.
2 to 12 months	More than 50 per minute.
12 months to 5 years	More than 40 per minute.
More than 5 years	More than 20 per minute.

Suspected Meningitis: A case of fever* usually of sudden onset and with one or more of the following:

- Neck stiffness (sign elicited by the health personnel),
- Severe unexplained headache,
- Neck pain and 2 or more of the following,
    - Photophobia (discomfort looking into bright lights).
    - Nausea,
    - Vomiting,
    - Lowered or altered consciousness (confusion to coma)

In children less than 2 years of age, a case of suspected meningitis is defined as fever* and one or more of the following:

- Irritability
- Bulging fontanel

* Axillary temperature – more than 38 degree in centigrade scale and 100.5 degree or more in Fahrenheit scale.

Measles: Acute onset of fever and maculopapular (flat or raised reddish spots) skin rash with cough or coryza (running of nose) or conjunctivitis (redness of eyes).

Suspected Malaria:

Acute onset of fever commonly but not always associated with chills, rigor (extreme shivers), myalgia (muscle pain), sweating, headache, backache, nausea or vomiting with or without blood smear collection will be considered a case of suspected malaria.

Unusual Syndrome: Cases with acute onset of symptoms that are unusual or unexplained and affecting more than one person residing in the area covered by a health worker or a health facility and not classifiable under any of the specific disease/ syndrome labels of OMDSS.

Others: All instances of services (promotive/ preventive/ curative) provided by the health facility/ health care worker to individuals, who cannot classified as cases under any of diseases/ syndrome labels of OMDSS including unusual syndrome, and all repeat visits by a patient for a disease/ syndrome which has already been reported, should be included in **"others"**.

Others category includes:

- All repeat case of any disease/ syndrome.
- Those new cases which do not fit in to any of the specific OMDSS case definitions.

Diseases/ Syndromes to be reported during particular seasons or disasters:

In summer: Heat disorder

A case with history of exposure to or working in a hot environment with high to very high body temperature, associated with any of the following: nausea, vomiting, headache, and dizziness, fainting and altered or lowered consciousness.

During flood and cyclones:

Skin infection: This category includes bacterial skin infections (impetigo), fungal skin infections (tinea), & scabies.

Snake bite: History of snakebite with local symptoms and signs & with/ without systemic manifestations.

Methods of case detection:

- A patient seeks at a health facility.
- The MPHW detects cases during his / her routine home visit.
- A mobile home unit identifies cases during village visit.
- The MPHW actively finds cases as in the vertical program.
- A community nodal person reports suspected cases of an epidemic prone disease.
- Media reports.
- Sentinel surveillance sites reports cases of specific diseases. e.g- HIV.
- Laboratories may notify cases when they get positive investigation result.

Person responsible for detection of cases

Usually most of the disease events are detected at the reporting units. At each level of health system, the technically qualified persons are responsible for detection of cases. In a sub center case detection is the responsibility of the ANM or the heath worker male or female. In a hospital it is the responsibility of the doctor. If the doctor is not available the qualified health worker, like pharmacist, health supervisor, nurse do the case detection.

A.1.4. (2): Data collection, transmission and compilation:

Data type: The number of cases and number of deaths of the specified diseases are the data to be collected and those should be collected for two-age groups- <5, >5 years.

Duration: Data is collected over a week span i.e. Saturday to next Friday. The weeks in a year are numbered by OMDSS. These numbers should be mentioned in each record and report.

Reporting formant: A uniform formant is used for all the reporting units.

Rules to be followed during collection of data:

- The newly detected cases are to be counted. Here the uniform case definitions should be followed.
- A patient with multiple diseases should be counted as a case of one disease only for a single visit/ admission.
- Daily tallying for counts of cases and deaths. Daily tally sheets are provided to the health units.
- Zero reporting if there is no case or death.
- Reporting of death should be done and the cause of death should be enquired and reported.

Reporting formats at each level of the system:

Uniform Reporting formats are used at each level of the system.

Primary data collection form:

Here the name of the sub-center, PHC, block, district have been mentioned. Then reporting week number, from date and from Saturday to Friday and date is to be mentioned here. The number of cases has been divided in to under 5 years and above 5 years. The number of new cases and number of deaths is to be filled up.

Daily tally sheet: Daily tally sheets have been supplied to all the health institutions. Every day different cases are tallied according to OMDSS from the out door register. It is compiled on Saturday.

Compilation Report: District level, Block level, Sector level, Sub-center level.

Reporting unit wise break up:

- District level – The break up report of different blocks, Area hospital, District headquarter, Subdivisional hospital is to be specified here.
- Block level- The break up report of all the sectors, Block PHC/ CHC is to be specified.
- Sector level- The break up report of all the sub-centers, sector hospital is to be specified.
- Sub-center level- The break up report is to be specified village wise.

Data Transmission log for districts: (Apendix-3) In the transmission log all the sub-district reporting units are mentioned. Then the day, date, time of reporting for each block and hospitals has been mentioned. Then whether it is on time, complete, then mode of transmission, whether there is any problem in transmission is mentioned. At last action or follow up whether required or taken is mentioned for each block and each hospital. Then in another paragraph which is mentioned as district report, here it is to be mentioned the day and date, time, sent by, transmission mode, transmission problem, whether any action required or taken, whether follow up required or taken.

Case based Reporting form: Here Acute Flaccid Paralysis, Cholera, Dengue, Japanese Encephalitis, Measles, Plague diseases are included. Here clustering of cases are taken in to consideration.

Household format for Identification of base/ denominator/ Susceptible Population during outbreaks of epidemics.

This format is used during any outbreaks and epidemics.

Individual format for different outbreaks: There are individual formats for outbreak investigation for different diseases as Malaria, Measles. In Apendix-1 and 2 Formats for outbreak investigation of outbreak of water borne diseases and heat disorder has been given.

Data compilation: Data compilation is the process of summing up or aggregating the primary data collected from subunits. The health workers collect the data from the community and they have a meeting in the sector every Saturday. In the meeting they submit the reports to the health supervisor. The health supervisor compiles those reports and the report of the sector hospital. He submits the compiled report in the Primary Health Center or community Health Center on Monday.

Table 2. Data compilation process at various levels.

Compilation level	Main report compiled from	Reports to be compiled by
Sub center	Data collected from villages covered by the sub center	Health worker (Male / Female)
Sectors	Data reported by each sub center, PHC (N)	Health supervisor (M/F)
Block	Data from each sector and from block Primary Health Center / Community Health Center.	Statistical Assistant, Vital Statistics Clerk / Block Extension Educator / Pharmacist.
Districts	Data from each block under the dist and from District Headquarter Hospital, Sub divisional Hospital.	Data entry operator/ Statistical Assistant / Vital Statistics Clerk.
State	Data reported by each district	Data Entry Operator / Statistician at State Disease Surveillance cell.

Data transmission:

Table-3. Completed data is transmitted to next higher level shown in table 3.

From	To	Persons responsible	Mode of transmission	Day
Community nodal person	Sub center	Any nodal person from village / panchayat.	Manual /verbal	By Friday
Health sub center	Sector PHC.	Health worker, male/ female	Manual	Saturday
Mobile health unit	Block PHC/CHC	Pharmacist	Manual	By Monday
Sector PHC	Block PHC/CHC	Health supervisor Male / Female	Manual	Monday
Block PHC/CHC	District	Pharmacist/SA/VS clerk/ BEE.	Electronic/Manual	Tuesday
Hospital (SDH/ DHH/ Area hospital	District	Pharmacist/staff nurse/medical record staff	Electronic/manual.	Monday
District (CDMO)	State level	DEO/SA/VS clerk	Electronic	Wednesday
Medical college	State level	Department SPM.	Electronic/Manual	Monday
Reporting units of other health sectors	Sector	Designated nodal staff	Manual	Saturday
	Block		Manual	Monday
	District/state level		Manual/electronic	By Tuesday

Immediate report transmission is necessary in the event of a potential or a suspected outbreak.

Daily data transmission during emergency and in summer: In addition to the time of outbreak of diseases/syndromes, daily reporting of cases and death for all diseases/syndromes including snakebites and skin infections during emergency (cyclone / flood) due to heat disorder in summer from all levels of health system is mandatory.

Timeliness of the data collection, compilation & transmission:

Timeliness of data collection: Data is collected over a week span i.e. Saturday to next Friday. The weeks in a year are numbered by OMDSS. These numbers should be mentioned.

Timeliness of data compilation: All the reports are compiled at different levels in time. The reports in the sector is compiled on Saturday and transmitted on Monday to the PHC manually. The health supervisor compiles the reports and carries it to the PHC to the Supervisor's meeting, which is held in the PHC on Monday. The reports are compiled on the same day in the PHC and transmitted on Tuesday morning to the district epidemic cell. In the district all the reports are compiled on the same day and the compiled report is transmitted to the State Epidemic Cell on Wednesday morning. If there is late in receiving report from any PHC then the incomplete reports are compiled in the district and transmitted to the state epidemic cell. When the report is received within the week then again this report is sent to the state level as supplementary report. The supplementary report should reach the state epidemic cell within next Tuesday. If it reaches after Tuesday then it is marked as incomplete but on time. If the supplementary report reaches within the stipulated time it is added to the main report and it becomes complete. If the report reaches after Wednesday it is marked as complete but late. If the reports reach late and incomplete it is marked as incomplete and late.

On time: Repots received at the higher level by the deadline.

Late: Reports received at higher level after the deadline, but before the next week's dead line.

Not Reported: Reports received at higher level after the end of the next week's deadline or not reported at all.

Complete: The report of a particular level is said to be complete if it contains reports from all the reports from all the units that directly report to the level. At the district level a block is said to be complete if it's report contains reports of all the sectors of that block.

Supplementary reports:

- When the reporting unit fails to send a complete report or send any report at all and sends the same report in the subsequent week.
- It should be clearly marked as "**Supplementary Report**".
- The OMDSS reporting week for which the report has been compiled should be mentioned.

Updated reports:

- Once a report is transmitted, any mistake in the report can be corrected/updated by sending an updated report.
- It has to be labeled as "Updated Report".

There is a color indicator maintained in the district and state level.

Complete and on time: Full green.

Incomplete but on time: Hatched green.

Complete but late: Hatched red.

Incomplete and late: Full red.

Not reported: Black in color.

This color-monitoring chart is updated every week. From the chart the completeness of reports is calculated. In a particular week the percentage of complete reports, incomplete reports can be calculated.

A.1.4. (3): Report generation, analysis and interpretation:

Report generation: The following reports are generated, maintained and updated using the complied data at the block, district level.

- Percentage of reporting units reporting on time (timeliness of reporting) by the designated deadline for the transmit ion of reports.
- Percentage of reporting units reporting every week (completeness of reporting).
- Summary tables showing the number of cases and deaths, by age group of diseases under surveillance for a reporting week should be prepared.

Data Analysis provides these outcomes.

1. Identification of outbreaks.
2. Prediction of outbreaks.
3. Monitoring trends.

Analysis at which level:

Data should be analyzed every week at the sector, block, district and state level.

Table 4: Persons responsible for data analysis at various levels

Level	Persons responsible
State	Joint director (Public Health), Surveillance medical officer, and Technical committee-Orissa Multi Disease Surveillance System.
District	ADMO (PH), Assistant Health Officer in charge of District Task Force.
Block	Medical officer in charge.
Sector	Medical officer in charge.

A.1.4. (5): Laboratory investigation in Orissa Multi Disease Surveillance System.

Rapid identification of the causative agents and the likely source of mode of transmission are essential to initiate proper control measures. During an outbreak appropriate and adequate specimens are collected keeping in perspective the differential diagnosis and knowledge of tests needed to conform a particular diagnosis. Correct storage, packaging and transport of specimens to an appropriate laboratory is done to identify the causative organism and the mode of spread.

A.1.4. (6): Feed back:

- Feedback is given to one level below in the system.
- Feedback is given to one level above in the system.
- Feedback is given to administrators and agencies outside the system.
- Feedback is given also to the media.

A.1.4. (7): Supervision and Monitoring:

For a system to be effective over the long term, and for its improvement, regular supervision and monitoring is very essential. Supervision and monitoring are required at every 5 years.

A.1.4. (8): Roles and responsibilities of the health personnel and district task force.

1. Activities of community nodal persons.

They do the case detection, investigation and response.

2. Activities of the multi purpose heath workers and health supervisor male/ female.
   - Case detection.
   - Data compilation and transmission.
   - Investigation and response.
   - Nomination of community nodal person.
3. Activity of the pharmacist.

   Data recording, collection, compilation and transmission.
4. Activity of the Medical Officer.
   - Case detection.
   - Data compilation and transmission.
   - Analysis.
   - Investigation and response.
   - Supervision and monitoring and feedback.
   - Training.
5. Activity, Statistical assistant /data entry operator/ vital statistics clerk in block /district.
   - Compilation of data.
   - Report generation
6. Activities of the ADMO (PH)/ AHO
   - Supervising the work of the DEO/SA.
   - Ensuring that the data id received in time checked, entered to master register.
   - Ensure that the non-reporting units are given reminders.
   - Analysis of data.
   - Implementation of action plan.
   - During outbreaks to ensure whether necessary measures are taken or not.
   - Ensuring that feedback on DSS is sent to the state level as well as to all blocks.
7. Existence of composition of rapid response teams at different levels:

(B) VERTICAL SURVEILLANCE SYSTEM

Before the OMDSS some diseases were reported separately for surveillance.

B. 1. Surveillance of Malaria under the program National Anti Malaria Program (NAMP)

a) Active Surveillance:

The Health worker male and female are allotted 10,000 population or 2000 households. In difficult areas there is one worker for 8000 population. The worker visits each house in his area every fortnight and collect blood slides for malaria parasites from all the fever cases during their village visit and give chloroquin tablets to the patients as presumptive treatment. They also collect the blood slides from the Fever treatment depots. In the sector meeting on every Saturday they give the blood slides to the health supervisor. On every Monday in the supervisor meeting the health supervisor submit all the blood slides collected by the health workers along with the blood slides collected in the hospital during the regular treatment process, to the malaria technician in the PHC.

b) Passive Surveillance:

The search for malaria cases by the local health agencies such as the primary health centers, sub centers, hospitals, dispensaries and local medical practitioners is known as Passive surveillance. The passive agencies collect blood smears from all fever cases and also from those with history of recent fever. They send these slides to PHC laboratory and the blood slides are examined and the result is communicated to the health workers.

B.1.1. Data: Number of fever cases and number of blood slide collection.

B.1.2. Data source: The health worker male and female in case of active surveillance and out door of the hospitals as passive surveillance.

B.1.3. Reporting: Reporting is done weekly from sector to Primary Health Center, monthly from Primary Health Center to district and district to state.

B.1.4. Methods of case detection: When the person seeks heath facility, out door of the hospitals in passive surveillance and when the health worker visits the houses during the active surveillance.

B.1.5. Person responsible of case detection: The medical officers, the pharmacist, Staff nurse and health worker male and female are responsible for case detection.

B.1.6. Data collection: From the blood slides collected from the fever cases.

B.1.7. Data compilation: Data is compiled in the PHC and sent to the district level. From the district it is compiled and transmitted to the Joint Director Malaria.

B.1.8. Data transmission: Data is transmitted from to sector to PHC on Monday and in the PHC the blood slides are examined. All the blood slides are preserved for crosschecking. The information of positive slides is sent to the sector for Radical Treatment as quick as possible. The positive information is compiled and at the end of the month the data is sent to the district level and from the district total data is compiled and sent to the state level.

B.1.9. Data Analysis: Data analysis is done in the district level.

B.1.10. Parameters of Malaria surveillance:

1. Annual parasite incidence. (API).
2. Annual blood examination rate. (ABER)
3. Annual falciparum incidence. (AFI)
4. Slide positivity rate. (SPR)
5. Slide falciparum rate. (SFR)
6. PF percentage.

B.1.11. Supervision and Monitoring.

Supervision of health workers: Target is given to them for blood slide collection in each month. They are supplied with adequate amount of glass slides and needles, sprit and cotton.

Quality control of laboratories: The positive and negative slides are crosschecked. From the state malaria laboratory every month they send a digit, which may be the last or first digit of the numbers assigned to the positive or negative slides. The laboratory technicians send these slides to the state laboratory. These slides are crosschecked there and the accuracy of the result is sent to the laboratory technicians.

B.2 Surveillance of Leprosy under Leprosy Eradication Program.

Previously it was a separate vertical programme, and a leprosy unit consisted of 2 doctors, pharmacists, 20 paramedical workers covering a population of 4.5 lakhs. Now it is a horizontal programme, National leprosy eradication programme.

Active surveillance:

Active surveillance was done through the paramedical workers, and health workers. Every month in the last sector meeting the paramedical workers submit their report to the health supervisor in a prescribed form. The health workers collect their report during their normal village visit & submit at the sector meeting. In the end of the month it is compiled in the sector and sent to the PHC. From the PHC the reports are compiled and sent to the district level. From the district the compiled report goes to the joint Director Leprosy.

Active search for Leprosy cases has been carried out every year since 1998, which is known as MLEC, Modified Leprosy Eradication Campaign.

Data: Leprosy cases according to the case definition, persons having anesthetic and depigmented or reddish patches.

Data Source: Record from Health worker female and male from a sub center, hospital Leprosy register, suspicion record of the OPD.

Reporting: Reporting is done every month. In the report following information is given.

1. Number of cases at the beginning of the reporting month.
2. Total new leprosy cases detected in the reporting month.
3. Number of child cases amongst the new leprosy cases of the month.

3.1- Number of female

3.2- Number of visible deformity cases among the new cases.

3.3- Number of scheduled cast amongst the new leprosy cases of the month.

3.4- Number of scheduled tribe amongst the new leprosy cases of the month.

4. Number of cases deleted in the reporting month.

4.1. As RFT.

4.2. Otherwise deleted.

5. Number of cases at the end of the reporting month. (1+2-4)

6. Number of sub-centers providing MDT services.

7. Leprosy drug stock at the end of the reporting month- MB (adult, child), PB (adult, child)

Methods of case detection:

The PMW is allotted an area and affixed population for active search of leprosy cases. He does active search and report it every month. The health worker male and female does some active search of cases during their regular village visit. They keep the record in the leprosy register and report it every week. They also distribute drug to the patients of their sub center area every month. During MLEC active combing search is carried out in all the villages. By that time a lot of cases come to limelight.

Data collection- Every month data is collected in the sector.

Data compilation- Data compilation is done in the PHC.

Data transmission- From the sector data is transmitted to the PHC, then from PHC to district level and from the district to the Joint Director Leprosy at the state level.

Data analysis- Prevalence rate is calculated in each year in the district, in every PHC, in every sector. Prevalence rate is compared for each year.

Feedback- Before every MLEC the medical officers, the PMW are trained how to conform the suspected cases, how to categorize and treat them, how to fill up the case cards, how to fill up the registers, how to write the reports. The health workers and volunteers are trained how to search and identify the leprosy cases, how to maintain the records in the sub center level.

Supervision and monitoring- Supervision and monitoring in the district level is done by the medical officer in the charge of LEU (leprosy unit).

B 3. Surveillance of Tuberculosis under Revised National Tuberculosis Control Program (RNTCP).

Objective:

1. Achievement of at least 85% cure rate of infectious cases through supervised short course chemotherapy involving peripheral health functionaries.
2. Augmentation of case finding activities through quality sputum microscopy to detect at least 70% estimated cases.
3. Involvement of NGO, information, education and communication and improve operational research.

In this RNTCP, active case finding is not been persued. Here case finding is passive. Patients presenting themselves with symptoms suspicious of Tuberculosis are screened through three sputum smear examinations. Sputum microscopic examination is done in the designated RNTCP microscopic centers. Microscopy centers are established in the RNTCP districts for every one lakh population. They are located either in PHC, CHC, sub divisional hospitals or TB dispensary. Each center has a skilled technician, a senior TB laboratory supervisor is appointed for every 5 microscopy centers.

During the intensive stage of chemotherapy all the drugs are administered under direct supervision called Direct Observed Therapy (DOTS). DOTS is given by peripheral health staffs such as MPW, through voluntary workers such as teachers, anganwadi workers, dhai, ex patients, social workers.

Data: Number of sputum AFB positive cases, extra pulmonary TB cases.

Data source: Hospitals, the RNTCP laboratories.

Reporting: Reporting is done every month. Reports are sent to the district tuberculosis officer, to the DTC.

Methods of case detection: the patient comes to the hospital with chronic cough, evening rise of temperature, emaciation. Then the doctor suspects the patient and refers to the RNTCP laboratory, which is present nearby. In the laboratory the technician asks for collection of 3 sputum samples, one on the spot, second in the next morning, the third one spot on the second day. If all the three samples are positive, or one is positive and the chest x ray is positive then those cases are categorized as TB, and then the drug schedule is prepared. One DOT provider is attached who can feed the drugs each day.

Data transmission: the data is transmitted from each hospital to the PHC, then from the PHC to DTO. From the district level the data is transmitted to state, to the STO. From the STO it goes to Central TB division, Deputy Director General (TB).

Data analysis: Prevalence rate is calculated, along with the cure rate in each year.

Feedback: Feedback is from the state level. At the state level there is a state Tuberculosis Officer (STO) who is responsible for planning, training, supervision and monitoring the programme in the state.

Supervision and monitoring:

Laboratory supervision:

Items to monitor on supervisory visits.

1. Is every smear positive patient recorded in the TB register?
2. Is patient information on the laboratory forms, including patients address and reason for sputum smear examination, complete and legible?
3. Are patients having follow up sputum smear examinations at recommended intervals?

4. Are their sufficient reagents for the expected numbers of slides to be prepared and examined in the next quarter?
5. Are the medical officers and other staffs of the center aware of the importance of the sputum smear microscopy for all chests symptomatic?
6. Are three sputum samples being examined for diagnosis of chest symptomatic?
7. Are two sputum samples being examined for follow up of diagnosed patients?
8. Are laboratory safety precautions maintained correctly?
9. Are sputum containers and other potentially infectious materials disposed properly?
10. Are sputum smear examination results reported promptly to the referring facility?
11. Is the TB laboratory register being properly and completely filled?

B 4. Surveillance of diseases treated in the hospitals.

Objective: To study the trend of diseases in a year in the hospital.

Descrption: It is a passive surveillance system.

1. A report about the following diseases is sent to the Office of ADMO (PH) every month.

The diseases are measles, neonatal tetanus, snakebite, rabies, whooping cough, polio, minor operation procedures, tinea, mumps, tuberculosis, leprosy, HIV, meningitis, hepatitis.

2. Another report is sent to the Office of ADMO (PH) every year. Here all the diseases treated in the hospital are sent categorically.

Here the diseases are categorized as vaccine preventable diseases, diseases treated by medicine, diseases treated by minor surgical procedures and major surgical procedures, fractures, carcinomas, HIV, dental diseases, ophthalmic diseases, ENT diseases, heart diseases, neurological diseases, skin diseases.

Data: Number of patients treated in the hospital.

Data source: The OPD Register.

Reporting: Reporting is done every month and yearly by the medical officer in charge or pharmacist.

Methods of case detection- The people come to the hospital for their treatment. The names are registered in the OPD Register. At the end of the day the pharmacist calculates the number of cases for panchabyadhi diseases, and categorize all the other diseases accordingly.

Data collection- The data is collected every month.

Data compilation – Data is compiled in the office of ADMO (PH).

Data transmission – Data is transmitted from the hospital to the office of ADMO (PH), then to the state level that is the Joint Director Public health.

Data analysis- Trend of different diseases in a particular area can be studied. Trend of a particular disease in a particular area every year or in every season can be studied.

Supervision and monitoring- Supervision is done by the ADMO (PH).

List of the diseases is given below.

From this the prevalence rate of each disease was calculated. All the diseases are classified in to,

1. Intestinal infectious diseases including cholera, amoebiasis.
2. Tuberculosis containing pulmonary, extra pulmonary, bone tuberculosis.
3. Other bacterial diseases including plague, leprosy, diphtheria, whooping cough, meningococcal infection, tetanus, septicemia.
4. Viral diseases including acute poliomyelitis, Small pox though it has been irradiated, measles, dengue, arthropod born encephalitis, arthropod borne hemorrhagic fever, viral hepatitis, trachoma, rabies.
5. Ricketssial and other arthropod borne diseases like malaria and leishmaniasis.
6. Venereal diseases.
7. Other fungal and parasitic diseases, like mycosis, helminthiasis, filariasis, dracunculosis, ancylostomiasis and necatoriasis.
8. Malignancy of oral cavity and pharynx.
9. Malignancy of digestive system.
10. Malignancy of respiratory organs and thoracic organs.
11. Malignancy of bone, skin and breast.
12. Malignancy of genitourinary system.
13. Malignancy of other nonspecific sites.

14. Malignancy of lymphatic and hemopoetic tissues.
15. Benign neoplasm.
16. Carcinoma in sit-u.
17. Other non-specified neoplasm.
18. Endocrine diseases like thyroiditis and diabetes.
19. Nutritional deficiencies.
20. Diseases of blood.
21. Psychiatric disorders.
22. Diseases of the nervous system, meningitis, multiple sclerosis, epilepsy.
23. Diseases of the eye and adenexa conjunctivitis, cataract and glaucoma.
24. Diseases of the ear and mastoid process.
25. Rheumatic fever and rheumatic heart diseases.
26. Hypertensive diseases.
27. Ishaemic heart diseases.
28. Diseases of the pulmonary system and heart diseases.
29. Cerebro vascular disorder.
30. Other diseases of circulatory system.
31. Diseases of upper respiratory tract.
32. Other diseases of respiratory tract as pneumonia, influenza, bronchial asthma.
33. Diseases of the oral cavity, salivary gland and teeth.
34. Diseases of the digestive system as, gastritis, appendicitis, chronic liver diseases, cholelithiasis.
35. Diseases of urinary tract as nephritis, urinary calculus.
36. Diseases of the male genital organs, hydrocele, benign hyperplasia of prostate.
37. Diseases of the female genital organs as, salpingitis, female infertility, menstrual disorders.
38. Abortions.
39. Obstetrics causes as post partum hemorrhage, toxemia of pregnancy, obstructed labor, other complications during delivery.
40. Indirect obstetrics causes.

41. Normal delivery.
42. Diseases of the skin and subcutaneous tissue.
43. Diseases of the musculo skeletal system.
44. Congenital anomalies.
45. Conditions originating in the prenatal period as birth trauma, growth retardation, hemolytic diseases of fetus.
46. Signs and symptoms of some ill-defined conditions.
47. Fractures.
48. Dislocations, sprains and strains.
49. Intracranial and internal injuries.
50. Open wounds and injuries of blood vessels.
51. Effects of foreign bodies entering in to orifices.
52. Burns.
53. Poisoning.
54. Complications of medical and surgical cares.
55. Other injuries and early complications o trauma.
56. Late effects of injuries and toxic effects and other external causes.
57. Transport accidents as road traffic, railway, water transport and air crash.
58. Accidental poisoning.
59. Misadventure during medical treatment.
60. Accidental falls.
61. Accidents caused by fire.
62. Other accidents including late effects.
63. Accidental drowning.
64. Accidents caused by machineries.
65. Accidents by fire arms.
66. Abnormal reactions of drugs.
67. Suicide and self inflicted injuries.
68. Homicide and purposefully inflicted injuries.
69. Other violence.
70. Injury undetermined whether accidentally or purposefully inflicted.
71. Injury resulting from operation of war.

B. 5. Surveillance of HIV / AIDS.

It is a sentinel surveillance system.

Objective:

1. To monitor the trend of HIV.
2. To reduce the caseload in the community by information education and communication.
3. To make people aware about the disease which has no satisfactory treatment and high cost of treatment.
4. In the high-risk group annual cross sectional survey is done over few years.

In this programme following activities have been carried out.

- ❖ IEC and social mobilization.
- ❖ Family Health Awareness Campaign.
- ❖ Prevention of HIV transmission from mother to child.
- ❖ Post exposure prophylaxis for health care workers.
- ❖ National AIDS telephone helpline.

Data- Number of suspected cases. Number of cases found in the blood bank or any laboratory during routine blood examination and from referral centers for AIDS or number of cases found during contact or family survey.

Data collection- Data is collected from the hospitals, laboratories and blood banks.

Method of data collection- If a medical officer suspects a patient as HIV, he should keep the name and address in detail and refer the case to the recognized centers for HIV. In these centers the name is kept confidential and blood is tested for HIV. If it is positive then the patient is informed. If any person is interested voluntarily to test his blood for HIV, then he is referred to the recognized centers. Here also his name is kept confidential.

Now it is mandatory in the blood bank to test each blood sample for HIV. Sometimes accidentally some people are found HIV positive. These patients name and address is to be reported to the AIDS CELL.

Some people voluntarily test their blood for HIV. If they are found positive, it is to be informed.

Data transmission- Data is transmitted to the Joint Director AIDS cell.

Data analysis- Prevalence rate is calculated for each year. It is compared with the global strategy. This PR can be compared among each year whether the trend is increasing or decreasing.

Feed back- Feedback is done by different training programs of medical officers and paramedical officers with a regular interval, which is highly essential in this programme.

Supervision and monitoring- Supervision and monitoring takes is done by the Joint Director AIDS.

B.6. Surveillance of Acute Flaccid Paralysis.

Case definition- A case of AFP is defined as any child aged < 15 years who has a acute onset of flaccid paralysis for which no obvious cause (such as severe trauma or electrolyte imbalance) is found, or paralytic illness in a person of any age in which polio is suspected.

Surveillance should be carried out for all cases of a AFP, and not just for Poliomyelitis. All AFP cases should be reported regardless of the final diagnosis.

Stool sample collecton: Two stool samples are collected from AFP cases within 14 days of paralysis onset and 24 to 48 hours apart. Outbreak response efforts are started promptly without waiting for the laboratory results, which might take up to 8 weeks. If a case of AFP is found late in a field, stool sample may be collected up to 60 days after onset of paralysis.

Adequate specimen can be defined as 2 specimens at least 24 hours apart, collected within 14 days of paralysis onset, each of adequate volume (8to 10 grams) a "thumb" sized and arriving at a WHO accredited laboratory in good condition. Good condition means-no desiccation, no leakage, adequate documentation and evidence that cold chain was maintained.

The classification of AFP is temporary. Within 90 days of onset, the case should be finally classified as polio, polio compatible or discarded as not polio.

Cases of AFP are classified as polio if

❖ Wild poliovirus was isolated from any stool specimen.

Cases of AFP without isolation of wild poliovirus may be classified as polio compatible.

❖ If stool sample was inadequate.

❖ Residual weakness was present 60 days after onset of paralysis or 60 days follow up was not done (due to death or absence).

❖ Expert review concludes that these cases could not be discarded as non-polio based on available data.

Reporting units-

There are 12 reporting units in the dist of Dhenkanal,

1.Dist Headquarter Hospital,

2.SDH- Kamakhyanagar, Hindol,

3.CHC- Sriram chandrapur, Anlaberini, Parjang,

4.Govt Hospital Bhuban,

5.PHC- Mathakargola, Birasal, Khajuriakata,Odapada, Beltikiri..

AFP cases reported in district of Dhenkanal.

Year	1999	2000	2001	2002	2003
Number of AFP cases reported	10	4	8	10	9

Wild viruses- nil.

Compatible case detected – nil.

Conslusion: All the vertical surveillance system should bemerged into one horizontal surveillance system. This year Government of India has planned to introduce Integrated disease Surveillane Program in Orissa in its second phase.

4. Secondary Data Analysis

1. Introduction:

Primary data: The first hand data or primary data is the number of cases and deaths due to diseases or any syndromes listed before and collected using a uniform formant at all reporting units.

Secondary data: The reports from the health worker male and female are compiled and sent to the sector levels and then compiled in each step and sent to the apex unit. These data are called secondary data.

2. Objectives of Analysis:

1. Identification of outbreaks or potential outbreaks.
2. Prediction of outbreaks based on comparison of time trends to initiate actions to prevent outbreaks.
3. Monitoring trends- Identification of disease occurrence rates over time.
4. Identification of high risk groups through comparison of levels of disease incidence between groups or places.
5. Assessment of the impact of intervention being taken at different levels within the district.
6. During the outbreak, analysis of the data identifies the most appropriate and timely control measures.

3. Analysis of the secondary data:

Here secondary data has been analyzed for these two diseases.

1. Bloody diarrhea.
2. Malaria.

3.1 Secondary data analysis of Bloody diarrhea:

3.1.1 Introduction:

Case definition: More than three to four loose motions with or without vomiting, with or without dehydration with visible blood in the stool is defined as bloody diarrhea.

Rationale of surveillance: To detect cases of Shigella, which has epidemic potential and high case fatality rate.

WHO recommended control objectives: Ensure clean water, case fatality less than 1%.

Surveillance objectives: Early detection of cases and prevention of outbreaks, monitoring incidence and case fatality rate.

Description of Bloody diarrhea: Here frank blood comes with liquid stool and mucous, with increased frequency, usually caused by Shigella group of organisms. Children less than 5 years are affected more than the adult cases and it affects all age groups and both sexes. It is transmitted by contaminated water.

3.1.2 Data: Data is collected for the age group 0 to 5 years and more than 5 years.

3.1.3 Method of data collection:

The weekly data from all the sectors are complied and written in a register under each PHC. From the register monthly data is calculated. By adding all the number of cases, new caseload in each month of the whole district is calculated. Attack rate per 10,000 populations between the age group (0-5) is calculated for each Primary Health Center and district for separate months. The attack rate is calculated for the population less than 5 and the total population, taking in to consideration the mid year population of the 0 to 5 year population and the total population respectively. Like this a line graph can be plotted for the total district. The line graphs of the PHC and the district can be compared for a particular year. This can show whether the attack rate in the particular Primary Health Center is more or less in comparison to the district. The attack rate of the Primary Health Center for consecutive years can be plotted and compared. It can show the trend in each month of the years, when it is rising and falling. If the attack rate is unusually high then we can predict an outbreak. We can predict the potential outbreak in each year from the yearly comparison graph and precaution can be taken. From the separate line diagrams for each PHC we can asses the high risk groups and the high risk areas.

3.1.4 Analysis:

Fig: 1 Attack rate of Bloody diarrhea among 0-5 year population

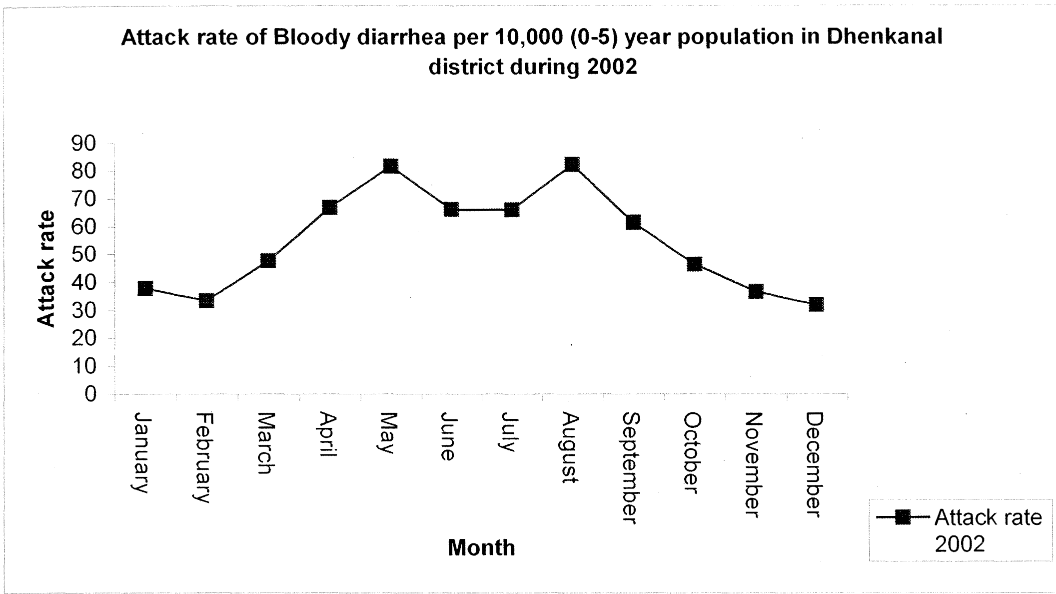


Table 4.1.Population & Attack Rate of Bloody diarrhea among children <5years. 2002 and 2003

Month	Cases 2002	Population 2002	Attack rate 2002	Cases 2003	Population 2003	Attack rate 2003
January	533	141053	37.78	640	141753	45.14
February	472	141053	33.46	668	141753	47.12
March	673	141053	47.71	639	141753	45.07
April	944	141053	66.92	751	141753	52.97
May	1153	141053	81.74	658	141753	46.42
June	934	141053	66.22	777	141753	54.81
July	933	141053	66.14	492	141753	34.71
August	1161	141053	82.31	870	141753	61.4
September	867	141053	61.46	771	141753	54.39
October	655	141053	46.44	809	141753	57.07
November	518	141053	36.72	497	141753	35.06
December	449	141053	31.83	524	141753	36.96

Figure 1 shows that the attack rate of the total district in the year 2002 from the month of January to the month of December asccording to the Orissa Multi Disease Surveillance system year. A line diagram has been plotted. This line diagram shows the Attack Rate has gradually increased and reached a peak in the month of May and again decreased and again reached a peack in the month of Augusust. The bloody diarrhea reaches a peak at the end of summer season and again increases during the Rainy season.

Fig: 2 A comparison of the Attack Rate of bloody diarrhea per 10,000 0 to 5 year population Dhenkanal sistrict during the year 2002 and 2003.

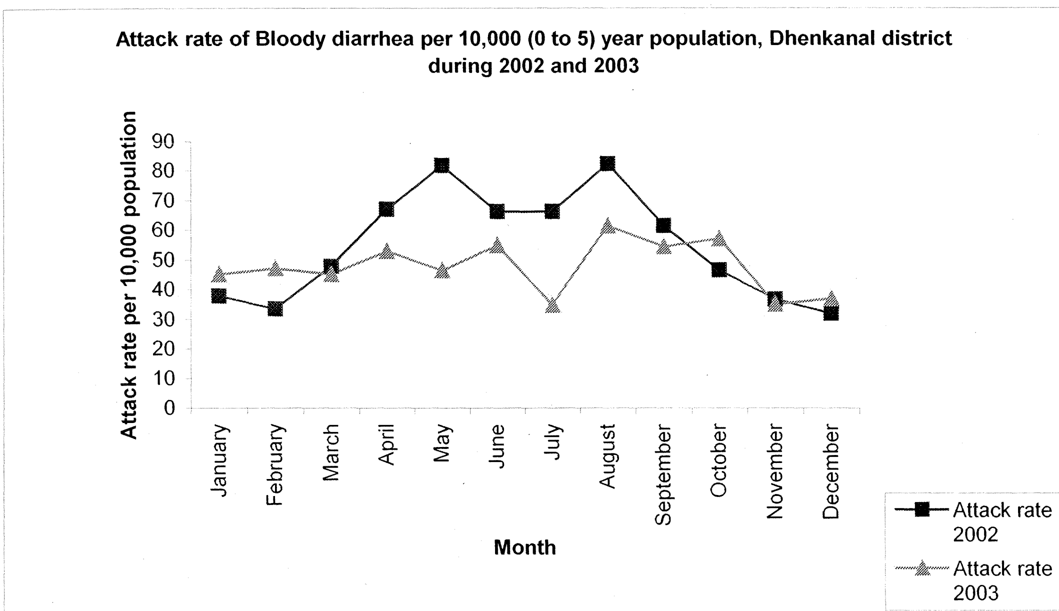


Figure No: 2 This graph shows a comparison line graph showing the attack rate of bloody diarrhea among the children below five years in the Dhenkanal district during the year 2002 and 2003. It shows same pattern in both the years as the attack rates have been reached their peak during the month of May 2002 but in 2003 during the month of June. Again the attack rates have been increased and reached the peak during August during both the years 2002 and 2003. It shows that the month of March, and July are important for the point of view of an outbreak of bloody diarrhea. These graphs can be compared with the graph of Orissa.

Figure No: 3 Shows the comparison between the attack rate of Dhenkanal and the state during the months from January to December 2002. The graph shows that the attack rates of the state is more than the Dhenkanal district as the district is a hilly area, and water supply is there in a number of villages. The two peaks of the district coincide with the peaks of the state in the month of May and August. The villages are not swampy still then, there is high attack rate. Necessary steps should be taken of reduce the attack rates.

Table No 4.2. Attack rate of Bloody diarrhea in Dhenkanal district & State of Orissa during 2002 and 2003 among 0-5 years children.

Months	Attack rate of Bloody diarrhea in Dhenkanal district, 2002	Attack rate of Bloody diarrhea in Orisssa during 2002
January	37.78	33.56
February	33.46	34.85
March	47.71	51.68
April	66.92	70.84
May	81.74	75.8
June	66.22	58.78
July	66.14	71.3
August	82.31	70.5
September	61.46	65.5
October	46.44	49
November	36.72	41.4
December	31.83	37.76

Fig: 3 Comparison between the attack rate of Bloody diarrhea among 0-5 year children in Dhenkanal district and the state of Orissa during the year 2002.

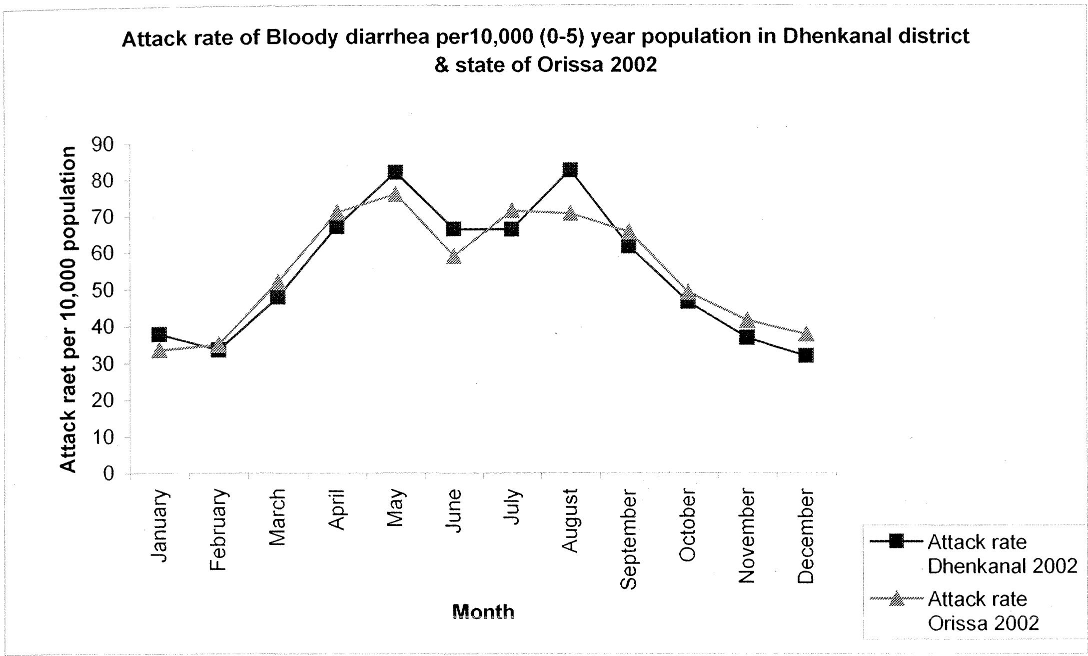


Fig: 4 A comparison of the attack rate of Bloody diarrhea among the 0-5 year children during 2002 and 2003 between Dhenkanal district and the state of Orissa.

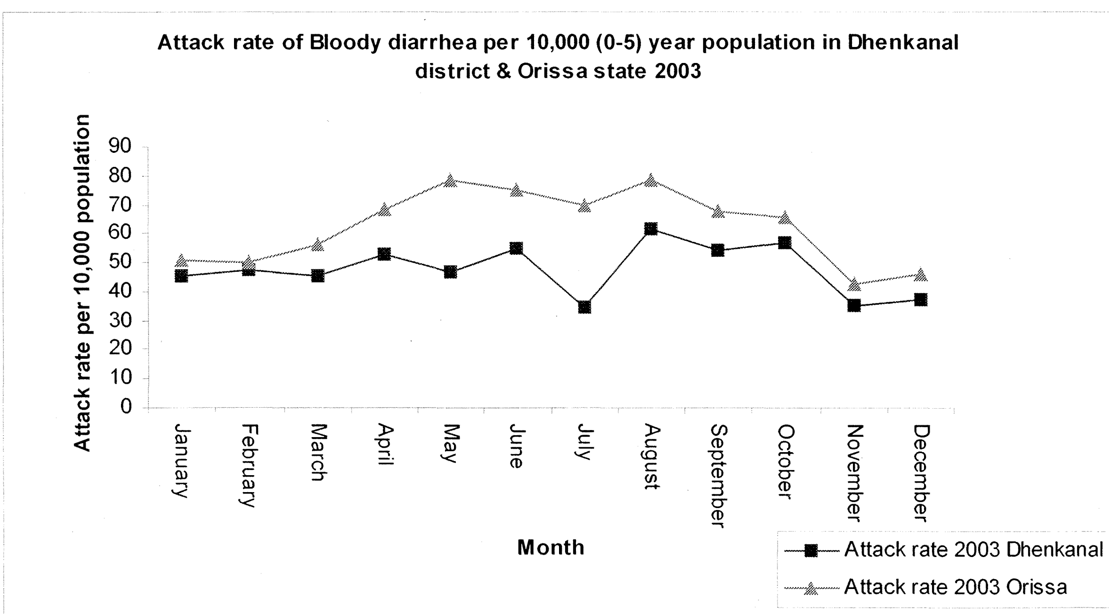


Figure No- 4 shows the comparison between the attack rate of Dhenkanal and the state during the months from January 03 to December 03 and the comparison between the attack rate of the district and the state coincides with each other. The graph shows that the attack rate of the state is more than the district and the peaks during the year coincide each other and the trend of the disease is that, the attack rate of bloody diarrhea increases in the month of May and August in the state of Orissa. So the health system should keep an eye during these two months to reduce the attacks.

Table: 5Attack rate of <5 yrs child population of Analaberini PHC, Dhenkanal, Orissa, 2002.

Month	Cases	Population 0- 5 years	Attack rate Anlaberini	Attack rate Dhenkanal	Attack rate Orissa
January	71	9388	75.63	37.78	33.56
February	65	9388	69.24	33.46	34.58
March	53	9388	56.46	47.71	51.68
April	128	9388	136.34	66.92	70.84
May	133	9388	141.67	81.74	75.8
June	79	9388	84.15	66.22	58.78
July	139	9388	148.06	66.14	71.3
August	68	9388	72.43	82.31	70.5
September	53	9388	56.46	61.46	65.5
October	73	9388	77.76	46.44	49
November	38	9388	40.48	36.72	42.4
December	57	9388	60.72	31.83	36.76

Fig: 5 Attack rate of Bloody diarrhea per 10,000 population during the year 2002 in the Beltikiri PHC, Dhenkanal district and the state of Orissa.

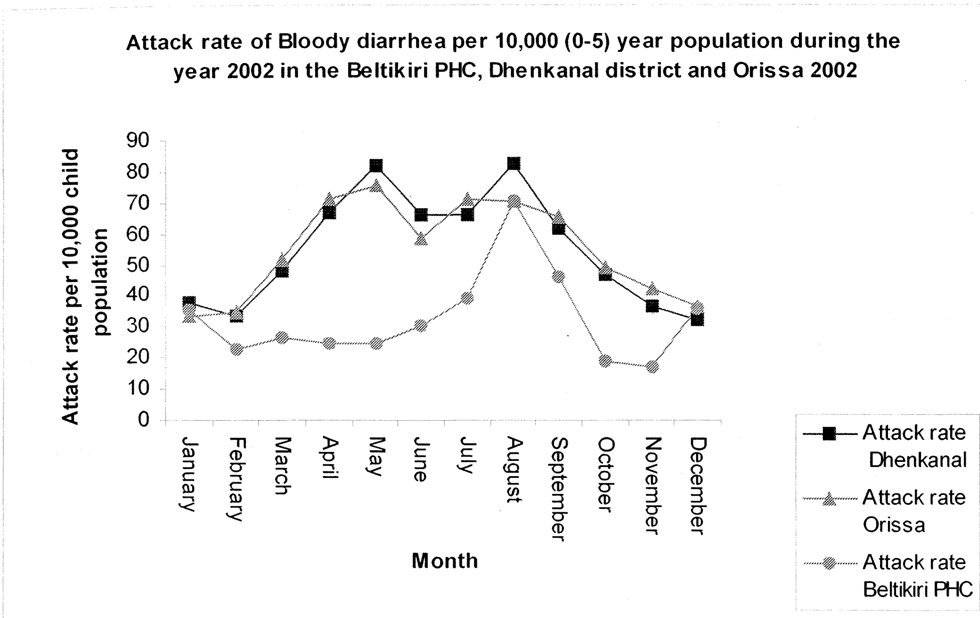


Fig: 5 shows that the trend of Bloody diarrhea among 0-5 year children in Beltikiri PHC, Dhenkanal district and the state of Orissa are similar. The attack rate in the Beltikiri PHC has been increased in the month of August. In the Beltikiri PHC there is only one preak in comparision to the double peaks in the district and state.

Malaria in Dhenkanal District:

Case definition of suspected malaria: A case of fever commonly but not always associated with chill, rigor, myalgia, sweating, headache, nausea or vomiting with or without blood smear collection will be considered as a case of suspected malaria. After the examination of the blood slide the case can be conformed whether it is conformed case or not.

Rationale of Surveillance: Major cause of morbidity/ mortality in endemic areas, high prevalence of falciparum malaria.

WHO recommended control objectives: Incidence at less than 10/1000 per month, case fatality rate at 1%.

Surveillance objectives: To monitor Incidence and case fatality rate.

Malaria is now a major health problem in the state of Orissa. Though the National Anti Malaria Programme is going in Orissa, still then the caseload is high. Orissa contributes approximately 20% of the total cases, 40% of the PF cases and 46% of the death due to malaria to the country. Another public health problem is for the Plasmodium falciparum malaria. In Orissa, in 2002 the PF% is 83.5%. This P.falciparum is the main cause of cerebral malaria and this is the main cause of death due to malaria. To tackle the malaria problem in the state EMCP has been implemented in 158 blocks out of 210 highrisk blocks of 21 districts of Orissa. Kankadahada has been declared as the EMCP block.

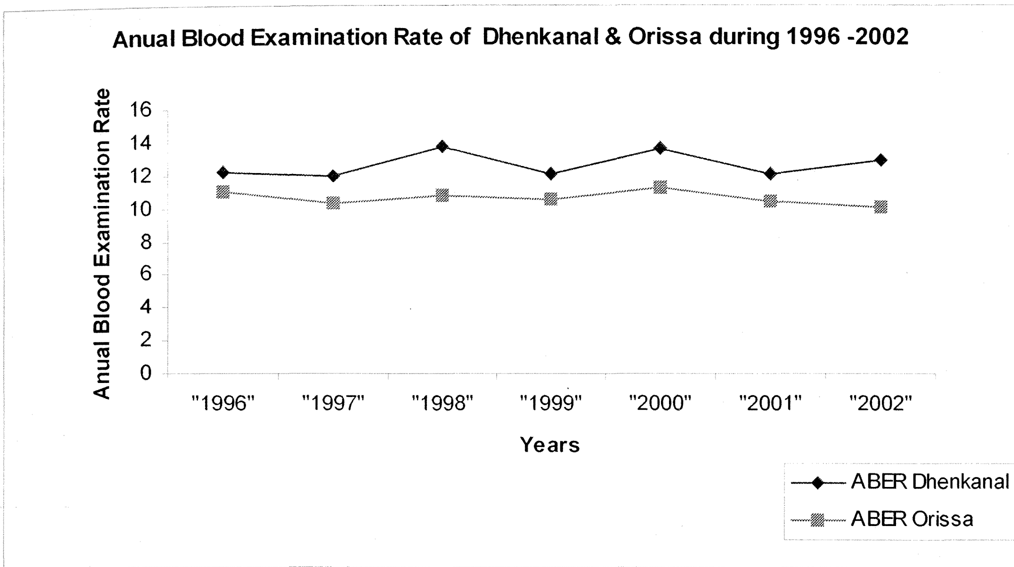
Analysis:

Epidemiological situation of malaria in Dhenkanal and the total state during 1996-2002 shows that, parameter of malaria surveillance like ABER, SPR are more in Dhenkanal in comparison to the whole state. But the PF% is less than that of Orissa.

Table: 5 Parameters of malaria in Dhenkanal district & Orissa from 1996 to 2002.

	Dhenkanal			Orissa		
Year	ABER	SPR	PF%	ABER	SPR	PF%
1996	12.2	18.3	74.2	11.05	11.83	86.33
1997	12	17.8	75.2	10.33	11.45	86.43
1998	13.7	18.4	78.1	10.82	12.14	85.45
1999	12.1	17.5	76.2	10.55	12.39	84.44
2000	13.6	17.7	73.5	11.27	11.89	84
2001	12.1	16.1	73.4	10.48	10.94	84.12
2002	12.9	15.8	73.6	10.1	10.8	83.5

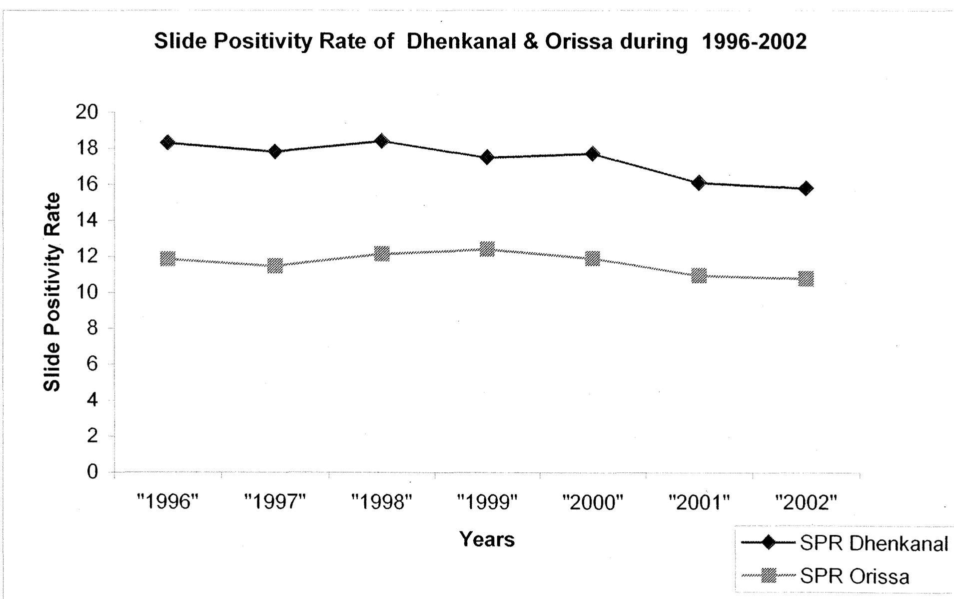
Fig: 6 Annual Blood Exammination Rate of Dhenkanal and Orissa from 1996 to 2002



This parameter shows the efficiency of case detection mechanism. A minimum ABER of 10% is fixed under Malaria Eradication Program.

Annual Blood Examination Rate is more or less similar throughout these 7 years. The Annual Blood Examination Rate is higher than that of the state through out the seven years (Figure: 6).

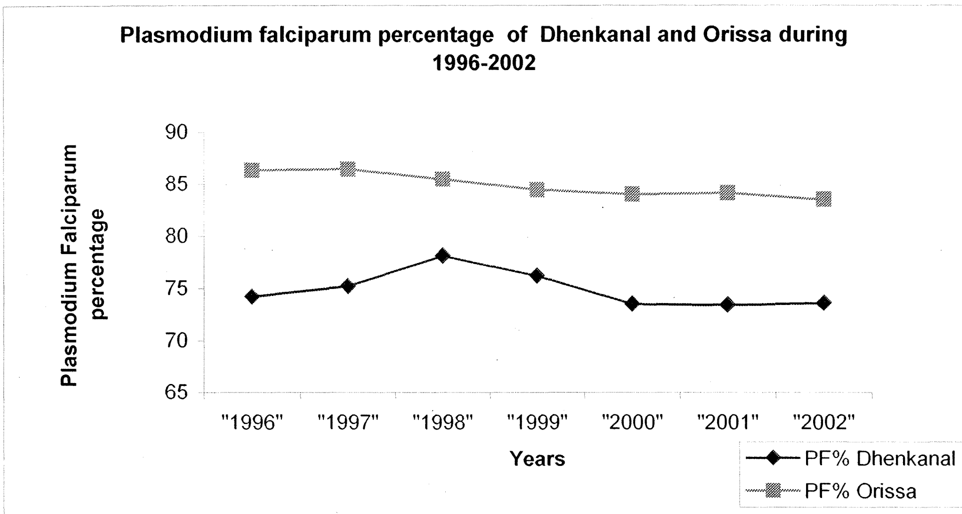
Fig: 7 The Slide Positivity Rate of Dhenkanal district and Orissa during 1996 to 2002



Slide Positivity Rate (SPR).

It gives the information about the trend of malaria transmission. This is a dependable parameter to determine the progress of containment measures and this gives information about the parasite load in the community. Slide Positivity Rate (SPR) of Dhenkanal district is gradually coming down after the year2000. In 2000 the SPR was 11.89 and now it comes down to 10.1. The SPR of Dhenkanal is very much higher than that of Orissa. It shows that the caseload of Dhenkanal district is very much higher than that of the total district. After the implementation of EMCP the rate may have been decreased.

Fig: 8 Plasmodium falciparum percentage of Dhenkanal district and the state of Orissa during 1996 to 2002.



PF% (Plasmodium falciparum Percentage)

This shows the proportion of P.falciparum to total case load of malaria parasite. Plasmodium falciparum percentage of Dhenkanal is less than Orissa. Still then it is high. From 1996 it was gradually increasing, but after 1998 it has been decreased up to 2000, and then it remained same. In the state the PF% is gradually decreasing but very slowly. From the ABER, SPR, PF% it may be concluded that the caseload of malaria in the district Dhenkanal is very high, but it may be due to the caseload of Plasmodium vivax.

Recommendation: The high-risk areas and high risk PHC should be identified and spraying should be done properly. Spray should be evaluated thoroughly. Surveillance system should be strengthened. IEC should be done properly, that the people should always use mosquito net, mosquito repellants. They should come forward for the examination of their blood slide for malaria whenever they suffer from fever. People should be advised to take the dose of Chloroquine in each fever. Drug Distribution Center and Fever Treatment Depoe has been opened in each village. The programmes should be evaluated properly. Insecticide impregnated mosquito net should be supplied to every family, and the use and how to reimpregnate with insecticide, what is it's usefulness should be taught to the people.

SECTION-2

SECOND

FIELD POSTING

1. Cost effectiveness analysis of case detection in Modified Leprosy Elimination Campaign, Orissa, 2003

1. Introduction:

An endeavor was made to do a cost effective analysis of the Modified Leprosy Elimination Campaign (MLEC) program of the state of Orissa just before one MLEC shortly to be carried out. Mr. Radha Kanta Samantaray and Mr Nimain Charan Sethi assisted me for the preparation of the project.

Leprosy [Hansen's disease] is a chronic infectious disease caused by Mycobacterium Leprae, which affects mainly the peripheral nerves. It also affects the skin, muscle, bones, testes and internal organs.

2. Study area: Total district of Dhenkanal is taken as study area and all the PHCs, CHCs of Dhenkanal district have been taken as units. Total Dhenkanal district has been taken in to account to avoid the variation of prevalence rate in individual PHC / CHC in the district. The prevalence rate of district area is the average of all the PHC & CHC.

3. Subject:

Here only the expenditure for case detection has been taken into account. Other countries free of cost supply Multi Drug Therapy, so that the cost of drugs, expenditure of transportation of drugs has not been taken in to account in this study.

4. Study Method:

In MLEC-4, 660 Leprosy cases have been detected through out the district using the method "Information Education Communication (IEC) followed by Voluntary

Reporting of Cases (towns), active search (area other than towns)" & we can get the actual cost for unit case detection. We might have used other methods for case detection.

By using other strategies for case detection if we get the same 660 cases, then we can find which method is cost effective among all the methods.

5. Description of the program MLEC 4:

1) There is training for the medical officers of PHC/CHC/PHC [N], the health supervisors, Block Extension Educator [BEE], pharmacist, paramedical worker, health worker male and female in the district headquarter. The Medical Officer PHC/CHC train the Anganwadi workers, and others volunteers in the PHC/ CHC before the program.
2) There was IEC before the active search for cases in the villages and schools.
3) After one week of intensive IEC there was Voluntary Reporting of Cases [VRC] in Dhenkanal town and active search for cases in the rest of the district. Interactive stalls were opened in market place in Dhenkanal town.
4) Voluntary Reporting of Cases [VRC]: In the Dhenkanal town Voluntary Reporting Centers were opened for two days each. Centers were opened in all dispensaries in the town and within three to four wards. The officials in the Voluntary Reporting of Cases [VRC] who performed their duties in their own place of posting they were not paid any allowance. The officials in the Voluntary Reporting of Cases [VRC] who were deputed outside their place of posting for which traveling allowance and per Diem were paid.

5) Active search for cases in the villages was as in the previous MLEC and each search team consisted of 3 members viz. two health workers, one male and one female and one volunteer from the same local villages. Each search team covered 3000 to 4000 population in 6 days. The volunteer was one for each village. The honorarium was according to the days of assistance given.

   A conformation cum supervision post is opened over each 5 to 10 search teams. These confirmation posts are manned by one Medical Officer and one Health Supervisor/ Para Medical Worker [PMW, who is a vertical staff].

Interactive stalls were opened in Haata Bazaars [common market places] in the district where the prevalence rate (PR) > 5 / 10,000 population,

There is Haata Bazaars average 1 in 10 villages. One Health Supervisor, one HW, open a stall there for one day and voluntary reporting is there.

Supervision by the district health authorities as Assistant District Medical Officer (ADMO), Chief District Medical Officer (CDMO) throughout the district

MLEC 4 is In short IEC followed by VRC in town area and active search in all other areas.

6. Alternative Methods for Case Detection:

1. Inter Personal Communication (IPC) for one month and in the last week there will be voluntary reporting of cases for two days.
2. Inter Personal Communication (IPC) and active search for six days.
3. Information Education and Communication (IEC) for one week & active search for six days.
4. Both IEC and IPC for one month, then

URBAN [City with 2,00000 population]	RURAL [Blocks excluding town with >2,00000 population]	
	PR<5/10,000 population	PR>5/10,000 population
VRC + LEC in slum areas	VRC in all areas + SAPEL in selected pockets with PR>3/10,0000 population	Active search

5. IEC for one week and voluntary reporting for two days.

Strategy 0- (MLEC–4) Information Education and Communication (IEC) one month followed by VRC in town area and active search in all other areas.

Strategy 1- IPC for 6 days and there will be voluntary reporting of cases for one month.

Strategy 2- Inter Personal Communication (IPC) and active search for six days.

Strategy 3- IEC for one week & active search for six days by health workers and volunteers and confirmation by the confirmation team, VRC in town areas.

Strategy 4-One hypothetical situation for the district as there is no such PR distribution, but it is an ideal method for case detection and this situation may be present in some other districts.

Strategy 5- Information Education and Communication (IEC) for one week and voluntary reporting for two days.

Then we will see the cost effectiveness of all these strategies taking in to account to all types of fixed, semi variable and variable costs. Here we shall not take in to account to the cost of drugs supplied to the patients, as this will be the same for all the strategies.

7. Cost effectiveness of Strategy- 0

7.1 Variable costs:

1. Information Educations and Communication.
2. Active search and Passive search [VRC].
3. Mobility for DOL in Government vehicle or hired vehicle if Government vehicle is not available.
4. Miscellaneous, 0.5% of the total cost.

7.1.1. Information Education and Communication through out the district.

Meeting and launching meeting = Rs3000/-

Hatta Bazaars [common market places] and stalls = Rs32025/-

Mike announcement = Rs20000/-

Hoarding [2] = Rs2000/-

School IEC = Rs38400/-

School IEC:

Table: 1 Cost for School Information Education and Communication (IEC)

No of PHC	High School				Middle School				Primary School				Hand bills @ Rs2000/ PHC	Cost of certificates	GRAND TOTAL
	Number @ 1/ PHC	Cost of Prizes @ Rs600/-	Per Diem to staff	Total cost	Number @ 2 /PHC	Cost of Prizes @	Per Diem to staff	Total cost	Number @ 4/PHC	Cost of Prizes @ Rs450/-	Per Diem to staff	Total cost			
8	8	Rs4800	Rs2160	Rs6960	16	Rs7200	Rs2720	Rs9920	32	Rs14400	Rs5440	Rs19840	Rs16000	Rs1680	Rs38400

Cost of leaflet, banners, posters = Rs10, 000/-

Total amount of expenditure for IEC = Rs3000 + Rs32025 + Rs20000 + Rs2000 + Rs38400 + Rs10000 = Rs105425/-

7.1.2. Active search and passive search [VRC]

Per Diem of Confirmer / day = Rs70/-

Per Diem of Supervisor / day = Rs50/-

Per Diem of Health Worker [M/F] = Rs35/-

Each volunteer is to be paid Rs50/- for 3 days work.

Per Diem of ADMO/ CDMO / day = Rs100/- for 10 days.

1 Supervision Team per 30,000 population in Non Tribal area & 20,000 population in Tribal area = 1 Confirmer and 1 Supervisor.

1 Search Team per 5,000 population in Non Tribal area & 3,000 population in Tribal area = 1 HW Male, 1 HW Female, 1 Volunteer

1 Volunteer per 500 populations in Tribal areas and 800 populations in Non-Tribal areas

7.1.2.a Per Diem for active search:

ADMO [PH] & CDMO		Conformer		Supervisor		Searchers		Volunteers		Diagnostic cards	Total amount
No	Amount	No	Amount	No	Amount	No	Amount	No	Amount	Amount	
2	2000	39	16380	39	11700	410	86100	1283	64150	420	180750

7.1.2.b Per Diem for voluntary reporting center.

There were 3 VRC outside the dispensary or hospital; so the Medical Officer, Health Supervisor, Health Worker male and female had to go outside the area and paid Per Diem Rs140. So total Per Diem is = Rs420/-

7.1.2.c Cost of interactive stall in haata or common market.

Common markets or Haata Bazzar are there, average 1/ 10 villages.

There are 1056 villages or average 105 Bazaars in the district.

For one stall the Per Diem of health supervisor is Rs50/- and health worker Rs35.

Cost of interactive stalls in haata bazzar.

PR on March 02	No of villages	Haata @ 1/10 villages	Stall 1 visit per Haata	Per Haata Bazaar Cost					Grand Total
				DOL 10 liters for 1 day @ Rs23.50	Per Diem to Driver for 1 day @ Rs35/-	Per Diem to Supervisor for 1 day @ Rs50/-	Per Diem to HW for 1 day @ Rs35/-	Total	
13.97	1056	105	105	235	35	50	35	305	32075

Total expenditure for Haata Bazaar interaction is Rs32025/-

7.1.3. District wise Details of Fund Requirement for Mobility Support.

DLO, ADMO [PH] & CDMO			Searcher/conformer /supervisor			IEC Activities			Grand total		
No of vehicle	Days	Amount	No of vehicle	Days	Amount	No of vehicle	Days	Amount	No of vehicle	Days	Amount
2	10	5400	16	6	25920	2	25	13500	20	41	44820

Cost of diesel is Rs23.50 per liter and per Diem to driver is Rs35.

7.1. Variable cost:

IEC including mass media, meeting & printing cost= Rs105425

Counseling charges for search & VRC= Rs180750

Mobility support= Rs44820

Hattabazzar= Rs32025

Total is Rs 383020, miscellaneous is 5%, Grand total is Rs364935

7.2. Semi Variable Cost:

7.2.a Orientation training [1 day] including Traveling Allowance / Per Diem.

Trainers per batch [3 trainers] = [TA - Rs300] + [Per Diem - Rs300] + [Lunch {3trainers + 2 supportive staffs} @ Rs40 =Rs200] = Rs800/- + Miscellaneous expenditure per each day's training- Rs500 = Total Rs1300/-

Health personel	TA	Per Diem	Lunch	Total
Medical Officer	Rs70	Rs70	Rs40	Rs180
Health supervisor/ BEE/ Pharmacist	Rs50	Rs50	Rs40	Rs140
Health worker	Rs35	Rs35	Rs40	Rs110
Volunteer	0	Rs25	Rs40	Rs65

7.2.a.1 Training of Medical Officers [47 in number] in 2 batches is Rs11060/-

7.2.a.2 Training of Health Supervisor/ BEE/ Pharmacist [77 in number] in 2 batches expenditure is Rs13380/-

7.2.a.3 Training of Health Workers [300 in number] in 10 batches expenditure is Rs46000/-

7.2.a.4 Training of Volunteers [1330 in number] in 10 batches expenditure is Rs86450/-

Trainers in 8 PHC/ CHC in total 44 sessions = Rs240X44 = Rs10560/-

Miscellaneous expenditure in 44 session= Rs150/- X 44 = Rs6600/-

7.2.a.4 Total expenditure in the training of the volunteers = Rs103610/-

7.2.a Total amount of expenditure for Orientation Training = Rs174050/-

Usually the training is given each year and training is utilized for total service period for searching and diagnosis of cases, except the volunteers. We can take average service period 10 years. So we shall take 120th part of the expenditure for MLEC.

Amount of expenditure for Orientation Training = {[Rs174050-Rs103610]/ 120} + Rs103610 = Rs587+ Rs103610 = Rs104197.

7.2.b Salary of the manpower for the period.

7.2.b.1 CDMO:

30% work hours is devoted for MLEC for supervision for 10 days.

Cost per day- $\frac{\text{Salary per month}}{30}$ X 30% = Rs19, 800 = Rs198/-

Cost during training = 5% work for 14 days

Cost during meetings, Inauguration of MLEC, Press conference = 40% work for 3 days

Cost during IEC = 5% of daily salary X 15 days.

Cost for supervision = Rs198X10 = Rs1980/-

Cost during meetings = (Rs19800/30) X 40% X 3 = Rs792/-

Cost during training = (Rs19800/30) X 5% X 14 = Rs660 X 0.7 = Rs462/-

Cost during IEC = (Rs19800/30) X 5% X 15 = Rs660 X 0.75 = Rs495/-

7.2.b.1 Cost of CDMO in MLEC in context to salary = Rs3729/-

7.2.b.2 Assitant District Medical Officer (Public Health)

60% work hours is devoted for MLEC for supervision for 10 days.

Cost per day- $\frac{\text{Salary per month}}{30}$ X 60% = Rs370/- (if salary is Rs18500 per month).

Cost for supervision = Rs370/-X10 = Rs3700/-

Cost during training = 75% work for 14 days = Rs6475/-

Cost during meetings Inauguration of MLEC, Press conference = 40% X3 days= Rs740/-

Cost during IEC = 5% X 15 days = Rs462.50/-

. File processing 18 working hours = 2 days work = Rs18500 X (2/30) = Rs1233/-

7.2.b.2 Cost of ADMO (PH) in MLEC due to salary = Rs12610/-

7.2.b.3. Medical Officer In Charge of 8 PHC/ CHC:

Salary per month of 8 PHC/CHC MO in charges is = 104000

Cost of total work hours per day- Salary per month/ 30 = 104000/30 = 3466.60

50% working hours is devoted for MLEC for supervision for 6 days.

7.2.b.3 (a) Cost of supervision in 8 PHC/CHC = [104000/30] X 50% X 6 = Rs10400/-

7.2.b.3 (b) Costs during achieving training in district headquarter of 8 MO I/C

80% of work hours for 1 day = [104000/ 30] X 80% = Rs2773/-

Cost of receiving training in context of salary is Rs2773/-, but they utilize it throughout the service [average 5 years] and particularly in MLEC for giving training to the volunteers for one month.

So the expenditure is Rs2773/{1/[12 X 5]} = Rs46.20

Cost during giving training to 44 batches of volunteers [5 batches in 4 PHC, 6 batches in 4 PHC = 30% work hours/ 1 day

Cost during training 5 batches [4 PHC] = [57000/30] X 30% X 5 = Rs2850/-

Cost during training 6 batches [4 PHC] = [57000/30] X 30% X 6 = Rs3420/-

7.2.b.3 (c) Cost during giving training to 44 batches = Rs2850/- + Rs3420/- = Rs6270/-

7.2.b.3 (d) Cost during IEC = [104000/30] X 5% X 15 days = Rs2600/-

Cost during supervision = Rs10400/-

Cost during getting training = Rs46.20/-

Cost during giving training to volunteers = Rs6270/-

Cost during IEC = Rs2600/-

7.2.b.3 Cost of MO/IC of PHC/CHC in MLEC due to salary = Rs19316/-

7.2.b.4 File regarding MLEC processing:

48 working hours of BEE 6 days work of BEE = [Rs7500/ 30] X 6 = Rs1500/-

6 days work of accountant = [Rs7200/ 30] X 6 = Rs1440/-

7.2.b.4 File of MLEC processing in PHC/CHC = Rs2940/-

7.2.b.5. Cost of conformers [medical officers, supervisors]:

7.2.b.5 (a) Cost of conformers [Medical Officers]:

80% working hours is devoted for MLEC for conformation for 6 days.

Cost per day- (Salary per month / 30)X 80%

Salary per month of 39 confirmers [Medical Officers] is = 468000

Cost of conformation= [468000/30] X 80% X 6 = Rs74880/-

7.2.b.5 (b) Cost during achieving training in district headquarter of 39 MO:

80% of work hours for 1 day = [468000/ 30] X 80% = Rs12480/-

As the training is for the total service period and for conformation of cases in MLEC training cost for one month is taken in to account. Average service period is 10 years. Training cost for MLEC is 120^{th} of the amount = 12480/120 = Rs104/-

Cost of conformation by MO = Rs74880/- + Rs104/- = Rs74984/-

7.2.b.5 (c) Cost of Conformators [Health Supervisors]:

100% working hours per day is devoted for MLEC for conformation for 6 days.

Salary per month of 39 confirmators [Supervisors] is = Rs292500

Cost of confirmation= [292500/30] X 6 == Rs58500/-

Costs during achieving training in district headquarter of 39 Supervisors:

100% of work hours for 1 day = [292500/ 30] = Rs9750/-

As the training is for the total service period and for conformation of cases in MLEC training cost for one month is taken in to account. Average service period is 5 years. Training cost for MLEC is 60th of the amount = [292500/30]/ 60 = 162.50

7.2.b.5 (d) Cost of conformation by Supervisor = Rs58500/- + Rs163/- = Rs58663/-

7.2.b.5 Cost of conformation team by Medical Officers & Supervisors = Rs133647/-

7.2.b.6 Cost of Searchers:

100% working hours per day is devoted by Health Worker Male and Female & volunteers for MLEC for searching for 6 days.

Salary per month of 300 searchers HW [M&F] is Rs1800000

Cost of searching = Rs360000/-

As the training is for the total service period and for conformation of cases in MLEC training cost for one month is taken in to account. Average service period is 10 years. Training cost for MLEC is 120th of the amount.

Costs during achieving training in district headquarter of 300 HW [M&F] for searching of cases in MLEC = (Rs1800000 / 30)X 1/120 = Rs500/-

7.2.b.6 Cost of Searchers [HW] = Rs360000/- + Rs500/- = Rs360500/-

Cost of Searchers [volunteers] = It has already been added Rs50/- for 3 days of searching.

7.2.b.7 Cost of driver in context to salary:

The driver for MLEC for conformation, supervision, haata bazaar stall and VRC devotes 100% working hours per day.

2 drivers for supervision by ADMO and CDMO for 10 days = [6500/30] X2 X 10 = Rs4332/- (taking salary per month of a driver in average Rs6500/-)

During conformation and supervision, 8 Government vehicles from PHC/CHC, 1 Government vehicle is used in Haata Bazzar stall.

7.2.b.7 (a) 9 drivers for conformation for 6 days = [6500/30] X 9 X 6 = Rs11696/-

7.2.b.7 (b) During IEC 2 Government vehicles for 25 days were used.

2 drivers for IEC for 25 days = [6500/30] X 2 X 25 = Rs10825/-

7.2.b.7 Cost of driver in context to salary = Rs4332 + Rs11696 + Rs10825 = Rs26853/-

7.3.1. Cost of the jeeps [Annualization]

Annualization cost of one jeep:

Cost of one jeep- Rs300000/-.

Annual cost of the jeep = $\dfrac{r\,(1+r)^{n} \text{ X Current value}}{(1+r)^{n} - 1}$

r = Discount rate taken as 6% in this study.

n = Number of years= 15 years.

Annual cost of the jeep = $\dfrac{6\,\%(\,1+6\%)^{15} \text{ X } 300000}{(1+6\%)^{15} - 1}$ = 30894

Per day cost of the jeep = 30894/ 365 = Rs84.64

For supervision by ADMO, CDMO – 2 jeeps for 10 days each.

- Cost of the 2 jeeps for 10 days = (30894/ 365) X 10 X 2 = 84.64 X 20 = Rs1693/-
- 9 vehicles for conformation for 6 days = Rs84.64 X 9 X 6 = Rs4570.50
- 2 vehicles for 25 days for IEC = Rs84.64 X 2 X 25 = Rs4232/-

7.3.1 Cost of the jeeps used = Rs1693/- + Rs4570.50 + Rs4232/- = Rs10495/-

7.3.2. (a) Cost of the training halls.

District Headquarter - The training program is done in a hall, hired from Rotary Club. Its cost has been added in the miscellaneous cost.

7.3.2. (b) PHC/ CHC. According to the house rent per month the cost of the hall is calculated. The rent of the houses in these areas is Rs1/- per square feet and the halls are 300 square feet each. Per month the rent of the hall is Rs1/- X 300 = Rs300/-.

Per day the cost = Rs300/ 30 = Rs10/- or for one batch cost = Rs10/-

Per 44 batches the cost for halls = Rs10/- X 44 = Rs440/-.

7.3.2. (c) Electricity

For 1200 square feet the charge is Rs300/- permonth. For 300 square foot the electricity charge for one month = Rs300 / 4 = Rs75/-.

For one day cost of electricity is Rs75/ 30 = Rs2.50.

For 44 batchs or 44 days, cost of electricity is Rs75/ 30 = Rs2.50 X 44 = Rs110/-.

7.3.2. Cost of the training halls of PHC/ CHC, electricity = Rs550/-

7.3.3 (a). Dispensary

Ten square feet place is used for keeping the records and the drugs used for Leprosy patients. So the cost for one month is Rs10/-.

3 (b). Electricity – It has not been used.

7.3.Fixed cost for MLEC 4 - Rs10495/- + Rs550/- + Rs10/- = Rs11055/-

Total cost of case detection in MLEC 4 = Semi variable cost + Variable cost + Fixed cost = Rs733792 + Rs364935 + Rs11055 = Rs1109782

Now it is to be calculated, how many cases detected during the MLEC 4 and how much money is spent for detection of one case.

	Paucibacillary	Multibacillary	Total
Active search	460	184	644
VRC	2	3	5
Stall	5	4	9
Hatta Bazaar	2	0	2
Total	469	191	660

660 cases were detected during the MLEC 4 from 30.1.03 to 5.2.03.

Total cost of case detection in MLEC 4 = Rs1109782/-

Cost of detection of 660 cases is Rs1109782/-

Unit cost of case detection is Rs1682/-.

8. STRATEGY 1

STRATEGY 1: Inter Personal Communication (IPC) for one week and within one month there will be voluntary reporting of cases (VRC) for two days. In municipality and Notified Area Council there will be L.E.C.

Guidelines:

IPC Team- 1 team per 500 populations in tribal & 800 populations in plain area. 1 Team consists of Anganwadi worker, Ward member, SHG member/ Local volunteer.

No of teams for one sub center with 3000 to 5000 populations.

Tribal – Teams 3000/ 500 = 6 teams and number of team members = 6 X 3 = 18.

Non-tribal – 5000/ 800 = 6 teams and number of team members = 6 X 3 = 18.

Implementation period house to house visit for IPC- The team will hold village level meetings at each ward and sensitize the village people to propagate the massage of early signs of Leprosy and availability of diagnosis and treatment facilities at Sub-center/ PHC.

Per Diem for Health Worker

Rs100 was paid to HW after completion of visit of all villages/ conformation of all suspects / Registration of all conformed cases.

Total Rs100 X 2 = Rs200/ Sub-center.

Referral slip- 4 number per sub-center.

Reporting format – 1 per each village = 6.

Miscellanous expenditure = Rs5/ Sub-center.

Training and Orientation:

- All IPC team members will be oriented about leprosy and conduction of IPC at village level.
- The training will be undertaken at Sector level by MO PHC/ Para medical worker.
- Health Worker will also attend training.
- MO- PHC will be the resource person at Block level.

Financial Guidelines for Orientation and Training.

18 personnel per Sub-center + 2 Health Worker + 1 Supervisor = 21.

Resource Person = 1 and supporting staffs = 2.

Per Diem (PD) per participants - Rs50 X 23 = Rs1150.

TA per participants Rs10 X 23 = Rs230.

Training material Rs10/ participant X 23 = Rs230.

Resource persons at Block level

PD to resource person – Rs70/ day = Rs70.

Working launch- @ Rs30 per head = Rs720.

Miscellaneous- Rs200.

Total cost for training per Sub center = Rs2600/ sub center.

TA, Per Diem for IPC Team = @ Rs100 per team member after completion of HWs visit.

TA, Per Diem for IPC Team of 1 sub center = Rs100 X 18 = Rs1800.

Per Diem for HW = Total Rs100 X 2 = Rs200/ SC.

Ref. slip- Rs 4/SC and Reporting format – Rs1/ village = Rs 5 / sub-center

Sl No	IEC materials	Rupees
1.	Flash cards 18/Sub center	Rs36
2.	Calendars 1000	Rs1000
3.	Poster 10	Rs50
4.	Tin Plate 1/Sub center	Rs50
5.	Total of IEC	Rs1136/sub center
6.	PD to supervisor @ Rs50/ day for 2 days	Rs100
	Supervision	Rupees
1.	I/C MO PHC for 1 day	Rs75/ day = Rs75
2.	MO PHC (FW) for 1 day	Rs75/ day = Rs75
3.	LEU MO for 1 day	Rs75/ day = Rs75
4.	DOL- 15 liters/ day (Rs23.50/lts) for 2 days	15 X 23.50 X 2 = Rs705
5.	Per diem for drivers	2 X 35 = Rs70
6.	Total of supervision	Rs1000
	Grand total	Rs6841

DOL and per diem to drivers are adjusted as the expenditure of the Government jeep, driver and the rest is expended in hiring of vehicles for the visiting of the rest sub centers. Within it training is semi variable cost and others are variable cost.

8.1 Variable cost:

Variable cost per sub center = Rs6841 - Rs2600 = Rs4241.

In Dhenkanal there are 166 sub centers.

Total cost for the Dhenkanal District = Rs4241 X 166 = Rs704006.

Mobility of ADMO (PH) and CDMO

Supervision for 8 blocks of the total districts = 8 days each, total 16 days.

DOL 10 liters/ day (Rs23.50/lts) = Rs3760.

Per Diem of ADMO/ CDMO Rs100/day X 16 days = Rs1600.

Per Diem of driver Rs35/ day X 16 days = Rs560.

Total cost of mobility of ADMO/ CDMO = Rs5920.

8.1. Variable cost = Rs704006 + Rs5920 = Rs709926.

8.2. Semi variable cost [Salary of the Man power for the period]

8.2.1Orientation Training [1 day] including TA/ Per Diem

Trainers per batch [3 trainers] = [TA Rs300] + [PD Rs300] + [Lunch {3trainers + 2 supportive staffs} @ Rs40 =Rs200] = Rs800/- + Miscellaneous expenditure per each day's training- Rs500 = Total Rs1300/-

Medical Officer [MO]= [TA- Rs70] + [DA-Rs70] + [Lunch-Rs40] = Rs180/-

Training of 47 Medical Officers in 2 batches.

Cost of Training of 47 medical officers in two batches is Rs11060.

Training of IPC team = In 166 sub centers.

In each sub center expenditure is Rs2600.

As the training is for the whole service period taking the average rest service period 10 years, we will take cost of one month in to account.

Cost of one month = 1/120 of the total training cost.

Total training cost of 2 HW and 1 Health Supervisor = [Training cost of the Sub center / 21] X 3 = [Rs2600/21] X 3 = Rs371.

1/120th of the cost will be taken in to account; that is Rs3.

Training cost for each sub center = Rs2600 – Rs371+Rs3 = Rs2232.

For the district the training cost for the IPC teams = Rs2232 X 166 = Rs370512.

8.2.2. Salary component:

8.2.2 a CDMO in context of salary: 30% work hours is devoted for MLEC for supervision for 8 days, cost during meetings, inauguration of MLEC, press conference is 40% of daily duty for 3 days , cost during IPC = 5% of daily duty for 7 days, cost during training is 5% of daily duty for 2 days. Monthly salary is taken same as strategy 0.

8.2.2.a. Cost of CDMO in MLEC due to salary = Rs2673/-

8.2.2.b ADMO (PH) :

60% of daily work hours are devoted for MLEC for supervision for 8 days, cost during training is 75% work for 2 days, cost during meetings with Collector, Inauguration of MLEC, Press conference is 40% of every days work for 3 days, cost during IEC is 5% work for 7 days, file processing 18 working hours for 2 days work

8.2.2.b Cost of ADMO (PH) in MLEC due to salary = Rs6074/-

8.2.2.c Medical officers [47 in number]

Average salary of 1 Medical Officer per month = Rs13000.

50% of the daily working hours is devoted for supervision for 1 day to 1 sub center.

Cost of supervision by MO, 166sub centers twice each= Rs71933.

Costs during achieving training in district headquarter of 47 Medical Officers = 80% of work hours for 1 day is Rs16293/-, but they utilize it throughout the service [average 15 years] and particularly in MLEC for giving training to the volunteers for one month.

So the expenditure of achieving training is Rs16293 X {1/ [12 X 15]} = Rs90.

Cost during giving training to 166 sub centers = 30% work hours/ 1 day = Rs21580.

Cost during supervision = Rs71933/-

Cost during getting training = Rs90/-

Cost during giving training in sub centers = Rs21580/-

8.2.2.c Total cost for MO in context with salary in the total district = Rs93603.

8.2.2.d Salary of MO [LEU]

Per month salary is average Rs13000 per month.

To every PHC/CHC there is supervision for 2 days each; total days of supervision are 16 and in each day of supervision 60% work hours are expended, supervison cost is Rs4160

8.2.2.e Salary of Health Supervisors [39]

Per sub center 2 days of supervision and 60% of work hours per day are utilized.

Salary per month = Rs7500.

332 supervisions cost by Health supervisor = Rs49800.

Training cost has been added before.

8.2.2.f Health Worker Male and Female [300]

Training cost has been added before.

The 300 health workers have to visit 1247 villages.

Each health worker visits average 4 villages.

Per day the health worker expends 60% of total work hours.

Total cost of helath worker male & female = [Rs7200/ 30] X 60% X 1200 = Rs172800.

8.2.2.g Salary of drivers during the MLEC-

Per month the driver gets average Rs7500 and total work hours per day costs Rs250.

Each sub center needs 3 days of supervision.

Total number supervisions by Government jeep = 16+16+80 = 112 days.

Per day the driver expends 80% of his work hours in supervision.

Cost of supervision in context to driver's salary = 112 X [Rs250 x 80%] = Rs22400.

8.2. Semi variable cost for MLEC [Strategy-1] = Rs733082.

8.3. Fixed cost for the MLEC [Strategy-1] -

Same as in strategy-0.

8.3.1. Cost of the jeeps [Annualisation]-

Annualisation cost of one jeep as before, for 116 days the cost of the jeep = Rs84.64X116=Rs9818.

8.3.2 Cost of the PHC/ CHC buildings, Electricity = Rs415 + Rs1660 = Rs2075.

8.3. Fixed cost for MLEC [Strategy-1]= Rs9818+Rs2075 = Rs11893.

<u>Action plan for LEC in Dhenkanal & Bhubana Municipality Area</u>

Components:

[A] <u>IEC:</u>

1. Sensitization meeting ½ day.
2. IPC [By stakeholders for 13 days.
3. Mike announcement for 2 days.
4. Leaflet distribution and banner displaying.

[B] Case detection by voluntary reporting of people at cluster points for 6 days.

[C] Supervision:

1. NMS – 1 in number in charge of10 wards.
2. NMS – 2 in number in charge of10 wards.
3. By MO LEU Dhenkanal – whole urban area.
4. By CDMO & ADMO (PH) Dhenkanal – whole urban area.

[D] Mobility:

1. Mobility of staff to work site for 6 days.
2. Mobility of Supervisors 6 days.
3. Mobility for IEC.

[E] Expenditure:

(a) PD for 6 days.

Per diem for CDMO, ADMO (PH), MO (LEU), PMW- IEC

(b) IEC:

1. Hiring of auto rickshaw.
2. Hiring of mike with battery.

3. Hiring of town hall for sensitization meeting.
4. Expenditure for sensitization meetings.
5. Printing of leaflet and designing of banners.
6. Distribution through newspaper hawkers.

(c) Cluster activity expenditure for 6 days.

(d) Other contingency.

8. Expenditure of LEC in Dhenkanal municipality, Bhubana NAC:

(A) IEC:

(1) Sensitization meeting in Dhenkanal municipality

Hiring of town hall for ½ day -----------------Rs500 **(Fixed cost)**

Light and sound arrangements ----------------Rs300. **Fixed cost)**

Snacks and tea ----------------------------------Rs1100.

PD for three resource persons @ Rs100------Rs300.

PD for 5 ancillary staffs @ Rs50--------------Rs250

Other contingency--------------------------------Rs500.

Total expenditure for the sensitization meeting ---Rs2950.

Expenditure for sensitization meeting in Dhenkanal and Bhubana = Rs2950 x 2 =Rs5900.

Semi variable cost =Rs4300, Fixed cost = Rs1600.

(2) Mike announcement in Dhenkanal

In Dhenkanal and Bhubana expenditure is Rs1500 X 2 = Rs3000. **(Variable cost)**

(3) Leaflet distribution and Banner Display:

In 2 places expenditure for leaflet distribution is Rs13000 X 2 = Rs26000 **(Variable cost)**

(B) Cluster Activity

(1) Cluster point arrangement-

In 2 places expenditure for cluster activity is Rs5440 X 2 = Rs10880. **(Variable cost)**

(2) Mobility support for both places- **(Variable cost)**

- DOL for CDMO, ADMO (PH) 50 liters = @ Rs23.50 = Rs1175.
- DOL for MO LEU & NMS & HE 120 liters @ Rs23.50 = Rs2820.

Mobility support for both places- Rs1175 + Rs2820 = Rs3995. **(Variable cost)**

(C) Per Diem

(1) Per Diem to supervisory staff

- CDMO, ADMO (PH) and 2 MO LEU @ Rs100 X 4 X 6 = Rs2400.
- NMS & HE @ Rs50 X 3 X 6 = Rs900 and for 2 areas = Rs1800.

(2) Cluster team leader @ Rs50 X 3 X 6 = Rs4500, 2 places = Rs9000.

(3) Per Diem for Drivers of CDMO, ADMO (PH) and 2 MO LEU = Rs1200.

Total Per Diem to supervisory teams = Rs14400. **(Variable cost)**

Salary of the personnel (Semi variable cost)

1. CDMO:

Cost for supervision 6days and cost of sensitization meeting in Dhenkanal Municipality, Bhubana NAC expenditure of CDMO in context to salary is Rs1782.

2. ADMO (PH):

60% work hours is devoted for MLEC for supervision for 6 days (Cost per day = Rs370)

Cost for supervision = Rs370 X6 = Rs2220.

Cost during training = 50 % work for 2 days = Rs617.

Cost during sensitization meetings in Dhenkanal = 20% X1day = Rs123.

Cost during sensitization meetings in Bhubana = 60% X1days= Rs370.

Cost of ADMO (PH) in context to salary = Rs2220+ Rs617+ Rs123+ Rs370 = Rs3330.

3. Salary of MO [LEU]

Per month salary is average Rs13000/month.

There is supervision for 6 days each to Dhenkanal municipality and Bhubana NAC. There are 2 MOLEU in the district. Each day of supervision, 60% work hours are expended and cost of supervision by MO LEU in context of salary = Rs3120.

4. Salary of Driver:

1 Driver is engaged for 6 days for supervision of CDMO, 1 day for training in Bhubana NAC, 6 days for ADMO (PH), 12 days for MO LEU. Total 25 days.

Per month the driver gets average Rs7500 or total work hours per day costs Rs250.

Per day the driver expends 80% of his work hours in supervision.

Cost of MLEC Strategy-1, in context to driver's salary =Rs5000.

Salary of all above (Semivariable cost) = Rs13232.

Fixed cost:

Annualization cost of the jeeps.

For 25 days annualisation cost of jeep = Rs84.64x25 = Rs2116.

Town hall and Electricity = Rs1600.

Total Semi variable cost for LEC = Rs13532.

Total variable cost for LEC = Rs58275

Fixed cost for LEC = Rs3716.

Variable cost = Rs709926.

Semi variable cost for MLEC [Strategy-1] = Rs733082.

Fixed cost for MLEC [Strategy-1]= Rs11893.

Total fixed cost for MLEC [Strategy-1]= Rs11893+ Rs3716=Rs15609.

Total semi variable cost for MLEC [Strategy-1] = Rs733082 + Rs13532 = Rs746614.

Total variable cost [Strategy-1]= Rs709926+ Rs58275= Rs768201.

Total cost of MLEC [strategy-1] = Rs 1530424/-.

660 cases were detected during the MLEC-4 from 30.1.03 to 5.2.03.

Cost of detection of 660 cases is Rs1530424/-

Cost of detection of one case is Rs2319/-

9. STRATEGY 2- IPC and active search for six days.

Guideline:

IPC as before for 6 days according the Guide lines written before, but here in place of voluntary reporting of cases there will be active search for cases and conformation for 6 days. L.E.C. in Municipality and NAC areas.

For each sub center there are 18 IPC members. 1 Team consists of – Anganwadi worker, Ward member, SHG member/ Local volunteers.

No of team members = 6 X 3 = 18.

Financial Guidelines for Orientation and Training.

18 personnel per Sub-Center, 2 Healthworkers and 1 Supervisor total 21 persons.

One resource person and 2 supporting staff.

PD per participants - Rs50/ X 23 = Rs1150.

TA per participants - Rs10/ day X 23 = Rs230.

Training material - Rs10/ participant X 23 = Rs230.

Resource persons at Block level

PD to resource person – Rs70/ day = Rs70.

Working launch- @ Rs30 per head = Rs720.

Miscellaneous- Rs200.

Total cost for training per Sub center = Rs2600/ sub center **(Semi variable)**.

TA, PD for IPC Team = @ Rs100 per team member.

TA, PD for IPC Team of 1 sub center = Rs100 X 18 = Rs1800.

TA, PD for IPC Team of 166 sub center = Rs1800 X166 = Rs298800 **(Variable)**.

Ref. slip- 4/SC and Reporting format – 1/ village = 6.

Cost = Rs5/ SC.

Total cost = Rs5 x 166 = Rs830. **(Variable)**

Sl No	IEC materials	Rupees
1.	Flash cards 18/Sub center	Rs36
2.	Calendars 1000	Rs1000
3.	Poster 10	Rs50
4.	Tin Plate 1/Sub center	Rs50
5.	Total of IEC	Rs1136/sub center

Total IEC for 166 sub centers = Rs1136x166 = Rs188576 **(Variable)**

1. Orientation Training [1 day] including TA/PD.

Trainers per batch [3 trainers] = [TA - Rs300] + [DA - Rs300] + [Lunch {3 trainers + 2 supportive staffs} @ Rs40 =Rs200] = Rs800/- + Miscellaneous expenditure per each day's training- Rs500 = Total Rs1300/-

Medical Officer [MO]= [TA- Rs70] + [DA-Rs70] + [Lunch-Rs40] = Rs180/-

47 Medical Officers in 2 batches = (Rs180x47)+(Rs1300x2) = Rs11060 **(Semi variable)**.

2.Training of IPC team = In 166 sub centers.

In each sub center expenditure = Rs2600.

As the training is for the whole service period taking the average rest service period 10 years, we will take cost of one month in to account.

Total training cost of 2 HW and 1 Health Supervisor = [Training cost of the Sub center / 21] X 3 = [Rs2600/21] X 3 = Rs371.

$1/120^{th}$ of the cost will be taken in to account; that is Rs3.

Training cost for each sub center = Rs2600 – Rs371+Rs3 = Rs2232.

For the district the training cost for the IPC teams = Rs2232 X 166 = Rs370512. **(Semi variable)**

3. Active search and passive search [VRC] (Variable).

Per Diem of Confirmator is Rs70, Supervisor is Rs50 and Health Worker [M/F] is Rs35

During active search the word member will not be included as volunteer. There will be 2 volunteers as before and each volunteer is to be paid Rs50/- for 3 days work.

Per Diem of ADMO/ CDMO is Rs100/- for 10 days.

1 Supervision Team per 30,000 population in Non Tribal area & 20,000 population in Tribal area = 1 Confirmator + 1 Supervisor.

1 Search Team per 5,000 population in Non Tribal area & 3,000 population in Tribal area = 1 HW Male + 1 HW Female + 1 Volunteer

1 Volunteer per 500 populations in Tribal areas and 800 populations in Non-Tribal areas.

Per Diem for active search.

CDMO, ADMO (PH)		Confirmator		Supervisor		Searchers		Volunteers		Diagnostic cards	Total
No	Amount	No	Amount	No	Amount	No	Amount	No	Amount	Amount	Amount
2	2000	39	16380	39	11700	410	86100	1283	64150	420	180750

4. District wise Details of Fund Requirement for Mobility Support.

DLO, ADMO [PH] & CDMO			Searcher/Confirmator/supervisor			IEC Activities			Grand total		
No of vehicle	Days	Amount	No of vehicle	Days	Amount	No of vehicle	Days	Amount	No of vehicle	Days	Amount
2	10	5400	16	6	25920	2	25	13500	20	41	44820

Cost of disel is Rs23.50 per liter and Per Diem to driver is Rs35/-

9.1. Variable cost

Travelling allowance, Per Diem for IPC Team of 166 sub center = Rs298800

Total cost of referral slips and cards = Rs5 x 166 = Rs830

Total IEC for 166 sub centers = Rs1136x166 = Rs188576

Mobility for DOL in vehicle (Per Diem to driver included)= Rs44820.

Counseling charges for search and searching team, experts for diagnosing difficult cases is Rs180750.

Miscellaneous= 0.5% of the total cost= Rs713776 x 0.5% =Rs3569.

9.1. Variable cost = Rs717345/-

9.2. Semi variable cost [salary of the man power for the period]

9.2.1. CDMO- 50% work hours is devoted for MLEC for supervision for 10 days.

Cost during training; 5% work for 2 days for Dhenkanal, 1 day, 70% work hours for Bhubana NAC and cost during inauguration of MLEC and press conference is 40% for 3 days Cost during IPC = 1 day for Dhenkanal and 1day for Bhubana that is 50% work hours of a day for 2 days.

9.2.1. Cost of CDMO in MLEC due to salary = Rs3960.

9.2.2. ADMO (PH)

60% work hours is devoted for MLEC for supervision for 6 days.

Cost during training = 75% work for 2 days for Dhenkanal, 1 day, 75% work hours for Bhubana NAC, Cost during meetings, Inauguration of MLEC, Press conference = 40% X3 days, cost during IPC = 75% X 2 days, file processing 18 working hours.

9.2.2. Cost of ADMO (PH) in MLEC due to salary = Rs6505/-

9.2.3. Medical officer in charge of 8 PHC/ CHC

Average salary per month of 1 PHC/CHC MO in charges is = Rs13000

50% working hours is devoted for supervision of MLEC for 6 days, IPC for 6 days.

Cost of supervision in 8 PHC/CHC = [104000/30] X 50% X 12 = Rs20800/-

Cost during achieving training in district headquarters of 8 MO I/C = 80% of work hours for 1 day = [104000/ 30] X 80% = Rs2773/-

Cost of receiving training in context of salary is Rs2773/-, but they utilize it throughout the service [average 5 years] and particularly in MLEC for giving training to the volunteers for one month, so the expenditure is Rs2773/{1/[12 X 5]} = Rs46.20

Cost during training to 166 batches of volunteers and HW, HS. = 30% work hours/ 1 day = Rs21580.

9.2.3. Cost of MO/IC OF PHC/CHC in MLEC due to salary = Rs42426/-

File regarding MLEC processing 48 working hours of BEE and accountant each 6 days

Work of BEE = [Rs7500/ 30] X 6 = Rs1500 and accountant Rs1440/-

File of MLEC processing in PHC/CHC = Rs1500/- + Rs1440/- = Rs2940/-

9.2.4. Cost of confirmers [Medical Officers, Supervisors]:

[a] Cost of confirmers [medical officers]:

80% working hours is devoted for MLEC for conformation for 6 days.

Cost for confirmers [Medical Officers] is Rs74880/-

Costs during achieving training in district headquarter of 39 MO = 80% of work hours for 1 day and average service period is 10 years. Training cost for MLEC is 120th of the amount = Rs104/-

Cost of conformation by medical officer = Rs74880/- + Rs104/- = Rs74984/-

[b] Cost of confirmers [Health Supervisors]:

100% working hours per day is devoted for MLEC for conformation for 6 days.

Salary per month of 39 confirmers [health supervisors] = Rs58500/-

Costs during achieving training in district headquarter of 39 Supervisors =

100% of work hours for 1 day = [292500/ 30] = Rs9750/-

As the training is for the total service period and for conformation of cases in MLEC training cost for one month is taken in to account. Average service period is 5 years. Training cost for MLEC is 60th of the amount = [Rs292500/30]/ 60 = Rs162.50

Cost of conformation by Supervisor = Rs58500/- + Rs163/- = Rs58663/-

9.2.4. Cost of confirmation team by Medical Officers & Supervisors = Rs133647/-

9.2. 5 Cost of searchers

100% working hours per day is devoted by Health Worker Male and Female & volunteers for MLEC for searching for 6 days.

Salary per month of 300 searchers HW [M&F] is = Rs1800000

Cost of searching= [Rs1800000/30] X 6 = Rs360000

Costs during achieving training in district headquarter of 300 HW [M&F] = 100% of work hours for 1 day = Rs60000/-

Average service period is 10 years.

Training cost for MLEC is 120^{th} of the amount = Rs500/-

Cost of Searchers [health worker] = Rs360000 + Rs500 = Rs360500/-

Cost of Searchers [volunteers] = It has already been added before Rs50/- for 3 days of searching by each volunteer.

9.2.5 Cost of Searchers [health workers and volunteers] = Rs360500/-

<u>9.2.6. Cost of driver in context to salary:</u>

100% working hours per day is devoted by the driver for MLEC for confirmation, supervision, haata bazaar stall and VRC.

2 drivers for supervision by ADMO and CDMO for 6 days, IPC 2days, training 2 days = 216.60 X2 X 10 = Rs4332/-

During conformation and supervision, 8 Government vehicles from PHC/CHC, 1 Government vehicle is used in Haata Bazzar stall. The DOL of 7 vehicles is used for the TA of other Medical Officers in the conformation team.

9 drivers for conformation for 6 days = 216.60 X 9 X 6 = Rs11696/-

During IEC 2 Government vehicles for 25 days are used.

2 drivers for IEC for 25 days = 216.60 X 2 X 25 = Rs10825/-

Cost of driver in context to salary = Rs4332 + Rs11696 + Rs10825 = Rs26853/-

9.2.6. Cost of driver in context to salary = Rs26853/-

9.2. Semi variable cost = Rs576831.

9.3. Fixed cost:

Cost of the jeeps used = Rs1693/- + Rs4570.50 + Rs4232/- = Rs10495/-

PHC/ CHC – Cost per day = Rs300/ 30 = Rs10/-

For 166 batches the cost for halls = Rs10/- X 166 = Rs1660/-.

The electricity charge is Rs300/- per month. For 1200 square feet the charge is Rs300/-. For 300 square foot the electricity charge is Rs300 / 4 = Rs75/-.

For one batch cost of electricity is Rs75/ 30 = Rs2.50.

For 166 batch cost of electricity is Rs75/ 30 = Rs2.50 X 166 = Rs415/-.

9.3. Fixed cost = Rs10495 + Rs1660 + Rs415 = Rs12570.

Semi variable cost for LEC = Rs13532.

Variable cost for LEC = Rs58530

Fixed cost for LEC = Rs3716.

Total fixed cost = Rs12570 + Rs3716 = Rs16286.

Total variable cost = Rs717345 + Rs58530 =Rs775875 /-

Total semi variable cost = Rs576831+ Rs13532 = Rs590363/-

Total cost for strategy-2 = Rs1382524.

Cost for searching a leprosy case in strategy-2 = Rs1382524/660 = Rs2095.

****

STRATEGY- 3

10.1. Variable costs:

1. Information Educations and Communication for a week and school IEC.
2. Active search and Passive search [VRC].
3. Mobility for DOL in Government vehicle or hired vehicle if Government vehicle is not available.
4. Miscellaneous, 0.5% of the total cost.

10.1.1. Information Education and Communication through out the district.

Meeting and launching meeting = Rs3000/-

Miking for announcement = Rs20000/-

Hoarding [2] = Rs2000/-

School IEC = Rs38400/-

Banners and other requirements in school IEC = Rs10000.

10.1.1. Total amount of expenditure for IEC = Rs73400/-

10.1.2. Active search and passive search [VRC]

Per Diem of Confirmer / day = Rs70/-

Per Diem of Supervisor / day = Rs50/-

Per Diem of Health Worker [Male / Female] = Rs35/-

Each volunteer is to be paid Rs50/- for 3 days work.

Per Diem of ADMO/ CDMO / day = Rs100/- for 10 days.

Per Diem for active search.

ADMO [PH] & CDMO		Conformer		Supervisor		Searchers		Volunteers		Diagnostic cards	Total amount
No	Amount	No	Amount	No	Amount	No	Amount	No	Amount	Amount	
2	2000	39	16380	39	11700	410	86100	1283	64150	420	180750

Per Diem for voluntary reporting center (VRC)

There were 3 VRC outside the dispensary or hospital; so the medical officer, Health Supervisor, Health Worker male, female had to go outside the area and paid Per diem Rs140 per day.

There were 3 confirmers from outside the center.

So PD is Rs140/- X 3 = Rs420/-

Per Diem for VRC = Rs420/-.

4. District wise Details of Fund Requirement for Mobility Support.

DLO, ADMO [PH] & CDMO			Searcher/conformer /supervisor			IEC Activities			Grand total		
No of vehicle	Days	Amount	No of vehicle	Days	Amount	No of vehicle	Days	Amount	No of vehicle	Days	Amount
2	10	5400	16	6	25920	2	7	3780	20	41	35100

10.1. Variable cost

IEC including mass media, meeting & printing cost	Counseling charges for search & VRC. Searching Team & Experts for Diagnosing difficult cases	Mobility for DOL in vehicle		Total	Miscellaneous @ 0.5%	**Grand Total**
105425	180750	35100		321275	1606	**322881**

10.1. Variable cost = Rs322881/-

10.2. Semivariable cost

10.2. 1. Orientation training.

10.2.1. Orientation Training [1 day] including TA/PD.

(a) Total expenditure for Training of MO [2 batches] = Rs8460+Rs2600 = Rs11060/-

(b) Total expenditure for training of Health Supervisor/ BEE/ Pharmacist [77 in number]= [2 batches]= Rs13380.

(c) Total expenditure in training of 300 Health Workers = [10 batches] = Rs46000/-

(d) Training of 1330 Volunteers in 10 batches = Rs103610/-

Total amount of expenditure for Orientation Training = Rs174050/-

Usually the training is given each year and training is utilized for total service period for searching and diagnosis of cases, except the volunteers. We can take average service period 10 years. So we shall take 120^{th} part of the expenditure for MLEC.

10.2.1 Amount of expenditure for Orientation Training ={[Rs174050-Rs103610]/ 120} + Rs103610 = Rs587+ Rs103610 = Rs104197.

10.2.2. Salary of the manpower for the period.

Cost of CDMO in MLEC due to salary = Rs3729/-

Cost of ADMO (PH) in MLEC due to salary = Rs12610/-

Cost of MO/IC OF PHC/CHC in MLEC due to salary = Rs19316/-

File of MLEC processing in PHC/CHC = Rs1500/- + Rs1440/- = Rs2940/-

Cost of conformation team by Medical Officers & Supervisors = Rs74984/- + Rs58663/- = Rs133647/-

Cost of Searchers [HW and volunteers] = Rs360500/-

Cost of driver in context to salary = Rs19060/-

10.2. Semi variable cost

1.Orientation and Training for 1 day = Rs104197.

2. Cost of CDMO in MLEC due to salary = Rs3729/-

3. Cost of ADMO (PH) in MLEC due to salary = Rs12610/-

4[a]. Cost of MO/IC OF PHC/CHC in MLEC due to salary = Rs19316/-

4[b]. File of MLEC processing in PHC/CHC = Rs1500/- + Rs1440/- = Rs2940/-

5. Cost of conformation team by Medical Officers & Supervisors = Rs133647/-

6. Cost of Searchers [HW and volunteers] = Rs360500/-

7. Cost of driver in context to salary = Rs19060/-

10.2. Semi variable cost = Rs655999/-

10.3. Fixed cost for the strategy-3

Same as other strategies.

10.3.1. Cost of the jeeps used as previous = Rs1693/- + Rs1185 + Rs4232/- = Rs7110/-

10.3. 2. (a) Cost of the training halls.

PHC/ CHC – Per 44 batches the cost for halls = Rs10/- X 44 = Rs440/-.

10.3.2. (a) Cost of the training halls & electricity = Rs440/- + Rs110/- = Rs550/-

10. 3 .2 (b). Dispensary. Ten square feet place is used for keeping the records and the drugs used for Leprosy patients. So the cost for one month is Rs10/-.

10. 3.2. (c). Electricity – not used.

10.3. Fixed cost in strategy 3 = Rs7110/- + Rs550/- + Rs10/- = Rs7670/-

10.1. Variable cost = Rs322881/-

10.2. Semi variable cost = Rs655999/-

10.3. Fixed cost = Rs7670/-

10. Total cost of case detection = Rs655999 + Rs322881 + Rs7670 = Rs986550/-

Cost of detection of 660 cases is Rs986550/-

Cost of detection of one case in Strategy-3 is Rs1495.00

STRATEGY-4

Both IEC and IPC for one week, then

URBAN [City with 2,00000 population]	RURAL [Blocks excluding town with >2,00000 population]	
	PR<5/1,00000 population	PR<5/1,00000 population
VRC	VRC in all areas PR>3/1,00000 population	Active search

According to the above criteria Bhubana block and Dhenkanal Sadar block have the PR < 5/100000 population.

The number of sub centers of Sadar Block is 23 and the Bhubana block is 15.

Guidelines:

1. Orientations Training for all the Medical Officers, health supervisor /PMW /Pharmacist /BEE, Health workers, Volunteers.
2. IPC in above 2 blocks & IEC in other blocks.
3. VRC in the 2 blocks.
4. Active Search in the rest of the blocks.
5. Supervision in all the blocks.
6. The guidelines of the active search and VRC are given above.

11.1. Orientation Training (Semi Variable Cost)

Sl No	Categories to be trained	Total number Of trainees	Duration of Training	No of batches to be trained
1.	Medical Officers	54	1 day	2 batches
2.	Health Supervisor (M/F)	99	1day	3 batches
3	Health workers	300	1 day	10 batches
4.	Volunteers	1400	1 day	46 batches

First 3 categories will be trained in the District headquarter and volunteers will be trained in the respective PHC/ CHC.

(a) Medial Officers

TA to Trainers @ Rs100 x 1 day x 3 x 2 batches = Rs600

TA to Trainee @ Rs70 x 1 day x 54 = Rs3780

PD to Trainers @ Rs150 x 1 day x 3 x 2 batches = Rs900

PD to Trainee @ Rs70 x 1 day x 54 = Rs3780

Working lunch @ Rs40 x 1 day x (54+6+4) = Rs2560

Miscellaneous expenditure @ Rs500 / course x 2 batches = Rs1000.

Total expenditure = Rs12620.

(b) Health Supervisors (M/F) = 99

TA to Trainers @ Rs100 x 1 day x 3 x 3 batches = Rs900

TA to Trainee @ Rs50 x 1 day x 99 = Rs4950

PD to Trainers @ Rs150 x 1 day x 3 x 3 batches = Rs1350

PD to Trainee @ Rs50 x 1 day x 99 = Rs4950

Working lunch @ Rs40 x 1 day x (99+9+6) = Rs4560

Miscellaneous expenditure @ Rs500 / course x 3 batches = Rs1500.

Total expenditure = Rs18210.

(c) Health Worker (M/F) = 300

TA to Trainers @ Rs100 x 1 day x 3 x 10 batches = Rs3000

TA to Trainee @ Rs35 x 1 day x 300 = Rs10500.

PD to Trainers @ Rs150 x 1 day x 3 x 10 batches = Rs4500

PD to Trainee @ Rs35 x 1 day x 300 = Rs10500.

Working lunch @ Rs40 x 1 day x (300+30+20) = Rs14000

Miscellaneous expenditure @ Rs500 / course = 10 batches = Rs5000.

Total expenditure = Rs47500.

(d) Volunteers (AWW/ VHG/ Volunteers) = 1400 (46 Batches)

TA to Trainers @ Rs100 x 1 day x 3 x 46 batches = Rs13800

TA to Trainee @ Rs25 x 1 day x 1400 = Rs35000

PD to Trainers @ Rs150 x 1 day x 3 x 46 batches = Rs20700

Working lunch @ Rs40 x 1 day x (1400+138+46) = Rs63360

Miscellaneous expenditure @ Rs500 / course = 46 batches = Rs23000.

Total expenditure = Rs155860

Total expenditure in orientation training = Rs156513 (Semi variable cost).

11.2. Expenditure for Active search and Supervision (Variable Cost).

Sl No	Officials	Rates	Calculation	Total Amount
1.	CDMO	Rs100	1x10days	Rs1000
2.	ADMO (PH)	Rs100	1 x 10 days	Rs1000
3.	Confirmators	Rs70	43 x 6 days	Rs18060
4.	Health Supervisors	Rs50	43 x 6 days	Rs12900
5.	Searchers	Rs35	378 x 6 days	Rs79380
6.	Volunteers	Rs50	1330 x 1 day	Rs66500
7.		Total		Rs145590

Search team = 189 x 2 = 378.

Confirmers = 43, rest 11 will supervise the VRC.

11.2. Expenditure for Active search and Supervision (Variable Cost) = Rs145590.

11.3. Expenditure for Mobility.

Sl No	Activities	Rate	No of days	POL in litters	Total cost in rupees
1	CDMO, ADMO (PH), MO [LEU]	POL/vehicle/day	10	3x100	7050
2	Driver	PD@ Rs35/day	10	3x350	1050
3	Vehicle for periphery	POL 10 litters/ vehicle / day	6	53x6x10	74730
4	Driver	PD@ Rs35/ day	6	53x6x35	11130
5	Vehicle for IEC including PD to Driver	Rs350/ day	25	350x25	8750
6	Total		Rs102710.		

Cost of Diesel = Rs23.50

Search team = 181 and Confirmation team = 43.

11.3. Expenditure for Mobility = Rs102710 [Variable]

Total expenditure = Rs482490, miscellaneous expenditure = Rs482490x 0.5% =Rs2412.

<u>11.4. Voluntary Reporting of Cases</u>

11.4.A Supervision and VRC.

Medical Officer (LEU) = Rs70/ day for 10 days = Rs700.

13 Confirmers out side the center = Rs70/day = Rs70x2x13 = Rs1820.

DLO for 13 confirmers for 2 days = Rs4550.

Total cost of supervision and VRC= Rs7070 [Variable].

11.4. B Salary of the personnels [Semi variable]

11.4.B.1.CDMO (monthly salary is approximately 19800):

50% work hours is devoted for MLEC for supervision works for10 days, cost during training = 20% work for 14 days, cost during meetings = 40% works for 3 days.

11.4.B.1. Expenditure for CDMO in context to salary = Rs5940.

11.4.B.2. ADMO (PH) monthly salary is approximately = Rs18500.

60% work hours is devoted for supervision for 10 days, cost during training = 75% work hours for 14 days, cost during training = Rs6475, cost during meetings= 40% work hours per day for 3 days = Rs740.

11.4.B.2. Expenditure for ADMO (PH) in context to salary = Rs10915.

11.4.B.3.Medical Officers in charge of 8 PHC/CHC For supervision 50% Work hours is devoted for 6 days.

Cost of supervision = Rs10400.

Cost during achieving training = Rs2773. Real cost = Rs46.20.

Cost during training to 46 batches of volunteers [5 batches in 2 PHC, 6 batches in 6 PHC]

Cost during training to 5 batches = Rs1300.

Cost during training to 6 batches = Rs4680.

Cost during training to 46 batches of volunteers = Rs5980.

Cost during IEC/IPC = 5% work for 7 days = Rs1213.

File works in PHC/ CHC = Rs2940.

11.4.B.3. Cost of MO (PHC/CHC) = Rs17639 + Rs2940 = Rs20579.

11.4.B.4. Cost of confirmers: [Medical Officers and Supervisors]

11.4.B.4. [a] Cost of conformers [medical officers]:

80% working hours is devoted for MLEC for conformation for 6 days.

Cost of conformation = Rs74880/-

Real costs during achieving training of 39 medical officer = Rs104/-

Cost of conformation by MO = Rs74880/- + Rs104/- = Rs74984/-

11.4.B.4 [b] Cost of conformers [Health supervisors]:

100% working hours per day is devoted for MLEC for conformation for 6 days.

Cost of confirmation = Rs58500/-

Real cost during achieving training in district headquarter of 39 Supervisors = Rs162.50

Cost of conformation by Supervisor = Rs58500/- + Rs163/- = Rs58663/-

11.4.B. Cost of conformation team by Medical Officers & Supervisors = Rs133647/-

11.4.C. Cost of searchers

100% working hours per day is devoted by Health Worker Male and Female & volunteers for MLEC for searching for 6 days.

Salary per month of 279 searchers HW [M&F] is = Rs1674000

Cost of searching = Rs334800/-

Costs during achieving training in district headquarter of 300 HW [M&F] = Rs60000/-

As the training is for the total service period and for conformation of cases in MLEC training cost for one month is taken in to account. Average service period is 10 years. Training cost for MLEC is 120th of the amount.

Costs during achieving training in district headquarter of 300 HW [M&F] = Rs500/-

Cost of Searchers [HW] = Rs334800/- + Rs500/- = Rs335300/-

Cost of Searchers [volunteers] = It has already been added before Rs50/- for 3 days of searching by each volunteer.

11.4.C Cost of Searchers [HW and volunteers] = Rs335300/-

11.4.D. Cost of driver in context to salary:

For supervision by ADMO and CDMO, 2 drivers for 10 days = Rs4332/-

During conformation and supervision, 8 Government vehicles from PHC/CHC have been used. The DOL of 7 vehicles is used for the TA of other Medical Officers in the conformation team.

9 drivers for conformation for 6 days = 216.60 X 9 X 6 = Rs11696/-

During Information, Education and Communication 2 Government vehicles for 25 days are used and 2 drivers for IEC for 25 days = 216.60 X 2 X 25 = Rs10825/-

11.4.D Cost of driver in context to salary = Rs4332 + Rs11696 + Rs10825 = Rs26853/-

11.4.E.Medical Officer (LEU):

Achieving training – Rs4/-

Supervision – 80% work hours/ day for 10 days = Rs3467.

Meeting – 60% work hours for 3 days = Rs780.

File processing = 10% work for 15 days = Rs650.

11.4. E. Total cost for MO [LEU] = Rs4901.

11.4.F. Conformer in VRC.

Achieving training – Rs4 X 8 MO = Rs32.

Cost of VRC in context to salary of MO- 10% work for 2 days = Rs80x8 = Rs360.

Cost of VRC in context to salary of 8 PMW = 100% work for 2 days= Rs4000.

Cost of VRC in context to salary of 1 HS, 2HW[M/F] for 21 centers for 2 days = Rs31500 (Training cost has been added before).

11.4. Total expenditure in context to salary in VRC = Rs35892.

11.5. Fixed cost for Strategy 4 :

Same as other strategies.

11.5.1. Cost of the jeeps [Annualization]

For supervision by ADMO, CDMO, MO [LEU] , 3 jeeps for 10 days each, 9 vehicles for conformation for 6 days, 2 vehicles for 25 days for IEC were used.

11.5.1. Cost of the jeeps used = Rs2539/- + Rs4570.50 + Rs4232/- = Rs11341/-

11.5.2. (a)Cost of the training halls.

District Headquarter – Rs500 X 14= Rs7000 with electricity and water.

Per 46 batches the cost for halls = Rs10/- X 46 = Rs460/-.

11.5.2 (b). Electricity: For 46 batch cost of electricity is Rs115/-.

11.5.2. Cost of the training halls District, PHC/ CHC buildings, Electricity = Rs7575/-

11.5. 2 (c). Dispensary: Ten square feet place is used for keeping the records and the drugs used for Leprosy patients. So the cost for one month is Rs10/-.

Fixed cost for strategy- 4 - Rs11341/- + Rs7575/- + Rs10/- = Rs18926/-

Total expenditure in orientation training = Rs156513 (Semi variable cost).

Expenditure for Active search and Supervision = Rs145590 (Variable Cost).

Expenditure for Mobility = Rs102710 (Variable).

Total cost of supervision and VRC= Rs7070 (Variable).

Expenditure for CDMO in context to salary = Rs5940 (Semi variable cost).

Expenditure for ADMO (PH) in context to salary = Rs10915 (Semi variable cost).

Cost of MO (PHC/CHC) = Rs20579 (Semi variable cost).

Cost of conformation team by MO & Supervisors = Rs133647/- (Semi variable cost)

Cost of Searchers (HW and volunteers) = Rs335300/-(Semi variable cost)

Cost of driver in context to salary = Rs26853/-(Semi variable cost)

Total cost for MO [LEU] = Rs4901 (Semi variable cost).

Total expenditure in context to salary in VRC = Rs35892 (Semi variable cost).

Miscellaneous expenditure = Rs2412 (Variable).

Variable cost Rs260722, Semi Variable cost = Rs695297,Fixed cost = Rs18926.

Total expenditure = Rs260722+Rs695297+Rs18926 = Rs974945.

For 660 case detection, expenditure is Rs974945.

Unit cost for detection of a case of leprosy = Rs1477/-.

STRATEGY - 5

Guidelines:

- IEC for one week including the school IEC for one month followed by Voluntary Reporting of Cases.
- Voluntary reporting of cases for two days.
- Voluntary reporting centers will be opened in each 10,000 populations or in each sub center.
- VRC team consists of 4 persons- one Medical Officer, one Health Supervisor, one health worker male and one health worker female. Where the center is outside the hospital/ Health Center, where Medical Officer is not available, a Senior Non Medical Supervisor can head the team in the VRC.
- The officials in the VRC who performed their duties in their own place of posting they were not paid any TA/DA. The officials in the VRC who were deputed outside their place of posting for which TA/DA were paid.
- There will be supervision by the district health authorities as ADMO, CDMO, and District Leprosy Officer during these days. Separate DLO is given for this supervision activity.

12.1. Variable costs:

1. Information Educations and Communication for a week and school IEC.
2. Passive search [VRC].
3. Mobility for DOL in Government vehicle or hired vehicle.
4. Miscellaneous, 0.5% of the total cost.

12.1.1. Information Education and Communication through out the district.

Meeting and launching meeting = Rs3000/-

Miking for announcement = Rs20000/-

Hoarding [2] = Rs2000/-

School IEC = Rs38400/-

Banners and other requirements in school IEC = Rs10000.

12.1.1. Total amount of expenditure for IEC = Rs73400/-

12.1.2. Per Diem for voluntary reporting center (VRC).

MO, Health Supervisor, Health Worker Male and Female had to go outside the area and awarded DA Rs190/- per day.

Medical officer = Rs70, health supervisor = Rs50, health workers Rs35 each.

There are 165 sub centers in the district.

Population of municipality area and NAC area is 90564.

There will be 9 VRC in the town area and 165 sub-centers; total 174 VRC.

In the district there are 47 health facilities, so there will be 127 extra VRC.

12.1.2. PD is Rs190/- X 127 = Rs24130/-

12.1.3. District wise Details of Fund Requirement for Mobility Support.

DLO, ADMO [PH] & CDMO, MO (LEU)			IEC Activities			Grand total		
No of vehicles	Days	Amount	No of vehicles	Days	Amount	No of vehicles	Days	Amount
3	9	7290	10	7	18900	11	17	22410

12.1. Variable cost

IEC including mass media, meeting & printing cost	Counseling charges for VRC.	Mobility for DOL in vehicle	Total	Miscellaneous @ 0.5%	Grand Total
73400	24130	22410	119940	600	120540

12.1. Variable cost = Rs120540/-

12.2. Semi variable cost

12.2.1. Orientation Training [1 day] including TA/DA.

Total expenditure for Training of MO [2 batches] = Rs8460+Rs2600 = Rs11060/-

Total expenditure for training of Health Supervisor/ BEE/ Pharmacist [77 in number]= [2 batches]= Rs13380.

Total expenditure in training of 300 Health Workers in 10 batches = Rs46000/-

Total amount of expenditure for Orientation Training = Rs70440.

12.2.1. Real amount of expenditure for Orientation Training =Rs70440/ 120 = Rs587.

12.2.2. Salary of the manpower for the period:

a. Cost of CDMO in MLEC due to salary = Rs3036/-

b. Cost of ADMO (PH) in MLEC due to salary = Rs11778/-

c. Cost of MO/IC OF PHC/CHC in MLEC due to salary = Rs19316/-

d. File of MLEC processing in PHC/CHC = Rs2940/-

e. Salary of Medical Officers.

20% working hours is devoted for MLEC for conformation for 2 days.

Salary per month of 39 confirmers [Medical Officers] is = Rs564000

Cost of conformation= [Rs564000/30] X 20% X 2 = Rs7520/-

Cost of getting training = Rs176/-

e. Cost of medical officers = Rs7520+ Rs176 = Rs7696/-

f. Salary of supervisors

100% working hours per day is devoted for MLEC for conformation for 2 days.

Salary per month of 127 confirmers [Supervisors] is = Rs952500

Cost of confirmation = Rs63500/-

Costs during achieving training in district headquarter of 127 Supervisors =

100% of work hours for 1 day = [Rs952500/ 30] = Rs31750/-

Real training cost for MLEC is 60th of the amount = [Rs952500/30]/ 60 = Rs529/-

f. Cost of conformation by Supervisor = Rs63500/- + Rs529/- = Rs64029/-

g. Expenditure for MO (LEU) in context to salary = Rs10, 000/-

Expenditure for Medical Officers & Supervisors = Rs7696 + Rs64029 = Rs71725/-

Expenditure for health workers = Rs120000 + Rs500 = Rs120500/-

Expenditure for driver in context to salary = Rs5848 + Rs15162/- = Rs21010/-

12.2. Semi variable cost

1. Orientation and Training for 1 day = Rs587.
2. Cost of CDMO in MLEC due to salary = Rs3036/-
3. Cost of ADMO (PH) in MLEC due to salary = Rs11778/-

4[a]. Cost of MO/IC OF PHC/CHC in MLEC due to salary = Rs19316/-

4[b]. File of MLEC processing in PHC/CHC = Rs2940/-

5. Expenditure for Medical Officers & Supervisors = Rs71725/-
6. Expenditure for health workers = Rs120500/-
7. Expenditure for driver in context to salary = Rs21010/-
8. Expenditure for MO (LEU) in context to salary = Rs10, 000/-

12.2. Semi variable cost = Rs260892/-

<u>12.3. Fixed cost</u>

12.3. 1.Cost of the jeeps used as previous = R6687/-

12.3.2. (a)Cost of the training halls.

District Headquarter - The training program is done in a hall, which is hired from Rotary Club. Its cost has been added in the miscellaneous cost.

12.3.3. Dispensary: Ten square feet place is used for keeping the records and the drugs used for Leprosy patients. So the cost for one month is Rs10/-.

12.3. Fixed cost = Rs6687/- + Rs10/- = Rs6697/-

12.1. Variable cost = Rs120540/-

12.2. Semi variable cost = Rs260892/-

12.3. Fixed cost = Rs6697/-

Total cost of case detection = Rs260892 + Rs120540 + Rs6697 = Rs388129/-

Cost of detection of 660 cases is Rs388129/-

Cost of detection of one case is Rs588.00

13. ANALYSIS

13.1. Strategy- 0:

13.1.1. In context to salary.

When we took all the salary components in to account, total expenditure in context to salary = Rs579992

Expenditure in context to salary per unit case searching = Rs879.00.

Expenditure per unit case searching = Rs1682.

Percentage of expenditure in context to salary per unit case searching = 52.26 %

13.1.2. In context to mobility:

Total Expenditure in context of mobility = Rs133268.

Expenditure in context to mobility per unit case searching = Rs201.92.

Expenditure per unit case searching = Rs1682.

Percentage of expenditure in context to mobility per unit case searching = 12%

In context to DA to HW, Volunteers, Training and other expenditure = 47.62%

13.2. Strategy- 1:

13.2.1. In context to salary.

In Active Search

Total expenditure in context to salary = Rs329110.

In LEC

Total expenditure in context to salary = Rs337342.00.

Expenditure in context to salary per unit case searching = Rs511.00.

Expenditure per unit case searching = Rs2319.

Percentage of expenditure in context to salary per unit case searching = 22.04 %

13.2.2. In context to mobility:

Expenditure for mobility of ADMO/ CDMO = Rs4320.

Expenditure of driver in context to salary = Rs22400.

Cost of jeeps used = Rs9818.

In LEC

Total Expenditure in context of mobility = Rs44529.00.

Expenditure in context to mobility per unit case searching = Rs67.50.

Expenditure per unit case searching = Rs2319.

Percentage of expenditure in context to mobility per unit case searching = 2.9%

In context to DA to HW, Volunteers, Training and other expenditure = 75.05%

13.3. Strategy- 2:

13.3.1. In context to salary.

In Active Search

Total expenditure in context to salary = Rs494147.

In LEC

Total expenditure in context to salary = Rs502379.00.

Expenditure in context to salary per unit case searching = Rs761.00.

Expenditure per unit case searching = Rs2095.

Percentage of expenditure in context to salary per unit case searching = 36.33 %

13.3.2. In context to mobility:

In Active Search

Expenditure for mobility = Rs44820.00.

Expenditure of driver in context to salary = Rs26853.

Cost of jeeps used = Rs10495.00.

Total Expenditure in context of mobility = Rs82168.00.

In LEC

Expenditure for mobility = Rs3995.00.

Expenditure of driver in context to salary = Rs5000.00

DA for drivers = Rs1200.00

Cost of jeeps used = Rs2116.00.

Total Expenditure in context of mobility = Rs12311.00.

Total Expenditure in context of mobility = Rs94479.00

Expenditure in context to mobility per unit case searching = Rs143.00

Expenditure per unit case searching = Rs2095.

Percentage of expenditure in context to mobility per unit case searching = 6.83%

In context to DA to HW, Volunteers, Training and other expenditure = 56.84%

13.4. Strategy- 3:

13.4.1. In context to salary.

In context to salary = Rs532742.00

Unit cost for one case detection = Rs807.18.

Total cost for one case detection = Rs1495.

Percentage of one case detection in context to salary = 53.99%

13.4.2. In context to mobility:

Cost of mobility = Rs61608.

Unit cost for one case detection = Rs93.34

Percentage of one case detection in context to mobility = 6.24%

13.4.3. Others:

Unit cost for one case detection = Rs594.47

Percentage of one case detection in context to IEC & others = 39.77%

13.5. Strategy- 4:

13.5.1. In context to salary.

Total expenditure in context to salary = Rs547174.00

Expenditure in context to salary per unit case searching = Rs829.00

Expenditure per unit case searching = Rs1477.00.

Percentage of expenditure in context to salary per unit case searching = 56.1%

13.5.2. In context to mobility:

Expenditure for mobility = Rs102710.

Expenditure of driver in context to salary = Rs26853.

Cost of jeeps used = Rs11341.

Total Expenditure in context of mobility = Rs140904.

Expenditure in context to mobility per unit case searching = Rs213.00

Percentage of expenditure in context to salary per unit case searching = 14.42%

13.5.3. Others: In context to DA to HW, Volunteers, Training and other expenditure = 29.48%

13.6. Strategy- 5:

13.6.1. In context to salary.

Total expenditure in context to salary = Rs236355.00

Total expenditure = Rs388129/-

Percentage of expenditure in context to salary per unit case searching = 60.89%

13.6.2. In context to mobility:

Cost of the jeeps used = Rs6687/-

Cost of mobility = Rs22410/-

Expenditure for driver in context to salary = Rs21010/-

Total expenditure in context to salary = Rs50107/-

Percentage of expenditure in context to salary per unit case searching = 12.91%

13.6.3. In context to others:

Expenditure for salary = Rs236355.00

Expenditure for mobility = Rs50107/-

Total expenditure = Rs388129/-

Expenditure for others = Rs101667/-

Percentage of expenditure in context to others per unit case searching = 26.19%

Figure:1 Comparison of percentage of salary, mobility and other costs in different strategies in case searching during Modified Leprosy Elemination Campaign.

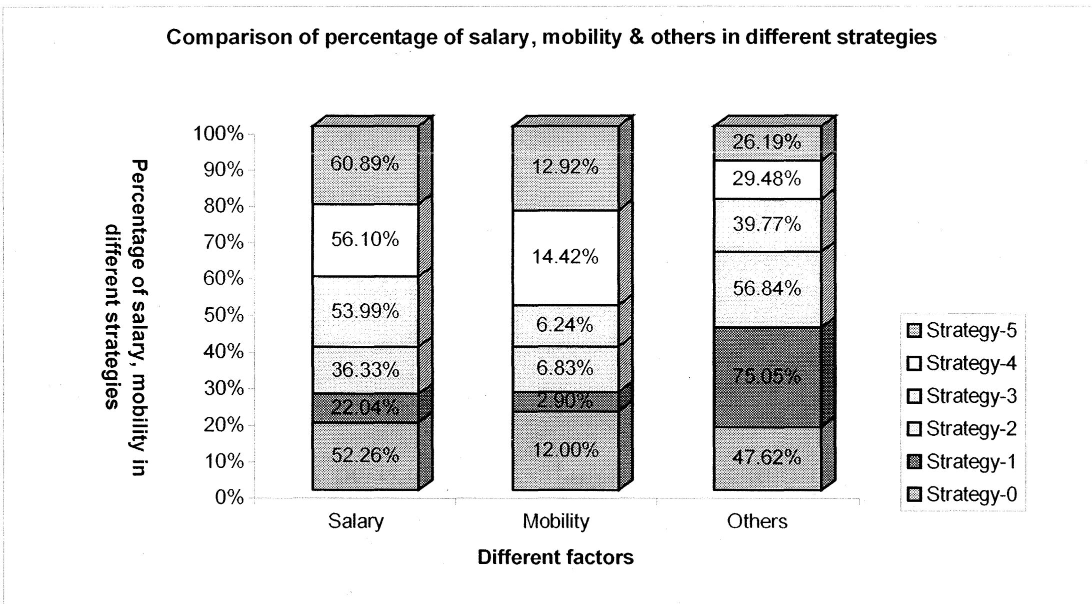


Figure 2. Comparison of percentage of salary, mobility and others in different strategies of Modified Leprosy Elemination Campaign.

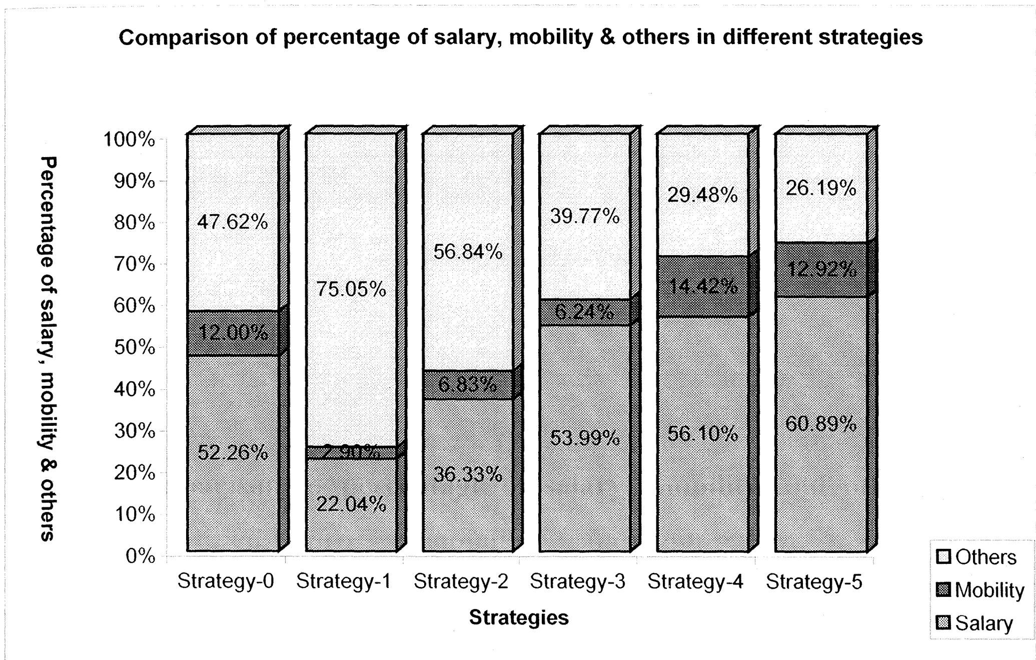
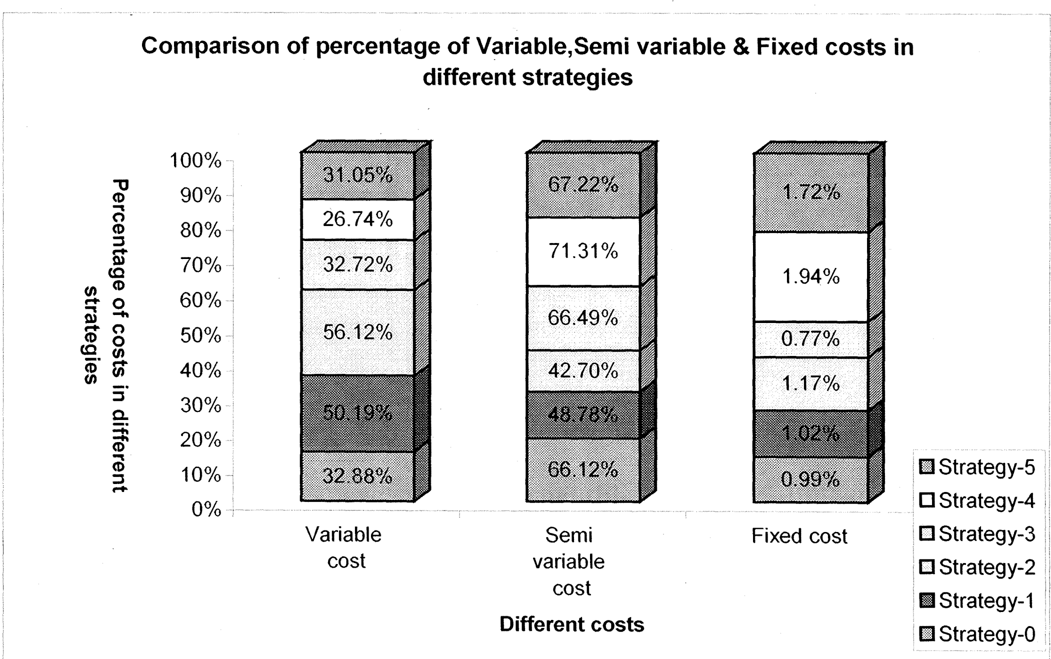


Figure 3. Comparison of percentage of variable, semivariable and fixed costs in different strategies.



Cost- effectiveness of Modified Leprosy Elimination Campaign of Leprosy, Dhenkanal District, Orissa, 2003.

Strategy	Procedures	Variable cost	Semi variable cost	Fixed cost	Total cost	No. of patients detected$	Unit cost in Rupees
0	IEC followed by VRC (Towns) and active search (areas other than towns)	364935	733792	11055	1109782	660	1682
1	IPC (1 week) followed by voluntary reporting (1 month)	768201	746614	15609	1530424	660	2319
2	IPC followed by active search (6 days)	775875	590363	16186	1382524	660	2095
3	IEC (1 week) followed by active search (6 days) & conformation of diagnosis	322881	655999	7670	986550	660	1495
4	IEC + IPC (1 month) followed by a special strategy*	260722	695297	18926	974945	660	1477
5	IEC (1 week) followed by VRC for 2 days.	120540	260892	6697	388129	660	588

*Hypothetical strategy; $ 469 PB and 191 MB patients

IEC – Information, Education and Communication; IPC- Inter-Personal Communication; VRC- Voluntary Reporting center.

Variable cost:

1. IEC throughout the district
2. Salary of manpower involved

Semi-variable costs:

1. Orientation training
2. Active and passive search
3. Transportation.

Fixed costs:

1. Cost of vehicles
2. Training facilities
3. Buildings.

13. (a) Analysis proper:

The unit cost for detection of a leprosy case in MLEC in strategy-0 is Rs1682, strategy-1 is Rs2319, strategy-2 is Rs2095, strategy-3 is Rs1495, strategy-4 is Rs1477 and strategy-5 is Rs588. The expenditure in unit case detection in **strategy-5 is the lowest**. In this strategy-5, the percentage of expenditure for salary is highest, mobility is second highest but the other expenditure is lowest. The expenditure in unit case detection in **strategy-1 is highest**. In this strategy-1, the percentages of expenditure for salary and mobility are lowest but the other expenditure is highest.

If we take salary, mobility and others in to consideration we can find, in strategy-5 the percentage of expenditure in salary and in strategy-4, mobility in unit case detection is highest and in strategy-1 percentage of expenditure in salary and mobility in unit case detection are lowest but other expenditures are very high.

Variable cost is highest in strategy-2 and lowest in strategy-4; Semi variable cost is just the reverse; fixed cost strategy-4 is highest and strategy-3 is lowest.

The cost of IEC is less than IPC, and VRC is less costly than active search. Strategy-5 is cost effective among all the strategies. But when we come to quality, strategy-4 is qualitative as it covers the district with appropriate methods of case detection and it is a judicious summation of IEC & IPC, VRC & active search.

14. Conclusion:

From the above analysis it is found that, IEC for one month then, active search of cases for 6 days and confirmation in the blocks having PR > 5/10,000 population and VRC in the blocks where the PR < 5/10,000, the unit cost for case detection of leprosy is the lowest. The strategy- 0 has the unit cost more than the last strategy, but in the strategy 0 there is expenditure in school IEC and interactive stalls in Haata Bazaars. These impart more cost per unit cost of case detection. I reach in conclusion that; the active search succeeding IEC is more cost effective than VRC preceded by IPC. IEC is more cost effective than IPC. VRC in all blocks preceded by IEC will be most cost effective than all the strategies. From the past experiences of 4 MLEC we have seen that, VRC is not as effective as active Search when we consider the number of case detection as the indicator. The strategy-4 is a judicious summation of all. Strategy-5 is cost effective but when we come to quality its quality is not so high. So strategy-4 is cost-effective as well as qualitative.

Reference:

1. WHO recommended surveillance standards – October 1999.
2. WHO (1998), Technical Report Series No 874.
3. Leprosy Elimination Monitoring in Orissa 2003.
4. Study materials of Dr D Vartharajan.
5. Leprosy Reviews Volume – 70, November 4, December 1999.
6. A Mathematical model for evaluating the impact of vaccination schedule: application to Neisseria meningitides. Epidemiol.Infect (2003). 130.
7. Identification and control of work related diseases. Report of a WHO Expert Committee. WHO Technical Series 714.
8. Estimating Cost For Cost Effectiveness Analysis, Guidelines for Managers of Diarrheal Diseases Control Programs.
9. Guidelines for MLEC- 2,3,4,5, SAPEL, LEC.
10. Financial Guidelines of WHO for the MLEC.

2.Critical Review: A Prospective Study on the Effect of Home-based Neonatal Care management of Sepsis on Neonatal Mortality

Introduction:

This article " A prospective study on the effect of home-based neonatal care management of sepsis on neonatal mortality" was published in the journal "The Lancet, December 1999". In this article Abhay T Bang described about a field trial in the Godchiroli district in India; the effect of home based neonatal care and management of sepsis on neonatal mortality in the Indian community. It is very use full for us to reduce infant mortality. Dr Abhaya Bang did a pilot study and then he has done an interventional study in 39 villages and published his results.

Objective:

To do a critical review of this article "Effect of home based neonatal care and management of sepsis on neonatal mortality".

<u>**Critical Review:**</u>

1.Title:

In rural India should be omitted and might be written Godchiroli district India. Because India is not a rural area, it is a combination of rural and urban population. Time, the year of study should be mentioned.

2. Summary:

2.1. Background: It addresses the real problem and the hypothetical solution for it.

2.2. Method: Study method has been mentioned properly. The team did a pilot study for baseline data and then they did the study proper.

2.3. Findings: Findings were of positive value.

2.4. Interpretation: Proper and useful. The summary is nice and this article is worth reading.

3. Introduction:

The author has mentioned the background, the problems according time place and person properly. Author has mentioned the hypothetical result here and we have to read further to know whether this hypothetical result is accepted or rejected. He has mentioned here about the Integrated Management of Childhood Illness Program and it's lacuna that it has not included the management of neonatal sepsis. The Author has become hopeful about this study as he has become successful in a study "Management of pneumonia in neonates with oral co-trimoxazole given by village health workers". In this introduction the author has again mentioned rural India, but India is not rural, he should mention the rural areas of the country India.

4. Description of evidences:

4.1. What was the exposure or intervention?
4.2. What was the outcome?
4.3. What was the study design?
4.4. What was the study population?
4.5. What was the main result?

4.1. Exposure

In this study the author and his team has collected the baseline data from April 1993 to March 1995. The health workers did a baseline survey and collected the data from 100 villages about live birth, neonatal death, infant death and stillbirth. This is highly necessary and with this baseline data we can compare the reports after the intervention study. By this comparison we can get the accurate result. If we do not do this study we have to compare the study result with the data of the state, by which we may miss the smaller variations. So we can get an accurate result and accurate comparison. Before the intervention both the male and female health workers were trained to take the history pregnant women, neonatal care, case management of pneumonia, neonatal sepsis.

In this study, neonatal care was introduced in 39 intervention villages of Gadchiroli district in the state of Maharastra, India in a stepwise manner over a period of 3 years. In the first year of intervention (1995-1996), female health worker listed the pregnant women in the villages, collected data by home visits, observed labor and neonates at birth. The female health worker did home visits on days 1,2,3,5,7,14,21,28 and in any other day if the family called. She takes the history, examines mother and child, weighed the child every week, managed minor illnesses and refers the cases if necessary. They followed up the neonates for 28 days after birth, until the mother left the village or until the neonates died, which ever was earlier.

In the second year of intervention (1996-1997), the female health workers were trained in home-based management of neonatal illness. They gave such care since April 1996, as well as they managed neonatal sepsis from September 1996, in addition to previous tasks.

In the third year of intervention (1997-1998) they provided health education to mothers and grand mothers about care of pregnant mothers and neonates.

4.2. Outcome:

The indicator for the out comes; of this intervention study was neonatal, infant and perinatal mortality rate in the intervention villages as well as the control villages. 93% of neonates received home-based neonatal care.

After the intervention the outcome was neonatal mortality rate, infant mortality rate and perinatal mortality rates in the intervention area (net percentage reduction) compared with the control area were 25.5 (62.2%), 38.8 (45.7%) and 47.8 (71%) respectively ($p<0.001$). Case fatality in neonatal sepsis declined from 16.6% (163 cases) before treatment, to 2.8% (71 cases) after treatment ($p<0.01$).

In 1997-1998 this home based neonatal care averted one death (fetal or neonatal) per 18 neonates cared for.

4.3. Study Design:

It was a non-randomized controlled field trial done in Gadchiroli district, Maharastra, India during April 1995 to March 1998.

4.4. Study population:

All the neonates of 39 intervened villages and 47 control villages of Gadchiroli district, Maharastra, India from April 1995 to March 1998.

4.5. Result:

Population characteristics at baseline in the intervention and the control area were similar. Here the case and control are similar. In the intervention area 94.6% were home delivery and 43% neonates had low birth weight (<2500 grams).

The mean agreement between the data recorded by the village health worker and the physician on 47 variables was 92.3% with standard deviation 7.4. It is important for exclusion of the measurement bias.

97.5% preferred care for ill neonates from the village health guide as care was available in the village itself and the care is free of cost.

Other results have been expressed in tabular manner below.

Table-1: Effect of Intervention on mortality rates: (1993-1995, 1995-1998)

	Intervention area				Control area			
	Base line 1993-95	Intervention period			Base line 1993-95	Intervention period		
		Year-1 1995-96	Year-2 1996-97	Year-3 1997-98		Year-1 1995-96	Year-2 1996-97	Year-3 1997-98
Number of villages	39	39	39	39	47	47	47	47
Total population	39322	40110	40520	41353	42617	43803	44498	45383
Live births	1999	1016	804	979	2271	1074	940	1108
Crude birth rate*	25.4	25.3	19.8	23.7	26.6	24.4	21.1	24.4
Still birth	55	34	29	26	55	46	36	51
Still birth rate‡	32	32.4	34.8	25.9	23.6	41.1	36.9	44
Neonatal deaths (0-6 days + 7-27 days)	75+49	33+19	25+4	22+3	96+35	55+15	31+16	55+11
Early neonatal mortality rate ♣	37.5	32.5	31.1	22.5	42.3	51.2	33	49.6
Late neonatal mortality rate ♣	24.5	18.7	5	3.1	15.4	14	17	9.9
Neonatal mortality rate ♣	52	51.2	36.1	25.5	57.7	65.2	50	59.6
Infant deaths (0-11months)	151	74	38	38	175	96	64	83
Infant mortality rate ♣	75.5	72.8	47.3	38.8	77.1	89.4	68.1	74.9
Perinatal mortality rate ‡	68.3	63.8	64.8	47.8	64.9	90	68.7	91.5

All the data are numbers except these.

* per 1000 population

‡ per 1000 births

♣ per 1000 live births

Table-2: Change in Case Fatality Rate by Birth weight and Maturity.

	1995-1996			1996-1997			1997-1998			% Change in CF (1995-96 to 1997-98)	P-value
	Deaths	Neonates	CF (%)	Deaths	Neonates	CF (%)	Deaths	Neonates	CF (%)		
Birth weight (g)											
<1500 g	9	13	69.2	6	13	46.2	4	16	25	-63.9	0.045
1500-1999	18	61	29.5	4	47	8.5	5	47	10.6	-64.1	0.033
200-2499	9	246	3.7	4	243	1.6	4	258	1.6	-56.8	0.230
>2500	1	417	0.2	2	365	0.5	5	574	0.9	+350	0.395
Unknown	3	26	11.5	0	17	-	4	18	22.2	-	-
Gestation period (weeks)											
<34	15	29	51.7	3	24	12.5	7	21	33.3	-35.6	0.315
35-37	10	46	21.7	3	53	5.7	2	72	2.8	-87.1	0.003
>37	14	673	2.1	10	597	1.7	11	801	1.4	-33.3	0.398
Unknown	1	15	6.7	0	11	-	2	19	10.5	-	-
Total	40	763	5.2	16	685	2.3	22	913	2.4	-53.8	0.003

CF = Case Fatality.

Table-3: Home-based case management of suspected neonatal sepsis and outcome (1995-1998).

Management	Cases	Deaths	Case fatality (%)
Before training in sepsis management*	163	27	16.6
After training ♣			
Treated by VHW	71	2	2.8
Not treated (missed by VHW)	19	5	26.3
Parents refused treatment	14	2	14.3
Hospital treatment	7	1	14.3

VHW = Village Health worker.

* April 1995 to August 1996 there was no sepsis management.

♣ September 1996 to March 1998, p<0.001 for comparison of row 1 vs row 2, and of row 2 vs 3 and 4.

Table-4: Change in cause specific neonatal mortality rate in the intervention area. (1995-1996, 1997-1998)

Cause of death	Neonatal mortality rates*		Absolute change in rate	Change (%)
	1995-1996	1997-1998		
Prematurity	7.9	6.6	-1.3	-16.5
Birth asphyxia	10.5	5.5	-5.0	-47.6
Neonatal sepsis	27.5	6.6	-20.9	-76 ♣
Others	1.3	1.1	-0.2	-15.4
Not known	5.2	4.4	-0.8	-15.4

* per 1000live births

♣ p = <0.005

Table –5: Neonatal mortality rate and Relative risk in Intervention and Control Area, (1995-1998)

Study Area/RR	Neonatal Mortality Rate			
	1995-1996	1996-1997	1997-1998	1995-1998
Intervention Area	51.2	36.1	25.5	37.8
Control Area	65.2	50	59.6	58.6
Relative Risk	0.8	0.7	0.4	0.6

Table-1 and table-2 show the mortality rates both in intervention area and control area but in table-3 cause specific mortality rate has been described but there should be a comparison between the control and intervention area. In these tables the author has arranged the information completely and beautifully.

5. Internal validity-

(a) Consideration of non-causal explanations.

5. (a). 1. Are the results likely to be affected by observation bias?

The 39 intervened villages and 47 control villages have been chosen in a non-randomized manner and there may be chance of some selection bias.

The female health workers have collected the data. The mean agreement between the data recorded by the village health worker and the physician on 47 variables was 92.3% with standard deviation 7.4. It is important for exclusion of the measurement bias. But when we consider the neonatal sepsis and pneumonia, there may be some difference in diagnosis. The health worker might not have diagnosed the cases properly and during preliminary stage the parents might not have recognized the diseases and there may be late to take the baby to hospital. So there may be death of the baby when taken to the hospital late. It may distort the result.

5. (a). 2. Are the results likely to be affected by confounding?

Socio economic condition, cultural backgrounds, birth weight, literacy and knowledge about neonatal care may be the confounders. As the baseline data of both intervened and control villages are similar, we can tell there might not be any effect of the confounders. Still then there may be some difference in the neonatal care practices and literacy and awareness, IEC (Information, Education, Communication) play a great role in it. Another confounder may the hospitals in the area. If it is nearby then the people take their children to the hospital quickly. Here also literacy, cultural factors and awareness play an important role.

There might be some program for Maternal and Child Health in the district and state and it might affect the infant mortality rate. It might act as a confounder.

In Table-2 it shows that the case fatality has been decreased gradually in the strata of low birth weight babies since 1995 to 1998. It is well known that the low birth weight babies are more prone to pneumonia, neonatal sepsis and other diseases. Due to the home based neonatal care the case fatality might have been decreased. It is also found from the table-2 that the decrease of case fatality is same in all the three strata of low birth weight babies. So it is clear that here the low birth weight is not a confounder.

In this table it is found that the case fatality among the babies with normal birth weight has been increased during 1995 to 1998. With so much health care at the door step the case fatality should not be increased. It should either remain same or decrease instead it has been increased. The neonatal sepsis and pneumonia may be most common in low birth weight babies and it may be less prevalent in the normal birth weight babies. These diseases have been taken care of more and the case fatality among the normal birth weight babies. But it is not the case. In the discussion the probable causes should be highlighted. It has been informed in the discussion part that, there was another study in the same Gadchiroli district for detection of high-risk neonates and home based management of pre term or low birth weight babies, but not for management of neonatal sepsis. The female health workers were being trained for these activities. It might be the answer of the question why there was so much decrease in neonatal mortality rate in the babies of <2500-gram birth weight but why there is increase in the neonatal mortality rate among the normal birth weight babies. This training to the female health workers and the study in the same area about the same topic except the management of neonatal sepsis may act as a confounder. This has been taken care by taking the base-line data from the same area. In the discussion part the author has mentioned about the specificity of the management of home-based management of neonatal sepsis and he has mentioned that difference of the decrease of the neonatal mortality rates from the base-line data in the two studies might be specific for the management of neonatal sepsis. But the effect of the previous study is still there, it may act as a confounder.

In table-2 again we can find that the neonates have been stratified according to gestational period. It is found that in all the strata the case fatality has been decreased during the year 1995-1998. So we can opine that the period of gestation may not act as a confounder here.

5. (a). 3. Are the results likely to be affected by chance variation?

Another thing comes to mind, whether these results are significant or it may be due to merely by chance. The author should generate a null hypothesis and show the degree of association and prove the statistical significance.

5. Internal validity - (b) Consideration of positive features of causation.

5. (b). 1. Is there a correct time relationship?

The author did a base line survey in the intervened as well as control villages for three years from 1993 to 1995. Then he studied for three years from 1995 to 1998. Both the base line study and intervention study are for same time period. Neonatal care was introduced in three phases.

In the first phase during 1995 to 1996 female village health workers listed the pregnant women in the villages and collected the data by home visits in the third trimester, they observed labour and neonates at birth and also they did regular home visits.

In the second year of the study, 1996-1997 the female workers were trained in home-based management of neonatal illness and they gave such care since April 1996 and managed neonatal sepsis from September 1996.

In the third year 1997-1998 health education to the mothers and grand mothers about care of pregnant women and neonates was added to the program.

As neonatal care was introduced in three phases, the study period took three years to be completed. In the last year of the study the health education was introduced. People usually take some time to work out the health education and they take some time to change their usual practice. During the same year of health education, the effect might not be expressed and come in to picture. So the relation between the effect of the health education and neonatal care might not have been come in to picture. The effect could have been studied properly during the next year during 1998-1999. It might be better to make the study period four years instead of three years.

5. (b). 2. Is there a dose-response relationship?

In this study there is dose response relationship but in relation to the study objective, there is no need to evaluate it or express it. Because though the health education to the pregnant mothers can be increased and the increase in the level of knowledge has positive relationship with the study indicators, it is not the study subject. Here there is no need to evaluate the dose response and there is no need to write here in the article.

5. (b). 3. Are the results consistent with the study?

The result of the study is consistent with the study method. The team has collected the data according to the study method mentioned as before.

In the table-2 it is found that the decrease in case fatality among all the subgroups is similar among the infants below 2500 grams birth weight after the intervention. The result is consistent.

In the table-4 it is found that the decrease in case fatality rate within the subgroups as prematurity, birth asphyxia, others and unknown are more or less same. The decrease in case fatality rate is high in neonatal sepsis.

Inference is that the results are more or less consistent with the study.

5. (b). 4. Is there any specificity within the study?

In this article the specificity for the study is about the home-based neonatal care for neonatal sepsis. Here also the study is not totally specific for the neonatal sepsis. The decrease in infant mortality rate due to other causes is also included in the study.

Summary of Internal validity:

The internal validity of this study is high. It is difficult to argue against the study results and causality. There are a few cofounders in this study and the confounders have been taken care by taking the base-line data and stratification according to birth weight. But the previous study in the same area about the management of low-birth babies may act as a confounder here. It might be taken care by doing this second study in a different area.

6.External validity: generalization of the results.

6.1. Can the study results be applied to the eligible population?

6.2. Can the study results be applied to the source population?

6.3. Can the study results be applied to other relevant population?

6.1. Can the study results be applied to the eligible population?

Here the eligible population consists of the neonates who took birth subsequently during the study (1997,1998) from the parents residing in these intervened and control villages. They have been included in this study. Some parents might be there in the study area who might have two pregnancies during these three years of study period. Here there is no information about it. The case fatality rate has been decreased gradually in all the eligible population but in the stratum of more than 2500 grams birth weight it has become reverse. So it is not applicable to all the eligible population. So the study results are not applicable to all the eligible population.

6.2. Can the study results be applied to the source population?

The source population is the population of the neonates during the study period. Here the result is not applicable to the source population, as the result is applicable to the babies who had the birth weight less than 2500 grams but the result is reverse for the normal birth weight babies. The number of babies in the community with normal birth weight is more than that of the low birth weight babies. So the result is not applicable to the source population.

6.3. Can the study results be applied to other relevant populations?

The study results cannot be applied to all the population in the country. We have to see whether the study population is a representative of all the target population of the country. If similar types of studies have been done in other areas of the country and the study results are same, it can be taken as a proof that the study result can be applied to other relevant populations. The people of the community are more or less similar in the country but there may be some differences in the cultural practices. There are differences between the rural and urban population, their culture, standard of living, style of living, per capita income and availability of health facilities. In this study, in the title it is written that the rural India and it implies the study is applicable to the people of the rural areas only. The study has been accomplished in the communities or in villages only and the study population is the people of the communities. A few similar studies has been done in other part of the country; out side the country and found same result as this study. One of them was from the rural areas of Guatemala and other study was from the slums of New Delhi. The slum dwellers in the cities have low per capita income and similar way of living as the rural people. So the study result is applicable to other rural population or similar or relevant population but it is not applicable to all the population of the country and the rural population out side the country. Another contradiction is the decrease in infant mortality rate was for the low birth weight babies but there were increase in infant mortality rate in the stratum of normal birth weight babies, though there is decrease in infant mortality rate as a whole. In the country and outside the country the percentage of normal birth weight babies is more than the low weight babies. So the study result cannot be applicable to the relevant population though there is a major effect in the result when we consider the whole population.

7. Comparison of these study results with other evidence.

7.1.Are the result consistent with other evidence, particularly evidence from studies of similar or more powerful study design?

7.2. Does the total evidence suggest any specificity?

7.3. Are the results plausible in term of the biological mechanism?

7.4. If a major effect is shown, is it coherent with the distribution of exposure and the outcome?

7.1.Are the result consistent with other evidence, particularly evidence from studies of similar or more powerful study design?

A few similar studies of home-based neonatal care are available. One of them was from the rural areas of Guatemala and other study was from the slums of New Delhi. In these studies it has been reported that the use of injectable antibiotics to treat suspected neonatal sepsis at home decreased the case fatality rate in both of the studies. The same authors in the same Gadchiroli district did another similar study previous to this study. They reported decrease in case fatality rate after the home based care.

In an uncontrolled field study near Pune, village health workers were trained to detect high-risk neonates and in home-based management of pre term or low birth weight babies. In that study the neonatal mortality rate was reduced by 25.1% from the base-line study. In the present study the neonatal mortality rate decreased by 59% from the base-line study. The authors have mentioned that the difference between this 25.1% and 59% was probably the contribution of sepsis management.

It is inferred that the result is consistent with other evidences.

7.2. Does the total evidence suggest any specificity?

The specificity of the result in regard to the home-based management of sepsis is important, as it is a major cause of the neonatal mortality in the country. In this study the home-based neonatal care and the home-based neonatal care have been mixed up. As there was another study about the home-based neonatal care of the pre-term low birth weight babies before this study, it is not a specific study for management of neonatal sepsis. If this study has been done in another area it might be specific for both the parts of the studies. In the discussion part the author has mentioned that the difference between the decrease of the neonatal mortality rate from the base-line study of the home-based management of low birth weight and premature babies and the decrease in neonatal mortality rate from the base-line study of the home-based management of neonatal care and neonatal sepsis might be the specificity of the management of neonatal sepsis at home. But in the result part the author has not discussed it. The author has not given any statistical significance for it. So the total evidence does not suggest any specificity clearly.

7.3. Are the results plausible in term of the biological mechanism?

The result is plausible or reasonable to some extent not to full extent. The result is reasonable, as the study has been done in a stepwise manner and according to the need in the community. The steps were from the observation and data collection about the delivery to the growth monitoring in infancy. So the study shows that it is a reasonable. Here biological method cannot be tested as in test animals. Another result goes against the plausibility that the result is just the reverse in case of the normal birth weight babies. The result should be the same in all the strata.

7.4. If a major effect is shown, is it coherent with the distribution of exposure and the outcome?

Here the decrease in infant mortality rate by this home-based management of neonatal sepsis is a major effect. This is coherent with the distribution of exposure and the outcome except the normal birth weight babies. The normal birth weight babies are the major stratum in the community. So the result is incoherent with the distribution of exposure and the outcome.

Summary of the external validity:

It shows that the result is consistent with other studies though a few similar studies have been done. The result of the study, home-based neonatal care and management of neonatal sepsis is not specific for the neonatal sepsis. The neonatal sepsis is most important as it is a major cause of infant mortality rate in our country but the result is not specific for it. The home-based neonatal care has modified the specific result for the decrease in infant mortality rate a lot. The result is reasonable but to some extent. Though there is a decrease in the neonatal mortality rate as a whole, the neonatal mortality rate in the normal birth weight babies has been increased. The result is reasonable to some extent and it is incoherent with the distribution of exposure and the outcome.

Conclusion:

This is a non-randomized controlled field trial in the Gadchiroli district Mahrastra. In this study there is no observation bias, a few confounders taken care by base-line data, high internal validity and low external validity.

Progress subsequent to this study:

A specific study for home-based management of neonatal sepsis should be done in another area other than Gadchirolli district. It should be one randomized control trial.

3.Critical Rivew: A Case-Control study of Screening Sigmoidoscopy and Mortality from Colorectal Cancer.

Introduction:

This article "A case-control study of screening sigmoidoscopy and mortality from colorectal cancer" has been published in the New England Journal of Medicine on 5th March 1992. A case-control study was done by Dr Joe V Selby and his team and published the report about the effect of the screening sigmoidoscopy and mortality from colorectal cancer. If the colorectal cancer can be diagnosed in early stage then mortality rate due to this particular cancer can be prevented. So this study is very useful for mankind.

Critical Review:

1. Title: The title is appropriate but the year should be mentioned.

2. Abstract:

2.1. Background:

In the background the problem, it's real solution and alternative solution has been mentioned. There is no necessity to write about the need of the study, as it is self-implicating.

2.2. Methods:

It is a matched case-control study. The controls have been matched by age and sex. Retrospective study for ten years before the diagnosis has been done for the screening with sigmoidoscopy. The method is appropriate as it is a matched case-control study.

2.3. Results:

Result is clear and there is statistical significance of the results.

3. Introduction:

In the introduction it has been discussed about the advantage and disadvantage of the sigmoidoscopy and it has been mentioned the casue and references about the non-use of the procedure as a regular screening process. Here the disadvantge of randomized control trial, which are the ideal study design and the advantage of case-control study for this particular procedure over the ideal study design has been mentioned clearly. In the introduction also confounding and stratification for confounding has been discussed briefly and clearly.

4. Description of Evidences:

4.1. What was the exposure or intervention?
4.2. What was the outcome?
4.3. What was the study design?
4.4. What was the study population?
4.5. What was the main result?

4.1. Exposure:

<u>Cases:</u> Case subjects included plan members 45 years and older who were found to have adeno carcinoma of the colon or rectum between 1971 and 1987 and who died of the cancer by the end of 1988. Deaths were ascertained from registry information of 1331 patients and 381 patients from automated linkage to California state death certificates.
261 cases were reported which could have been detected by sigmoidoscopy. A random sample of 268 cases was selected from the remaining cases in which the adenoma was above the reach of the sigmoidoscope that is above 20 cm from the anus.

Controls: Four or less control subjects were matched with the case subject.

Inclusion criteria of the controls:

1. Each control should be alive and a member of the health plans.
2. Control subjects with a history of adenomatous polyps or nonfatal colorectal cancers were not criteria of exclusion.

Out of 261 case-control sets 136 sets having four controls, 81 had three controls, 37 with two controls, 7 with one control.

One control was selected for each of the 268 patients with colorectal cancer that was above the reach of the sigmoidoscope.

4.2. Outcome:

24.2 percent controls had undergone screening of sigmoidoscopy in contrary to 8.8 percent cases during 10 years period.

The case subjects had undergone fewer health checkups, screening by digital rectal examinations and screening occult blood tests than controls.

The number of sigmoidoscopy was strongly correlated with the number of periodic health examinations in the control group, lesser extent with the number of rectal examinations and occult-blood tests.

The odds ratio for exposure to one or more sigmoidoscopies during 10 year period was 0.3 for the case as compared with control.

The association did not differ according to sex, age at diagnosis.

The adjusted odds ratio for the confounder was 0.41.

The efficacy of screening, in the cases beyond the reach of sigmoidoscopes; beyond 20 centimeter above the anus and controls is very less.

Screening every 10 years is as efficacious as screening more frequently.

4.3. Study Design: It is a matched case-control study.

4.4. Study Population:

Cases: Case subjects included plan members 45 years and older who were found to have adeno carcinoma of the colon or rectum between 1971 and 1987 and who died of the cancer by the end of 1988. Deaths were ascertained from registry information of 1331 patients and 381 patients from automated linkage to California state death certificates. 261 cases were reported which could have been detected by sigmoidoscopy. Total cases are 1712 patients.

Controls: Four or less control subjects were matched with the case subjects. Total controls are 868 patients. Inclusion criteria of the controls:

1. Each control should be alive and a member of the health plans.
2. Control subjects with a history of adenomatous polyps or nonfatal colorectal cancers were not criteria of exclusion.

Out of 261 case-control sets 136 sets having four controls, 81 had three controls, 37 with two controls, 7 with one control.

One control was selected for each of the 268 patients with colorectal cancer that was above the reach of the sigmoidoscope.

4.5. Main Result:

Table: 1 History of screening tests during the 10 years period before the diagnosis of Fatal cancer with the Reach of the Rigid Sigmoidoscope in the Case Subjects.

Variables	Case subject (n=261)	Control subject (n=868)	P value
Screening sigmoidoscopies			
No of subjects (%)			
0	238 (75.8)	658 (75.8)	<0.0001
1	16 (6.1)	118 (13.6)	<0.0001
>1	7 (2.7)	92 (10.6)	<0.0001
Mean no of screening digital rectal examination	1.64	2.5	<0.0001
Mean no of screening occult blood test	0.18	0.4	0.003
Mean no of periodic health check up	1.3	2.5	<0.0001

Table: 2 Odds of Having Had at Least One Screening during the 10-Year Period before the Diagnosis of Fatal Cancer Subjects.

Adjustment	Case subject (n=261)	Control subjects (n=868)	Odds ratio (95% CI)
Cancer within reach of the sigmoidoscope		Number (%)	
Unadjusted	23 (8.8)	210(24.2)	0.30(0.19-0.48)
History of colorectal cancer or polyp, family history of colorectal cancer	-	-	0.25(0.16-0.42)
History of colorectal cancer or polyp, family history of colorectal cancer no of periodic health check ups.	-	-	0.41(0.25-0.69)
Cancer above the reach of sigmoidoscope		Number (%)	
Unadjusted	56 (22.9)	67 (25)	0.8(0.54-1.19)
History of colorectal cancer or polyp, family history of colorectal cancer	-	-	0.8(0.54-1.19)
History of colorectal cancer or polyp, family history of colorectal cancer, no of periodic health check ups	-	-	0.96(0.61-1.50)

Table: 3 Screening sigmoidoscopy in case subjects and controls during 10 years before the diagnosis of fatal cancer within reach of the sigmoid scope in the case subjects.

Year before diagnosis	No (%) undergone sigmoidoscopy		Matched odds ratio (95% CI)
	Case (n=253)	Control (n=762)	
0-2	6(2.3)	68 (7.8)	0.28 (0.12-0.65)
2-4	10 (3.8)	73 (8.4)	0.43 (0.22-0.87)
4-6	9 (3.4)	89 (10.3)	0.33 (0.16-0.67)
6-8	6 (2.3)	72 (8.3)	0.25 (0.11-0.60)
8-10	5 (1.9)	59 (6.8)	0.26 (0.1- 0.66)

Table-4: Most recent screening sigmoidoscopy in case subjects and controls before the diagnosis of fatal cancer within reach of the sigmoidoscope in the case subjects.

Year before diagnosis	Number (%) Case (n=253)	Control (n=762)	Matched Odds ratio (95%CI)
1-2	4 (1.6)	27 (3.5)	0.41(0.14-1.22)
3-4	5 (2)	20 (2.7)	0.74 (0.27-2.01)
5-6	5 (2)	30 (4.2)	0.44 (0.17-1.15)
7-8	1 (0.4)	27 (3.2)	0.11(0.01-0.83)
9-10	1 (0.4)	21 (3.2)	0.12 (0.02-0.93)

5. Internal validity:

5. (a) Consideration of non-causal explanations.

5. (a). 1. Are the results likely to be affected by observation bias?
5. (a). 2. Are the results likely to be affected by confounding?
5. (a). 3. Are the results likely to be affected by chance variation?

5. (a). 1. Are the results likely to be affected by observation bias?

Within a period of 10 years one person might not have screened all the cases, so there might be inter personal observation bias.

As it is a retrospective study there may be intra personal bias.

Here in this study the death records have been scrutinized only, so that the true picture might not be reflected in the registers.

In the scrutiny there may be some bias, but it has been taken care by administering two persons for scrutiny.

Whether all the patients were followed up or not; is not mentioned here.

In some patients the colorectal cancer developed within three years. Their lesions have been missed during screening or it developed within this period.

5. (a). 2. Are the results likely to be affected by confounding?

The results are likely to be affected by confounding as socio-economic status, food habits, in take of alcohol and smoking, intake of roughage in the diet, taking non-vegetarian diet and sedentary life etc.
Membership of the health facility and regular health check up has taken care of the most important confounder the health advice.

5. (a). 3. Are the results likely to be affected by chance variation?

In this matched case-control study the controls have been matched with cases according age within one year and sex. Here odds ratio and confidence interval have been calculated. Again these unadjusted odds ratio has been adjusted for the family history of colorectal carcinoma or polyps and the estimated risk decreased to 0.25 (0.16-0.42). Again it was adjusted for the number of periodic health check ups and the odds ratio increased to 0.41 (0.25-0.69). Chi square test should be done to prove the association because the association might be by chance.

5. (b) Consideration of positive features of causation.

5. (b). 1. Is there a correct time relationship?
5. (b). 2. Is there a dose-response relationship?
5. (b). 3. Are the results consistent with the study?
5. (b). 4. Is there any specificity within the study?

5. (b). 1. Is there a correct time relationship?
Yes there is a correct time relationship in the study.
5. (b). 2. Is there a dose-response relationship?
The retrospective study for ten years was stratified to two years each. Table-3 shows that the odds ratios are more or less same for the stratifications. The confidence intervals are very large. When the recent sigmoidoscopy is taken in to consideration, with this 2 years stratification; the odds ratios were found similar and with wide confidence interval. It can

be concluded that increase in frequency of sigmoidoscopy has not influenced the outcome. So there is a few dose response relationships in this study.

5. (b). 3. Are the results consistent with the study?

The results may not be consistent in this study. This result might not be similar in other countries also, but there are a few studies like this. There is also variation in food habits and intake of roughage and fiber in diet and there is difference in intake of processed food materials in different countries. So we cannot tell that the study is consistent through out the world.

5. (b). 4. Is there any specificity within the study?

The mortality due to colorectal cancer depends on, how quickly the disease has been screened out and how quickly it has been removed out before metastasis. As the cancer is not so common many people might not have this disease during their lifetime. Here in this study the food habits which has a big role on this cancer has not been taken in to consideration. It cannot reduce the mortality rate directly. So there is less specificity in this study.

Summary of internal validity:

In this study dose response relationship and specificity have not been fully established. The study may not be consistent through out the world and through out all the races. It is difficult to say about the effect among different age groups. There should be further studies to know about the racial factor and food habits and age group distribution. As it is a fatal disease, this study is important for the world.

6.External validity: generalization of the results.

6.1. Can the study results be applied to the eligible population?

Here eligible population is the disease occurring next time in the same population. But as it a fatal disease it cannot be applied to the eligible population. We can go for a prospective study for some years within the members of the particular health facility.

6.2. Can the study results be applied to the source population?

Source population is all the members of the health facilities. It can be applied for all the source population.

6.3. Can the study results be applied to other relevant population?

The study result may not be applied to other relevant population. Some correlation is there between colorectal cancer and food habits, smoking, life style, fibers in the diet, intake of processed foods is there. The result has been taken in the age group of 45 years or beyond that. So it is difficult to apply the result to the lower age group of population. From some studies it is believed that fiber in the diet protects from colorectal cancer, more the processed food in the diet, smoking, alcohol consumption, family history, increased food colors and preservatives in the food, spices in the food increases the risk of this cancer. These food habits are different in one country. There may be some racial factor in it. But this result may not be applied in different parts of the world. So there should be some more studies in the world.

7. Comparison of these study results with other evidence.

7.1.Are the result consistent with other evidence, particularly evidence from studies of similar or more powerful study design?

The author has not shown any other references or similar studies for comparisons in this paper. So it is difficult to say about the consistency of the result with other evidences.

7.2. Does the total evidence suggest any specificity?

Due to the screening procedure more number of precancerous lesions of colon, rectum; benign and malignant lesions of the colon can be screened out and necessary precautions can be taken. So it can reduce the mortality due to colorectal cancer.

7.3. Are the results plausible in term of the biological mechanism?

Rigid sigmoidoscopy is a screening test. Now fibro optic flexible sigmoidoscope has been invented and it is easier and more area can be screened out. It is a diagnostic procedure, so that, the biological mechanism cannot be determined in this study.

7.4. If a major effect is shown, is it coherent with the distribution of exposure and the outcome?

Yes, there is coherence between exposure and outcome.

Summary of External validity:

This study has some deficiency in external validity and further studies should be done and correlated with it. This study is an important study as it is beneficial to mankind.

Conclusion:

This study is necessary for the mankind as the screening can decrease the mortality due to colorectal cancer although it is indirect. In this study the overall result has positive aspects and it needs some further studies to complete the study. The result till this is also enough for publish for the benefit of the mankind.

Further studies:

A prospective study can be conducted, though it is very difficult.

4.Evaluation of Orissa Multi Disease Surveillance System, Dhenkanal district, Orissa 2003.

1. Introduction:

Surveillance- Surveillance is defined as the "ongoing systemic collection, compilation, analysis and interpretation of data; and the dissemination of information to those who need to know in order that action may be taken."

Importance of disease surveillance system- The main purpose of surveillance is to detect changes in trend or distribution in order to initiate investigative or control measures. Surveillance must also follow the control measures. It also goes beyond the passive reporting of cases. It includes laboratory conformation of presumptive diagnosis, finding out the source of infection, routes of transmission, identification of all cases and susceptible contacts and still others who are at risk in order finally to prevent the spread of disease. Surveillance may comprise

(a) Individual surveillance.
(b) Local population surveillance.
(c) National population surveillance.
(d) International surveillance.

OMDSS of Dhenkanal is the Local population surveillance. It has been started from the year 1999 and managed by Orissa Health Systems Development Project (OHSDP) with staffs, vehicles, DOL, computers and data entry operators.

2. Objectives of evaluation:

1. Evaluation of structure:
   - To assess the achievement of the objectives of the OMDSS in Dhenkanal district.
   - Resources
   - Organizational procedures or inputs to the system.
2. Evaluation of Surveillance process.
   - Identification of gaps and underlying factors contributing to the gaps- (may be process, structure, and outcome variables).
   - Interpretation, presentation and communication of findings.
3. Evaluation of output:
   - Suggestions for appropriate measures to narrow down the gaps.

Description of the existing Surveillence system in Dhenkanal District.

1.Brief background of OMDSS in Dhenkanal district:

In October 1999, Orissa was affected by a super cyclone and there was apprehension of epidemics in these coastal districts. To detect the outbreaks and to prevent these from developing into epidemics, Government of Orissa with support from WHO implemented the Orissa Multi Disease Surveillance System in these 12 cyclone affected coastal districts on November 1999. The effectiveness of this system in these 12 districts led the Government to expand it to all the 30 districts. In this second phase OMDSS was implemented in the Dhenkanal district. Orissa Health Systems Development Project has provided hardware, software and human resources for computerized data processing and transmission in the district and state level.

2. Objectives of the OMDSS:

- Epidemic detection in the district and intervention.
- Prediction of outbreak in the district.
- Monitoring trends in endemic illness.

- Monitoring progress towards a control objective.
- Monitoring program performance.
- Evaluation of an intervention in the district.
- Estimating future disease impact.

3. List of various diseases under Surveillance:

These are the diseases listed which are under surveillance under OMDSS.

Diseases/ Syndromes:

- Simple diarrhea,
- Severe diarrhea,
- Bloody diarrhea,
- Suspected malaria,
- Acute Respiratory Infection,
- Measles,
- Neonatal Tetanus,
- Acute Jaundice Syndrome,
- Suspected meningitis,
- Unusual Syndromes like, some infectious diseases spreading in the community, food poisoning, some chemical poisoning.
- Seasonal disorders,
  - During Summer = Heat disorder,
  - During flood and cyclone = Skin infection like scabies, impetigo; Snake bite.

The other descriptions of the Orissa Multi Disease Surveillance System going on in Dhenkanal district has been described in Section-1.

Evaluation of the surveillance system

Introduction:

In the Orissa Multi Disease Surveillance System, these diseases included are of public health importance. Most of the patients come to the hospital, suffering from these diseases like Acute Respiratory infection, Simple diarrhea, severe diarrhea, Dysentery, Suspected malaria. Measles has public health importance as it has high morbidity and mortality among children and it is epidemic prone, Meningitis has been included as it has high mortality rate, Acute Jaundice has been included as it is epidemic prone, Neonatal tetanus shows the immunization status of the pregnant mothers and it is the window of the immunization status of the locality. We have to evaluate whether these diseases should or should not be included in to the surveillance system and whether any other diseases are to be included into the system. Apart from that it can be evaluated whether the objectives of the surveillance system fit to it or any others will be added to it. Whether the objectives of the system fulfill the need of the health management adequately or anything is lacking behind. The evaluation should be done whether the structure of the OMDSS is up to standard or any thing lacking behind; whether the process is simple in design and operation; flexible to admit changes in design and operation modes; acceptable to the health workers, administrators and community; sensitive to capture all disease occurrence events under surveillance, whether the predictive value is high to avoid wastage of scare resources in unnecessary response efforts; whether it is representative of the population intended to be covered; whether there is timeliness in information processing, response and feedback. Then at last it is to be evaluated about the outcome; whether there is any outcome or not, and if there is outcome whether it is satisfactory or not.

Evaluation area: Beltikiri PHC area.

Methodology:

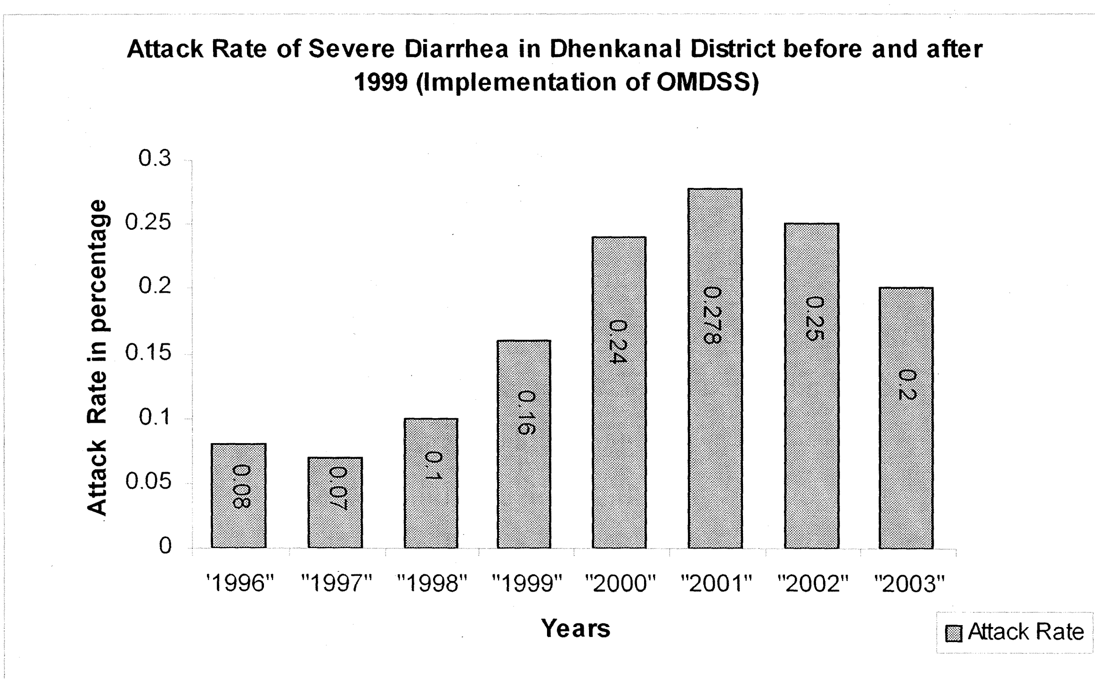
A. **For objectives:**

- Comparison of the prevalence rate of these diseases before and after implementation of OMDSS.
- Number of epidemics to be compared before and after implementation of OMDSS.
- Whether any anticipation could be done before and after implementation of OMDSS.

- A.1.Comparison of the prevalence rate of these diseases before and after implementation of OMDSS:

Before implementation of the OMDSS in the year 2000, there was no such strong system for surveillance of all these public health important diseases. There were vertical programs as surveillance of malaria under NMEP in the districts. Yearly disease reports were sent to the district head quarter without any action before OMDSS. We can compare attack rates of severe diarrhea before and after 2000.

Fig: 1 Attack rate of severe diarrhea inDhenkanal district before and after year 2000.



The prevalence rate has gradually increased may be due to better reporting and after 2001 the prevalence has decreased.

A.2. Table 1: Number of Epidemics before implementation of OMDSS.

Name of disease which caused an outbreak	Number of outbreaks recorded during the following years.		
	1996-97	1997-98	1998-99
Diarrhea	Not available	32	27
Bloody diarrhea	Not available	Not available	Not available
Acute Jaundice syndrome	Not available	Nil	Nil
Acute Respiratory Syndrome	Nil	Nil	Nil
Measles	Nil	Nil	Nil
Suspected Malaria (Fever)	12	9	8

Table 2: Number of Epidemics after implementation of OMDSS.

Name of disease which caused an outbreak	Number of outbreaks recorded during the following years.				
	1999-2000	2000-01	2001-02	2002-03	2003-04
Diarrhea	36	54	47	57	42
Bloody diarrhea	Nil	Nil	Nil	Nil	
Acute Jaundice syndrome					
Acute Respiratory Syndrome	Nil	Nil	Nil	Nil	Nil
Measles	Nil	2	1	Nil	Nil
Suspected Malaria (Fever)	21	20	8	8	

Discussion: In case of diarrhea, there may be under reporting of number of outbreaks. The number has been increased after implementation of OMDSS. Bloody diarrhea was not a separate entity before the implementation of OMDSS, so that separate data about the outbreak of bloody diarrhea could not be available separately. After implementation there is no outbreak of bloody diarrhea. There were no outbreak of acute respiratory syndrome and acute jaundice syndrome before the implementation of OMDSS. The outbreak of fever has been increased after the implementation of OMDSS and it may be due to reporting of outbreaks.

- A.3. Whether any anticipation could be done before and after implementation of OMDSS.

There was no anticipation of outbreaks before the implementation of OMDSS, because there was no system for reporting and transmission of weekly reports. Only when there is an outbreak then only daily reporting was done till, a week after the outbreak subsides. So there was no mechanism for anticipation of outbreaks. After the implementation of OMDSS also in Dhenkanal district there is no anticipation of outbreaks till date. It is due to lack of analysis, and lack of trained personnel for analysis. Only the health workers report the outbreaks and from newspaper the news of outbreaks can be known. Most of the time the news of outbreaks in such and such villages are read from the newspaper. Now the nodal persons of the villages have the mania to give the news to the press reporters rather than the health workers. They think that it is prestigious to give the news to the newspaper than to the health worker and also they have the idea that there may not be any action if it is reported to the health worker.

B. **Population under surveillance:**

- The demographic data is to be compared with the survey records of the district data and the data with the health workers.

I have compared here the demographic data of one PHC available in the district with the data available with the health workers of the same PHC Beltikiri.

Table 3: Block wise information:

Name of the block	Name of the sectors.	Number of villages	Mid year Population	Mid year population with health workers.	Recent data with health workers.
Dhenkanal Sadar.	1.Beltikiri	46	34,869	34,869	34,900
Total population-	2. Tarava	42	28,699	28,699	29,180
140,425. SC-14150.	3. Gobindapur	21	25,042	25,042	25,225
ST-3674. Female- 69581.	4.Shankarpur	32	21,232	21,232	21,297
GP- 27. Sub center-23.	5. Bhapur	33	30,158	30,158	30,403

Table 4: Sub center wise information:

Name of sector	Name of the sub center	Mid year population	No of villages
Beltikiri	Beltikiri	7,720	6
	Chaulia	5,801	6
	Tilapasha	5,647	11
	Banasingh	8,248	7
	Kaimati	7,453	16
Tarava	Tarava	5,596	8
	Derasingh	4,793	10
	Kankadapala	6,698	10
	Balabantapur	4,891	9
	Gengutia	6,721	5
Gobindapur	Gobindapur	9335	9
	Baladiabandha	3721	5
	Nadiali	4270	4
	Talabarakot	7716	3
Shankarpur	Ratnapur (Shankarpur)	5840	8
	Dhirapatna	4326	7
	Baliamba	6768	9
	Patrabhaga	4298	8
Bhapur	Bhapur	6632	5
	Koilipangi	6687	9
	Kankadahada	6589	8
	Bhaliabolakateni	3768	8
	Chndrashekharprasada	6482	3

Remarks:

The mid year population data of the health workers and the district data is the same. The recent population data with the health workers is higher than the mid year population data due to marriages (In coming and outgoing of girls as brides and birth). It is important that the demographic data collected by health workers and the district data is the same.

c. Events under surveillance:

Public health priority of diseases:

Method:

(a) Collection of secondary data available through various sources.

(b) Looking at the Government documents on OMDSS and the rationale provided it for listing the diseases included under surveillance as high priority.

(c) Generation of primary data through a semi structured questionnaire to be administered to a sample of various officers at different levels.

(d) Consultation of the WHO surveillance standard documents to identify the diseases kept under global surveillance.

Are there any implications or regulations for spread of these diseases and control of the same at an international level?

- **C.1. Trends of each of the diseases included over time with respect to:**
  - Total number of cases, incidence and prevalence rates of these diseases in the district before and after the introduction of OMDSS.
  - Mortality rates (Case Fatality Ratios) of diseases before and after the introduction of OMDSS.

Table 5, 6, 7: Attack rate of diarrhea in case of Simple & Severe Diarrhea Dhenkanal district 2001, 2002, 2003

Year 2001				
Disease	Number		Attack Rate	
	<5	>5	<5	>5
Simple diarrhea	16364	36330	13.95%	3.9%
Severe diarrhea	592	2236	0.5%	0.24%
Total diarrhea cases	16956	38566	14.45%	4.14%

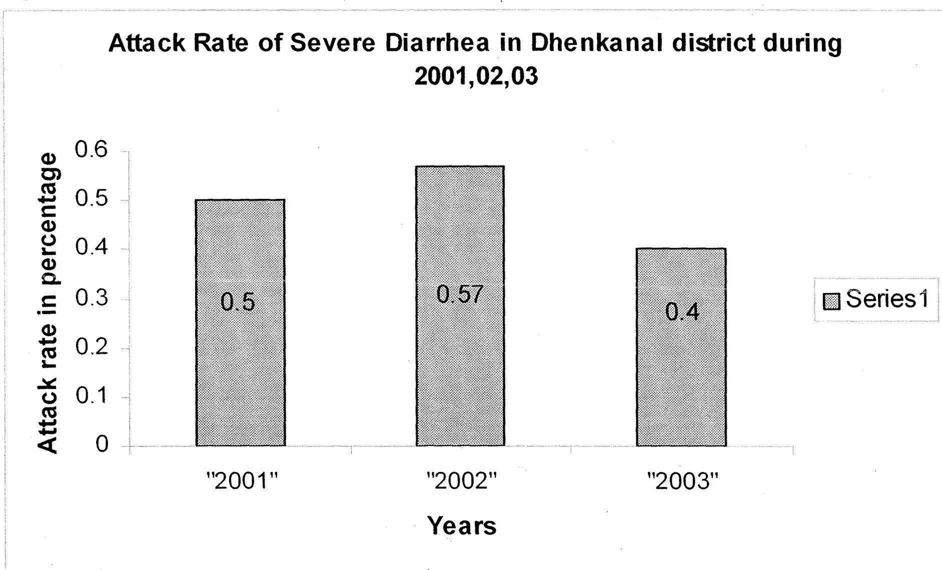
Table 6:

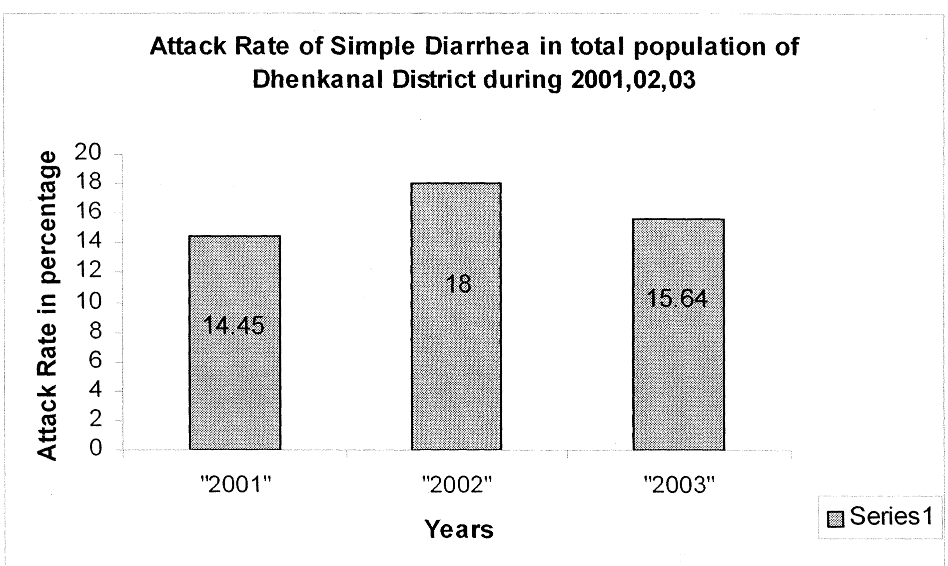
Year 2002				
Disease	Number		Attack Rate	
	<5	>5	<5	>5
Simple diarrhea	20689	39819	17.47%	4.24%
Severe diarrhea	675	1842	0.57%	0.19%
Total diarrhea cases	21364	41651	18%	4.43%

Table 7:

Disease	Year 2003			
	Number		Attack Rate	
	<5	>5	<5	>5
Simple diarrhea	18172	31341	15.23%	3.31%
Severe diarrhea	484	1535	0.4%	0.16%
Total diarrhea cases	18656	32876	15.64%	3.47%

Figures showing the comparison of attack rate of diarrhea in Dhenkanal district.





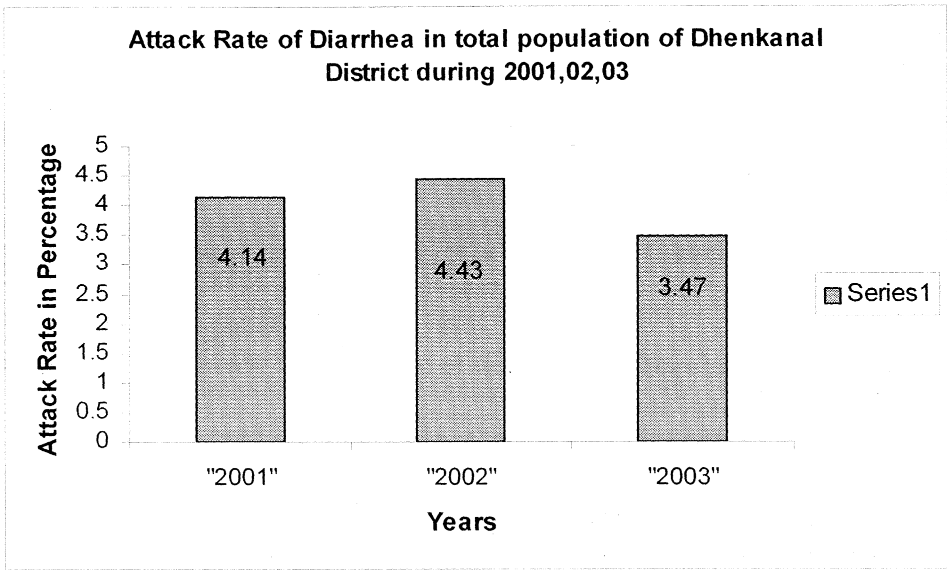


Table 8,9,10 show the number of cases, deaths, Case fatality rate, 2001,02, 03.

Year 2001						
Disease	Number		Death		CFR	
	<5	>5	<5	>5	<5	>5
Simple diarrhea	16364	36330	0	0	0	0
Severe diarrhea	592	2236	0	8	0	0.35%
Total diarrhea cases	16956	38566	0	8	0	0.02%

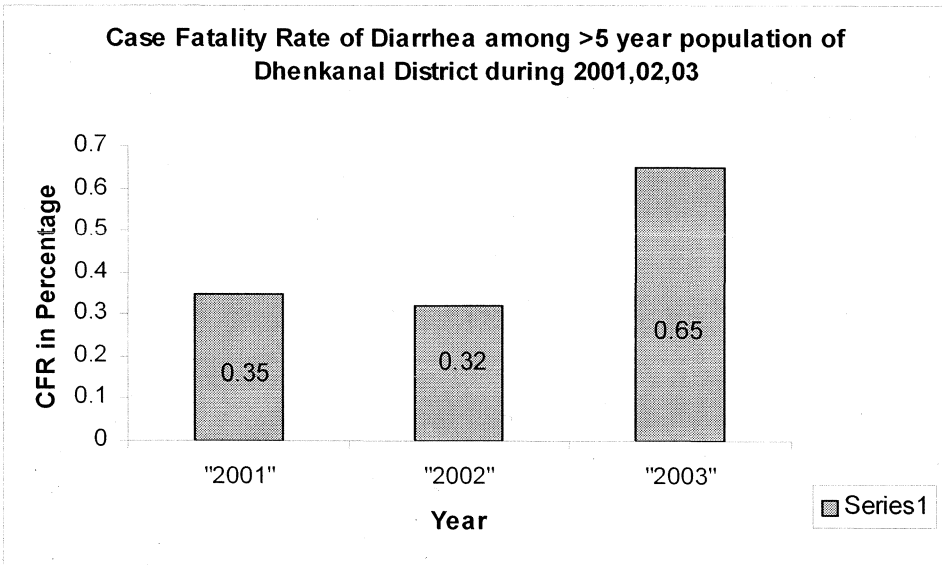
Table 9:

Year 2002						
Disease	Number		Death		CFR	
	<5	>5	<5	>5	<5	>5
Simple diarrhea	20689	39819	0	0	0	0
Severe diarrhea	675	1842	2	6	0.29%	0.32%
Total diarrhea cases	21364	41651	2	6	0.009 %	0.014 %

Table 10:

Disease	Year 2003					
	Number		Death		CFR	
	<5	>5	<5	>5	<5	>5
Simple diarrhea	18172	31341	0	0	0	0
Severe diarrhea	484	1535	6	10	1.24%	0.65%
Total diarrhea cases	18656	32876	6	10	0.03%	0.03%

Figure showing case fatality rate of diarrhea in Dhenkanal district, Orissa.



- C.2. The number of outbreaks of the specified diseases under OMDSS is to be compared with the number of outbreaks of other diseases.

There are only outbreaks of Jaundice, fever and food poisoning apart from these specified diseases, but these outbreaks are now included in the group of Acute Jaundice syndrome, unusual syndromes and others respectively. There are no other outbreaks in the districts as per previous records.

- C.3. "If the number of outbreaks could be predicted before" that can be compared before and after the introduction of OMDSS.

There were no prediction of outbreaks before implementation of OMDSS and after getting the news of outbreak from the health worker and health supervisor the medical officer of the PHC was doing the outbreak investigation and control of the epidemic and he sends the daily report to the ADMO (PH). If he feels necessary then only he requests the district authority for help. Now in the PHC level, the data is analyzed and taken care and the reports are sent to the district level. There is no record of prediction of outbreaks either in the district headquarter or in the PHC. In 2004, some Jaundice cases were recorded in 1 village and necessary actions were taken and an outbreak was avoided. Usually it happens in the PHC but it is not recorded.

Discusion: It is due to lack of training to the Medical Officers and Health Supervisors. Medical Officers have been given training in the year 2004 and there is preparation for the training in the PHC to the Health supervisors and Health workers. By practice the health workers give the news of abrupt increase of any diseases in any village to the health supervisors. The health supervisors send this news to the medical officer in charge of the PHC. Some times they are not aware about these and they take it as usual and they think that it will subside at its own but when it become uncontrolled all the control measures are started. To make the control measure stream line it take some days and there may be some loss of lives.

- **C.4. Are the diseases included constituting a major Public Health burden?**

C.4.1 -Is there a feasible intervention measure available for the diseases included?

All these diseases Diarrhea, Bloody diarrhea, ARI, Jaundice, Suspected malaria, Measles, Neonatal tetanus, Suspected meningitis constitute a major public health burden. Usually outbreaks of diarrhea and bloody diarrhea are most common; ARI is the commonest infection in the community and highest number of people coming to the hospitals is suffering from ARI. Usually jaundice means Viral Hepatitis A, which spreads due to food and contamination of water. When one outbreak of Jaundice occurs then it spreads very quickly and as it's incubation period is around one month, the outbreak continues in the community longer and during this incubation period a lot of people have been infected with it. Malaria is a global problem and the number of patients in a hospital due to suspected malaria comes after ARI. If it is not taken care there will be occurrence of a lot of deaths. Measles is a disease of children, which is preventable by vaccination, and it leads to pneumonia and severe depletion of vitamin A storage leading to either death due to severe pneumonia or blindness. Due to surveillance of this disease we can know the immunization status of the herd of children in the particular community. We can prevent measles by vaccination and other protective measures can be taken for prevention of post measles pneumonia and blindness. Neonatal tetanus has very high case fatality rate, almost 100% and it shows the immunization status of the antenatal mothers. After all it represents the antenatal care and shows how much effective is the MCH program. Suspected meningitis has high case fatality rate, so that it has been included in the OMDSS. Then comes the seasonal problem. Heat waves come in the summer season and heat stroke is there. It has a very high case fatality rate. So that in the summer season daily heat stroke reports is sent to the district headquarters when temperature exceeds 40 degree centigrade. During flood and cyclone there is daily reporting system to prevent any outbreak, as it is very difficult to control any outbreak in these areas. During this period the skin diseases are more prevalent and snakebites are more common. So these are added to the normal surveillance.

C.4.2. -Are any of or all of the diseases included of international importance- have they been listed by WHO as being under global surveillance.

All the diseases besides the seasonal diseases are listed by WHO as being under global surveillance.

- **C.5.Was there a surveillance gap with respect to these particular diseases prior to the OMDSS?**

- Before introduction of OMDSS, all the diseases were reported in a particular format at the end of the year. From this the prevalence rate of each disease was calculated. All the diseases are classified in to,
    1. Intestinal infectious diseases including cholera, amoebiasis.

2. Tuberculosis containing pulmonary, extra pulmonary, bone tuberculosis.
3. Other bacterial diseases including plague, leprosy, diphtheria, whooping cough, meningococcal infection, tetanus, septicemia.
4. Viral diseases including acute poliomyelitis, Small pox though it has been irradiated, measles, dengue, arthropod born encephalitis, arthropod borne hemorrhagic fever, viral hepatitis, trachoma, rabies.
5. Ricketssial and other arthropod borne diseases like malaria and leishmaniasis.
6. Venereal diseases.
7. Other fungal and parasitic diseases, like mycosis, helminthiasis, filariasis, dracunculosis, ancylostomiasis and necatoriasis.
8. Malignancy of oral cavity and pharynx.
9. Malignancy of digestive system.
10. Malignancy of respiratory organs and thoracic organs.
11. Malignancy of bone, skin and breast.
12. Malignancy of genitourinary system.
13. Malignancy of other nonspecific sites.
14. Malignancy of lymphatic and hemopoetic tissues.
15. Benign neoplasm.
16. Carcinoma in sit-u.
17. Other non-specified neoplasm.
18. Endocrine diseases like thyroiditis and diabetes.
19. Nutritional deficiencies.
20. Diseases of blood.
21. Psychiatric disorders.
22. Diseases of the nervous system, meningitis, multiple sclerosis, epilepsy.
23. Diseases of the eye and adenexa conjunctivitis, cataract and glaucoma.
24. Diseases of the ear and mastoid process.
25. Rheumatic fever and rheumatic heart diseases.
26. Hypertensive diseases.
27. Ishaemic heart diseases.
28. Diseases of the pulmonary system and heart diseases.

29. Cerebro vascular disorder.
30. Other diseases of circulatory system.
31. Diseases of upper respiratory tract.
32. Other diseases of respiratory tract as pneumonia, influenza, bronchial asthma.
33. Diseases of the oral cavity, salivary gland and teeth.
34. Diseases of the digestive system as, gastritis, appendicitis, chronic liver diseases, cholelithiasis.
35. Diseases of urinary tract as nephritis, urinary calculus.
36. Diseases of the male genital organs, hydrocele, benign hyperplasia of prostate.
37. Diseases of the female genital organs as, salpingitis, female infertility, menstrual disorders.
38. Abortions.
39. Obstetrics causes as post partum hemorrhage, toxemia of pregnancy, obstructed labor, other complications during delivery.
40. Indirect obstetrics causes.
41. Normal delivery.
42. Diseases of the skin and subcutaneous tissue.
43. Diseases of the musculo skeletal system.
44. Congenital anomalies.
45. Conditions originating in the prenatal period as birth trauma, growth retardation, hemolytic diseases of fetus.
46. Signs and symptoms of some ill-defined conditions.
47. Fractures.
48. Dislocations, sprains and strains.
49. Intracranial and internal injuries.
50. Open wounds and injuries of blood vessels.
51. Effects of foreign bodies entering in to orifices.
52. Burns.
53. Poisoning.
54. Complications of medical and surgical cares.

55. Other injuries and early complications o trauma.
56. Late effects of injuries and toxic effects and other external causes.
57. Transport accidents as road traffic, railway, and water transport and air crash.
58. Accidental poisoning.
59. Misadventure during medical treatment.
60. Accidental falls.
61. Accidents caused by fire.
62. Other accidents including late effects.
63. Accidental drowning.
64. Accidents caused by machineries.
65. Accidents by fire arms.
66. Abnormal reactions of drugs.
67. Suicide and self inflicted injuries.
68. Homicide and purposefully inflicted injuries.
69. Other violence.
70. Injury undetermined whether accidentally or purposefully inflicted.
71. Injury resulting from operation of war.

Apart from the yearly reporting of diseases, if there is any outbreaks during this period outbreak is sent every day by the Health supervisor to the PHC, from the PHC the headquarter health supervisor reports it to the ADMO (PH) to the district headquarter.

- There was also reporting of these diseases every month to the ADMO (PH).

Discussion: There was a surveillance gap in the district headquarter before the implementation of OMDSS. If there was an outbreak then the PHC was controlling it and reporting it to the district headquarter. The district headquarter was not taking any step until there was a request from the PHC. There was analysis of reports neither in PHC nor in district headquarters and if there was any analysis it was after a month after getting the monthly report; by that time the epidemic had been spreaded out or it had been controlled. So there was a gap in the surveillance of diseases. By that time if there was an outbreak in any village it was not noticed until the health worker was informed or until it took an alarming condition.

From the 40 questionnaires to the ADMO (PH) and Medical Officers in charges of the PHC and PHC (N) it was found that 32 agreed that there was a gap in the surveillance before OMDSS and 2 disagreed and they have remarked there is no gap as the health worker has not been trained. The other 5 medical officers have been posted after the implementation of OMDSS; they have agreed that it is obvious to be a gap in the surveillance. 95% opinion from the medical officers is that there was a gap in the surveillance before the implementation of OMDSS.

D. Detection of events:

- **D.1. Do the objectives of the system include one or more of the accepted objectives of any surveillance system?**

The objectives of OMDSS has included all the accepted objectives of the Integrated Disease Surveillance System (IDSP) except the surveillance of non communicable diseases; surveillance of diseases with laboratory data differentiating them to suspected, probable and conformed; inclusion of medical college hospitals, private sectors. The OMDSS has plans to include the medical hospitals and private sectors to this system and to develop the laboratory facilities for the conformation of the diseases in the near future.

- **D.2. Are the stated objectives SMART, Specific, Measurable, Action oriented, Researchable and Timely.**

Objectives of the OMDSS:

- Epidemic detection in the district and intervention.
- Prediction of outbreak in the district.
- Monitoring trends in endemic illness.
- Monitoring progress towards a control objective.
- Monitoring program performance.

- Evaluation of an intervention in the district.
- Estimating future disease impact.

- Epidemic detection in the district and intervention is specific for the outbreak of diarrhea, measles, jaundice, and acute respiratory tract infection. These are also measurable and action can be taken to control the outbreaks. These outbreaks can be detected in time and research can be done about the organisms, spread of the diseases.

- Prediction of outbreak in the district for example malaria, jaundice, measles, acute respiratory infections. These outbreaks can be predicted in time. This can be measurable, researchable. Action can be taken to prevent the outbreak in time.

- Monitoring trends in endemic illness as measles, malaria. It is specific for all the diseases included in OMDSS. Action can be taken to prevent the outbreaks in time.

- Monitoring progress towards a control objective. Polio is specific for it. Now polio is on the verge of eradication. It is action oriented and now stool sample is collected from the patients of acute flaccid paralysis. The stool sample is sent for isolation of poliovirus. It is also timely, measurable, and researchable.

- Monitoring program performance. It is specific for neonatal tetanus. It shows the immunization status of the pregnant mothers and show the performance of the Maternal Child Health Program. It is also action oriented and action can be taken in time due to analysis of the reports.

- Evaluation of an intervention in the district. DOTS in the RNTCP are specific for it.

- Estimating future disease impact. AIDS is specific for it. It is measurable, time oriented and action oriented.

- **D.3. Are the objectives included appropriately selected with respect to the nature and magnitude of the available resources to initiate appropriate action?**

This program is planned to act within the budget of the state. Here for data collection there is no need of new staffs; the health worker during his routine village visit collects the data of the particular diseases. This data collection was also his routine duty of the health worker before the implementation of OMDSS. He was also submitting the report in the PHC. Now after implementation of OMDSS he reports the data to the health supervisor on Saturday of the week. So there is no additional work to the health worker. The additional work of health supervisor is to compile the data. There is no additional work for the PHC to compile the data and transmit to the district. The additional work in the district is compilation of the data and analysis of the data. One data entry operator post was created to compile the data, to handle the computer and to fax the report to the State Epidemic Cell. So the additional budget is one computer in the district and one data entry operator in the district for the implementation of OMDSS.

E. System Evaluation.

E.1. Methodology for identification of "Structure" indicators.

E.1.1. -The original Government document should be looked for and the proposed issues for the organizational structure of the OMDSS identified.

According to the original Government documents, the existing Organizational structure is the same as the proposed structure. In the Government documents it has been proposed to involve the Medical College and private sectors in the surveillance system. Medical Colleges, ESI hospitals (Employees State Insurance Hospitals), large ESI Hospitals as Ispat General Hospital in Rourkela, Jawahar Centenary Hospital in Talcher Coal mines in Talcher; Railway Hospitals and large public sectors as Kalinga Hospital, Nilachal Hospital deal with all the complicated communicable and non communicable diseases and a large part of the total number of patients in Orissa. Though we can get the number and the suspected diagnosis of the patients who has been referred for treatment we cannot get the conformed diagnosis. These institutes that take care of a large number of patients have not been included in to the surveillance system yet. The non-communicable diseases like heart disease, malignancy and hematological diseases cannot come in to surveillance. It has been proposed to involve the non-communicable diseases in the surveillance system, but it has not been implemented yet. It has been proposed to strengthen the laboratory facilities in the district hospitals, but it has not been implemented yet.

E.1.2. -What were the units at different levels identified as the structural components of the OMDSS?

In the existing surveillance system, at the sub-center level the health worker male and female collect the report about the particular diseases that have been included in the OMDSS from the community during their regular village visit. Second level is the sector. Here on Saturday the Health supervisor compiles the reports and another report comes from the Sectoral Hospital. Then comes the PHC, here the data from all the sectors and sectoral hospitals are compiled. Next unit is the district level. The Vital Statistics clerk of the PHC compiles and transmits to the district headquarter. Then the data entry operator of the district compiles and transmits the report to the state epidemic cell. There is district task force in each district with a vehicle, driver, sanitary inspector and word attendant. These are the units identified as the structural components of the OMDSS. The proposed are the Medical colleges, ESI hospitals and Private sector hospitals. Until now these units have been included in to it.

E.1.3 -Does the infrastructure utilizes the existing health infrastructure at the district as it is? Or

-Does it recommend strengthening of the existing health infrastructure? If so we have to identify the nature and type of strengthening proposed and at what level.

Manpower:

The infrastructure for OMDSS utilizes the existing health infrastructure at the district, only the data entry operator and computers have been added to the infrastructures. It reco0mends the strengthening at the medical college level and laboratory facilities should be strengthened at the district headquarter level. In all the 3 medical colleges of Orissa there should be 3 data entry operators to compile the reports from all the departments and 3 computers and associated materials should be provided.

Laboratory facilities:

In the district headquarter there should be a properly trained Pathologist and there should be one well-equipped laboratory. In the laboratory transport mediums should be prepared, there should be facilities for culture and sensitivity; there should be facilities for examination of water sample. In the medical college there should be up gradation of laboratory for virus studies, virus isolation and culture.

Discussion:

In the outbreak investigations it should be mandatory to collect stool sample, water sample, blood and urine sample which ever is appropriate and in this stage they should send it for examination to the state laboratory or medical college laboratory. District laboratories; medical college laboratories should be upgraded for study of virus. The medical colleges and private sectors should be involved in the surveillance system.

E.1.4. -Have the Government document proposed strengthening of:
Laboratory facilities at different levels
Additional equipments at different levels
Additional manpower at different levels
Increases the drug and consumables: qualitative and quantitatively.

The Government document has proposed only the strengthening of laboratory facilities at the district level, not in the state level and medical college level. As the medical colleges are not involved in the system the specimens are to be transmitted to Regional Medical Research Center laboratory. The specimens cannot be sent to the medical college laboratories directly without the permission of the Director Health Services. It creates problem for the Chief District Medical Officer or the ADMO (PH). The specimens should be analyzed in the medical college laboratory with the letter from the CDMO or ADMO (PH) directly.

Government has proposed to supply additional equipments to the laboratories for up gradation.

Government has not proposed for any additional manpower for this system at different levels.

Government should increase drug and consumables, which is falling short with the District taskforce. District taskforce depends on the central store of the district for the drugs and other items.

E.1.5. -Do the structure proposed included involvement of the community members in the system and if so what community level structure would be involved?

The surveillance system has proposed the involvement of the community in the OMDSS. The community nodal persons should give the report of any outbreak or diseases to the Health workers on Friday of the week. For them the period of data collection is from Friday to Thursday of the week.

E.1.6. -What is the role and responsibility of the community?

The responsibility of the community nodal persons is to give the reports of any outbreak to the health worker. Because, the health worker visits all the villages of the sub-center within a week, so that he/she cannot visit all the villages each day. On the gap of the day if there is any increase of any communicable diseases then the community nodal person should notify it to the health worker. If there is any non-communicable disease or there is any case referred to the medical college or treated else where, that is not reported to the health worker should be reported to the health worker by the community nodal person.

E.1.7. -Whether NGO, private practitioners have included or not.

Until now the NGO and private practitioners have not been included in to the OMDSS though it has been proposed to involve them. As there are some NGO having mobile health units and NGO doing health camps should be included in it. The private practitioners should be involved as a lot of patients come to them for treatment from the community as well as the towns and those can-not be enumerated by the health worker. Some times the number of patients with a particular disease may rise with the private practitioner and from this we can predicate an outbreak. In the community the family of these patients may not report to the health worker.

E.1.8. -Whether the private sectors or private health institutions and medical colleges (if available in the district) have been included or not?

Though proposed, the private sectors or private health institutions in the district have not been included in to this OMDSS.

E.2. Methodology for Structure Indicators Evaluation:

E.2.1. District level:

<u>E.2.1.1. District task force:</u>

<u>Manpower:</u> All the posts are filled up. There is one Assistant Health Officer, one health supervisor, one laboratory technician, one ward attendant and one driver is present.

Assistant Health Officer is not a public health personnel. He is assistant surgeon on government service. He has been trained about OMDSS.

<u>Transportation:</u> There is a vehicle and driver for the district task force.

<u>Fuel:</u> Fuel is not adequate for the year. The fuel for the tours is adjusted from other heads as Malaria, Leprosy.

<u>Drugs:</u> Drugs are not sufficient and drug is procured from the central store of the district when it is necessary.

<u>E.2.1.2. Surveillance cell:</u>

<u>Manpower:</u> OHSDP has posted a data entry operator for compilation and transmission of the reports. A clerk and a peon are there for the surveillance cell. The clerk and the peon are posted by the government of Orissa.

Associated equipments: There are 2 computers and one telephone in surveillance cell. The report from the district is transmitted by e: mail to the state epidemic cell. The telephone bill is provided by the OHSDP.

E.2.2. PHC level:

Population to be covered = 140425

Manpower: Pharmacist is responsible for reporting the data of the PHC hospital. I have taken here Beltikiri PHC. The Pharmacist is present. The vital statistic clerk compiles the reports, which come from the sectors and he is present. There are 23 sub-centers and 23 sanctioned posts of Health Worker and 16 sanctioned health worker male posts. Out of these there are 23 health worker females are there and one health worker male post is vacant, but it does not hamper on the surveillance system. There are 5 sanctioned posts for Health supervisor male but there are 4 health supervisors currently and there are 3 health supervisor female posts are there and there is no vacancy. The health supervisor female manages the works of the vacant post of the health supervisor male. There should have been 23-health worker male in place of 16. The number of health supervisor female should be increased to 5. The health worker male and females and health supervisors have not been trained yet. In 4 PHC the training has been given and every week there is training program for the health worker and health supervisor in 2 PHC.

Transportation: there is a jeep and driver in the PHC. It requires reparation and allowance for fuel is less. The DOL should be increased.

Drugs: Drugs for the control of outbreaks are not adequate. Intra veinous fluids are more than sufficient but other drugs are less. Other supplies, as bleaching powder should be increased. There should be supply of records, paper and there should be a fixed traveling allowance for the health supervisors to the PHC for transmission of the reports physically.

Building: Hospital building is adequate. There is sanitary water supply to the hospital.

E.2.3. Sector level:

There are 5 sectors and 4 sectoral hospitals and 1 hospital, which is not a sectoral hospital. This hospital Dhirapatna PHC (N) is situated in the sector area of Shankarpur.

Manpower: There are 4 medical officers and all are trained with this system this year. There are 5-health supervisor male and 3-halth supervisors female. There are one pharmacist, one word attendant and one sweeper in each hospital. The pharmacist is responsible for the surveillance reports.

There is sector meeting every Saturday of the week presided by the medical officer. In all the 4 hospitals it was found average 76.9% meetings were presided by medical officers. It is because in Banasingh PHC (N) the medical officer has also been deputed to work in blood bank. In all the sectors there are 100% meetings presided by health supervisors. There is 0% failure of sector meeting. If the Saturday is a holiday then also there is no extension of date for meeting.

Transportation: there is no vehicle in the sector hospital.

Drugs and other supply: Drug supply is adequate and there should be allotment of more funds for traveling allowance of the medical officers and health worker.

Building: There is hospital building in each hospital. Building is adequate and in good condition.

E.2.4. Sub-center:

Manpower: Each sub-center comprises of one health worker male and female. 100% sub-centers are having health worker female in position. There are 16 sanctioned posts for the health worker male and out of the sanctioned posts 81.25% is filled up. There should have been 23 sanctioned posts for health worker female.

Building: There are sub-center houses for each sub-center but there is no quarter for health worker male. There should be provision of quarters for health worker male.

Drugs and accessories: There are adequate drugs and accessories but there is excess supply of intra veinous fluids in the sub-centers. About accessories and instruments there are more than adequate sets of instruments in the sub-centers. Other accessories for the sub-center as delivery table, other tables, hordings are adequate.

E.3. Methodology for identification of "Process" indicators.

E.3.1 Case definition:

- Whether the case definition is simple,

- What percentage of health worker has understood all the definitions?

- What percentage of health worker has understood 50% of all the definitions?

- Whether it is acceptable by the health workers, supervisors, medical officers & administrators.
- Whether it is flexible.

Method: Questionnaires to health worker male & female.

Case definition:

Simple Diarrhea: Acute watery diarrhea (Passage of three or more loose or watery stools over a period of 24 hours) without dehydration.

Discussion: Case definition is very broad. In this case definition all the types of diarrhea will be included whether it may be due bacterial origin or it may be due to amoeba in origin or it may be due to simple indigestion or due to hyper acidity. We should include the diarrhea due to amoeba and bacterial origin. This simple diarrhea may lead to severe diarrhea and this number is added to both simple and severe diarrhea. So there is chance of inclusion of false positive cases. It can be excluded by laboratory procedures. It is impossible to detect the cause in the sub-center level. The health workers can only detect the simple diarrhea cases. So the case definition is sensitive but not specific. 100% health worker male and female know the definition of simple diarrhea. It is simple and flexible.

Severe Diarrhea: Acute watery diarrhea with dehydration, with or without vomiting.

Common symptoms and signs of Dehydration:

Dry mouth and dry tongue; shrunken dry eyes; wrinkled or blotchy skin; scanty (less than six times per day in infants) dark yellow urine; lethargy; irritability; cold hands and feet; cramps in muscles of arms and legs; shrunken fontanels in infants in severe cases.

Discussion: Case definition is broad, sensitive but not specific for any cause. It may be due to vibreo cholerae or due to other bacteria in origin. In case of infants it may be due to E Coli. There is chance of addition of false positive cases. 100% health workers know the case definition and can identify a case severe dehydration. Culture of the stool and isolation of organism is necessary. Laboratory facilities should be strengthened for it. Case definition is simple and flexible.

Bloody Diarrhea: Acute watery diarrhea with visible blood in the stool.
(Patient or attendant must conform that blood was visible in the stool.)
Discussion: Case definition is sensitive and specific for shigella dysentery. It is simple and flexible.

Neonatal tetanus: A neonate (less than one month old) with normal sucking and crying in first two days of life who develops difficulty in sucking; cries weakly; becomes stiff or has convulsions (fits) or both between the third and 28th day of life (both inclusive) is considered a case of neonatal tetanus.
(While detecting the case, whether the mother was immunized with tetanus or not during her pregnancy need not be taken in to account).
Discussion: Case definition is broad but not so simple. It is sensitive and specific for Neonatal tetanus. It is not flexible and simple. 100% health workers could tell about the disease and know about 50% of case definition.

Acute jaundice syndrome: Acute onset of jaundice (yellow coloration of eyes) typically including deep yellow urine, anorexia (loss of appetite), generalized body aches and extreme tiredness with or without fever.
Discussion: Case definition is sensitive but not specific as it may include hepatitis A or B or E. Here hepatitis A is important for outbreak point of view, but it includes all the variety of jaundice may be blood born or water borne. Here it needs laboratory facilities

for conformation. 100% health workers could tell about the disease and know about 50% of case definition.

Acute Respiratory Infection (ARI): Acute Respiratory Infection includes both upper respiratory tract infections (URTI) and lower respiratory tract infections (LRTI).

Discussion: It includes all the respiratory diseases it may be upper respiratory tract infection or lower respiratory tract infection. It is sensitive but not specific for any type of respiratory diseases. 100% health workers could tell about URTI and know about 50% of case definition but 80% of health workers know about 50% of case definition of LRTI.

Suspected Meningitis: A case of fever* usually of sudden onset and with one or more of the following:

- ❖ Neck stiffness (sign elicited by the health personnel),
- ❖ Severe unexplained headache,
- ❖ Neck pain and 2 or more of the following,
    - o Photophobia (discomfort looking into bright lights).
    - o Nausea,
    - o Vomiting,
    - o Lowered or altered consciousness (confusion to coma)

In children less than 2 years of age, a case of suspected meningitis is defined as fever* and one or more of the following:

- ❖ Irritability
- ❖ Bulging fontanel

* Axillary temperature – more than 38 degree in centigrade scale and 100.5 degree or more in Fahrenheit scale.

Discussion: It is not possible for the health workers to suspect a case of suspected meningitis. It has been designed for the health facilities but it is difficult in the sector level hospital to diagnose a case of suspected meningitis. Here a laboratory investigation is badly necessary to diagnose a case. Here there is chance of addition of false negative cases. 85% health workers could tell 50% about this disease. The case definition is not simple and not flexible.

Measles: Acute onset of fever and maculopapular (flat or raised reddish spots) skin rash with cough or coryza (running of nose) or conjunctivitis (redness of eyes).
This case definition is sensitive and specific for measles. 100% health workers could tell about the disease and know about 50% of case definition.

Suspected Malaria: Acute onset of fever commonly but not always associated with chills, rigor (extreme shivers), myalgia (muscle pain), sweating, headache, backache, nausea or vomiting with or without blood smear collection will be considered a case of suspected malaria.
Discussion: It is sensitive but not specific. All the fever cases may be included in it and malaria cases associated with running nose and cough may be excluded and included in Acute Respiratory tract Infection.

Unusual Syndrome: Cases with acute onset of symptoms that are unusual or unexplained and affecting more than one person residing in the area covered by a health worker or a health facility and not classifiable under any of the specific disease/ syndrome labels of OMDSS.

Discussion: It is also nonspecific, not simple, but sensitive. 82.5% health workers have understood about 50% of the case definition.

Others: All instances of services (promotive/ preventive/ curative) provided by the health facility/ health care worker to individuals, who cannot classified as cases under any of diseases/ syndrome labels of OMDSS including unusual syndrome, and all repeat visits by a patient for a disease/ syndrome which has already been reported, should be included in "others".

Others category includes:

- All repeat case of any disease/ syndrome.

- Those new cases which do not fit in to any of the specific OMDSS case definitions.

The basic purpose of including "others" category is to find out the caseload of the health facility. The total number of patients seen in the health facility should be reflected in the total of the OMDSS weekly report.

Discussion: It is applicable for the health facilities.

Diseases/ Syndromes to be reported during particular seasons or disasters:

In summer

Heat disorder: A case with history of exposure to or working in a hot environment with high to very high body temperature, associated with any of the following: nausea, vomiting, headache, and dizziness, fainting and altered or lowered consciousness.

Discussion:

It is also non-specific and these symptoms are also found in suspected malaria. It is sensitive and non-specific.100% health workers have understood 50% of the case definition.

During flood and cyclones:

Skin infection: This category includes bacterial skin infections (impetigo), fungal skin infections (tinea), & scabies.

Snakebite: History of snakebite with local symptoms and signs & with/ without systemic manifestations.

Discussion:

These are specific as well as sensitive. 100% health worker could tell about these.

Procedure:

20 health worker female, 12 health worker male, 5 health supervisors male, 3 health supervisor female were given questionnaires. Out of the total 40, 32 (80%) could answer all the case definitions in Oriya language. 20% could not answer satisfactorily about one disease suspected meningitis. 80% answered that other diseases may be also included in the particular diseases.

Table 7: Understanding of case definition by Helath worker (M / F)

Case definition of the diseases	Total HW, HS	Understood 50% case definition.	Percentage understood 50% of case definitions.
Simple diarrhea	40	40	100
Severe diarrhea	40	40	100
Bloody diarrhea	40	40	100
Neonatal tetanus	40	36	90
Acute jaundice syndrome	40	40	100
ARI	40	40	100
Suspected meningitis	40	34	85
Measles	40	40	100
Suspected malaria	40	40	100
Unusual syndrome	40	33	82.5
Others	40	37	92.5
Heat disorder	40	40	100
Skin diseases	40	40	100
Snake bite	40	40	100

Table8: Percentage of case definition the health personel understood.

Percentage of health workers and supervisors understood 50% of all definitions	Percentage of health workers and supervisors understood 100% of all definitions but one	Percentage of health workers and supervisors understood 100% all definitions but two
67.5 %	25 %	7.5 %

<u>Population under surveillance for each disease:</u>

Population under surveillance for each disease has been divided in to two groups below 5 years and above 5 years. For neonatal tetanus only below 5 years age group is included. In the data collection format there is a column for new diseases and another column is for death. In simple diarrhea death column is not included as there is no death due to simple diarrhea.

<u>E.3.2. Data collection:</u>

During evaluation for data collection there were 20 health worker females and 12 health worker males were present and the rest were absent in the monthly meeting.

Out of the 32 health workers 32 (100%) agreed that they are going to each village at least once in a week.

All of them (100 %) agreed that they collect data from each village at least once in a week, within Saturday to Friday.

5 health worker male and 6-health worker female of the 6 sub-centers have intimated one outbreak in their sub-center area. It is also 100% detection of outbreaks in the PHC during 2003.

Sample survey:

To know the representativeness, flexibility, simplicity, specificity and positive predictive value a sample survey was done in a village.

Sample size:

Target population = 1,40,000.

Estimated proportion = 50%

Confidence coefficient = 95%

Confidence interval = 10%

Sample size = 97.

As sample size is a very small number, one total village was taken at random and each household was visited and the report of the health worker male and female was compared with the survey report.

Survey method:

Study area: Village Parbatia of Shankarpur sector of Beltikiri PHC was taken as study area.

Study population: Total population = 946.

Below 5 year children = 113.

Total number of households = 114.

Survey procedure:

Each household was visited and the family members were asked, whether any of them has suffered from any of the diseases included in the Surveillance system. The results were like this.

Table 9: Comaparision of survey reports and actually reported.

Sl No	Name of diseases	Number from survey		Number reported	
		<5 years	>5 years	<5 years	>5 years
1	Simple diarrhea	0	0	0	0
2	Severe diarrhea	0	0	0	0
3	Bloody diarrhea	0	1	0	1
4	Suspected malaria	0	8	0	6
5	Acute Respiratory Infection	4	10	1	3
6	Measles	0	0	0	0
7	Neonatal Tetanus	0	0	0	0
8	Acute Jaundice Syndrome	0	0	0	0
9	Suspected meningitis	0	0	0	0
10	Unusual Syndromes	0	0	0	0
11	During Summer = Heat disorder	0	0	0	0
12	Others	2	2	2	2
13	Skin infection	2	5	2	3

Analysis of the survey report:

Table 10. Representative ness:

Sl No	Name of diseases	Representative ness
1	Simple diarrhea	
2	Severe diarrhea	
3	Bloody diarrhea	100%
4	Suspected malaria	75%
5	Acute Respiratory Infection	28.5%
6	Measles	
7	Neonatal Tetanus	
8	Acute Jaundice Syndrome	
9	Suspected meningitis	
10	Unusual Syndromes	
11	During Summer = Heat disorder	
12	Others	100%
13	Skin infection	71.4%

<u>Sensitivity and positive predictive value for Suspected malaria</u>

Blood slides were collected from the 6 persons of suspected malaria and 2 out of the 6 slides were positive for malaria parasite.

The 2 patients who were not been included in the report were treated one in SCB Medical college and another with the medicine specialist District Headquarter Hospital privately. Blood slides from both of the persons were positive for malaria parasite.

Preparing the gold standard table it was found that,

Disease present	Disease absent	
(a) True positive = 2	(b) False positive = 4	Total reported = 6
(c) False negative = 2	(d) True negative = 0	

Positive predictive value for suspected malaria = a / (a+b) = 2/6 = 0.33

Sensitivity of the case definition = a/ (a+c) = 2/4 = 50%.

<u>E.3.3.Data compilation</u>:

E.3.3.a. Sector level:

Result after the record checking:

There is a record for sector meeting with each health supervisor male. In each meeting the subject of discussion is mentioned in the record. All the staffs present in the meeting sign it. Lastly the presiding officer of the meeting put his signature on it. To supervise the meeting from the PHC one of the staffs come to the sector meeting at random once in a month and District officers as ADMO or CDMO presides over a meeting in any sector every week. CDMO should have a visit at least once in a year. There are 3 ADMOs. Total 36 sectors of Dhenkanal district have been divided within them. Each ADMO has to supervise his 12 sectors within 3 months. In a year he should supervise a sector 4 times.

Records of 4 health supervisors and 4 sector hospitals of Beltikiri PHC of the year 2003 and found these results.

<u>Shankarapur Sector:</u>

Number of Sector meeting done =51.

Number of meetings presided by the medical officer = 30.

Number of meetings presided by the health supervisor male =8.

Medical officer of the PHC have presided the meeting = 4.

Persons from the PHC came for supervision = 6.

ADMO (PH) presided over the meeting = 3 = 75% of the total times of supervision to be done during the year. As he should supervise 4 times to each sector

CDMO presided the sector meeting = 1.

Discussion:

Number of Sector meetings done = 98%.

Presence of health workers at least 47 times (90% of the total weeks) = 100%.

Number of meetings presided by the medical officer = 30.

Number of meetings participated by the medical officer = 38 = 73% attendance.

ADMO (PH) presided over the meeting = 75% of the allotted times.

Persons from the PHC came for supervision= 50%

CDMO presided the sector meeting = 100%.

Bhapur sector:

Number of Sector meeting done =48.

Number of meetings presided by the medical officer = 32.

Number of meetings presided by the health supervisor male =6.

Medical officer of the PHC have presided the meeting = 4.

Persons from the PHC came for supervision = 6.

ADMO (PH) presided the meeting = 3 = 75% he should supervise 4 times to each sector

CDMO presided the sector meeting = 1.

Discussion:

Number of Sector meetings done = 92%.

Presence of health workers at least 47 times = 100%.

Number of meetings presided by the medical officer = 32.

Number of meetings participated by the medical officer = 40 = 77% attendance.

ADMO (PH) presided over the meeting = 75%

Persons from the PHC came for supervision= 50%

CDMO presided the sector meeting = 100%.

Beltikiri Sector:

Number of Sector meeting done =52.

Number of meetings presided by the health supervisor male =0.

Medical officer of the PHC have presided the meeting = 4.

Persons from the district came for supervision = 8.

ADMO (PH) presided over the meeting = 4 out of 4 supervisions = 100%

CDMO presided the sector meeting = 1.

Discussion:

Number of Sector meetings done = 100%.

Presence of health workers at least 47 times= 100%.

Number of meetings presided by the medical officer = 52= 100%

Number of meetings participated by the medical officer = 100% attendance.

ADMO (PH) presided over the meeting = 100%

Persons from the district came for supervision= 75%

CDMO presided the sector meeting = 100%.

Banasingha sector:

Number of Sector meeting done =50.

Number of meetings presided by the medical officer = 26.

Number of meetings presided by the health supervisor male =0.

Medical officer of the PHC have presided the meeting = 3.

Persons from the district came for supervision = 6.

ADMO (PH) presided over the meeting = 3 supervisions out of 4 = 75%

CDMO presided the sector meeting = 1.

Discussion:

Number of Sector meetings done = 96%.

Presence of health workers at least 47 times = 100%.

Number of meetings participated by the medical officer = 50% attendance.

ADMO (PH) presided over the meeting = 75%

Persons from the PHC came for supervision= 50%

CDMO presided the sector meeting = 100%.

Average of the sectors:

Number of Sector meetings done = 96.5%.

Presence of health workers at least 47 times (90% of the total number of weeks) = 100%.

Number of meetings participated by the medical officer = 75% attendance.

ADMO (PH) presided over the meeting = 81.2%

Persons from the PHC came for supervision= 55.2%

CDMO presided the sector meeting = 100%.

Discussion: Commencement of meeting should be 100%, attendance of health workers at least 47 times (90%) in a year is 100%, and Medical officers should attend the meetings more.

E.3.4.a. Data compilation:

Data compilation has been done incomplete 9 times out of 52 times in the year 2002.

Data compilation is complete during 2002 = 82.7%.

Compilation: Compilation has been done in time.

E.3.3.b. PHC level:

Supervisors' meeting has been done regularly. Usually the health supervisors attend the meeting and during his absence the health supervisor females have attended the meeting.

100% commencement of meeting in the year 2002 and 2003.

100% attendance of health supervisor male or female from each sector during these years 2002 and 2003.

E.3.3.c. District level:

ADMO (PH) is responsible for this surveillance system. One sanitary inspector does the compilation and transmits the data to the data entry operator. The data entry operator transmits the data in time to the state epidemic cell. The sanitary inspector maintains a record of the total number of patients and the AHO or ADMO (PH) analyzes the data.

Record survey:

From the record survey it was found that during OMDSS year 2001 and 2002, means from the month of January to December, the record has been maintained properly and the data has been analyzed and proper actions have been taken to improve the data collection, compilation and transmission. But after month of December the record has not been maintained and data has not been analyzed. No action has been taken or advised to improve the surveillance system. Though the color-coding has been introduced in the month of August 2001 there is color-coding neither in the office of ADMO (PH) nor with the data entry operator. There is neither timeliness nor completeness graph with both the office of ADMO (PH) and data entry operator since August 2001 till now. Some PHC like Beltikiri PHC has reported complete reports in time.

E.3.5. Data transmission:

- PHC level:

-Percentage of data transmission of each sector to the PHC in this year.

-Percentage of timeliness of data transmission of each sector to the PHC.

- District level:

-Percentage of data transmission of each PHC to the district in this year.

-Percentage of timeliness of data transmission of each PHC to the district.

Table: 8 Completeness of the report of each PHC during the year 2002.

Completeness of report for the year 2002																				
Institutes	Anlaberini PHC		Beltikiri PHC		Birasal PHc		DHH		Khajuirakata		Mathakargola		Municipality		Odapada		Parjang		SCPur	
Week	Rpt	Unit	Rpt	Unit	Rpt	Unit	Rpt	Unit	Rpt	Unit	Rpt	Unit	Rpt	Unit	Rpt	Unit	Rpt	Unit	Rpt	Unit
W1	19	23	28	28	24	24	0	1	33	33	22	22	3	3	24	28	23	23	29	29
W2	21	23	28	28	24	24	1	1	29	33	22	22	3	3	28	28	23	23	27	29
W3	22	23	28	28	24	24	1	1	33	33	22	22	3	3	28	28	0	23	29	29
W4	23	23	28	28	24	24	1	1	33	33	22	22	3	3	28	28	23	23	29	29
W5	22	23	28	28	24	24	1	1	33	33	22	22	3	3	28	28	23	23	29	29
W6	late/23	23	28	28	24	24	1	1	33	33	22	22	3	3	24	28	23	23	29	29
W7	21	23	28	28	24	24	1	1	33	33	22	22	3	3	28	28	23	23	29	29
W8	22	23	28	28	24	24	1	1	33	33	22	22	3	3	28	28	23	23	29	29
W9	23	23	28	28	24	24	1	1	33	33	22	22	3	3	24	28	23	23	29	29
W10	22	23	28	28	24	24	1	1	33	33	22	22	3	3	28	28	23	23	29	29
W11	23	23	28	28	24	24	1	1	33	33	22	22	3	3	28	28	23	23	29	29
W12	23	23	28	28	24	24	1	1	33	33	21	22	3	3	28	28	23	23	29	29
W13	22	23	28	28	24	24	1	1	33	33	22	22	3	3	28	28	23	23	29	29
W14	23	23	28	28	24	24	1	1	33	33	22	22	3	3	28	28	23	23	29	29
W15	22	23	28	28	24	24	1	1	33	33	22	22	3	3	28	28	23	23	29	29
W16	23	23	28	28	24	24	1	1	33	33	22	22	3	3	24	28	23	23	29	29
W17	23	23	28	28	24	24	1	1	33	33	22	22	3	3	24	28	23	23	29	29
W33	23	23	26	28	24	24	1	1	33	33	22	22	2	2	28	28	23	23	28	29
W34	22	23	28	28	24	24	1	1	33	33	22	22	2	2	28	28	23	23	29	29
W35	23	23	28	28	24	24	1	1	33	33	22	22	2	2	28	28	23	23	29	29
W36	23	23	20	28	16	24	1	1	33	33	22	22	2	2	28	28	23	23	20	29
W37	23	23	20	28	24	24	1	1	33	33	22	22	2	2	28	28	23	23	29	29
W38	23	23	27	28	24	24	1	1	33	33	22	22	2	2	28	28	23	23	29	29
W39	23	23	28	28	23	24	1	1	33	33	22	22	2	2	28	28	23	23	27	29
W40	21	23	26	28	0	24	1	1	33	33	22	22	2	2	28	28	23	23	29	29
W41	22	23	26	28	24	24	1	1	33	33	22	22	2	2	28	28	23	23	29	29
W42	22	23	28	28	24	24	1	1	33	33	22	22	2	2	28	28	23	23	29	29
W43	23	23	28	28	24	24	1	1	33	33	22	22	2	2	28	28	23	23	29	29
W44	23	23	27	28	24	24	1	1	33	33	22	22	2	2	28	28	23	23	29	29
W45	21	23	28	28	24	24	1	1	33	33	22	22	2	2	28	28	23	23	29	29
W46	23	23	27	28	24	24	1	1	33	33	22	22	2	2	28	28	23	23	29	29
W47	23	23	28	28	24	24	1	1	33	33	22	22	2	2	28	28	23	23	29	29
W48	23	23	28	28	24	24	1	1	33	33	22	22	2	2	28	28	23	23	28	29
W49	23	23	28	28	24	24	1	1	33	33	22	22	2	2	28	28	23	23	29	29
W50	23	23	28	28	24	24	1	1	33	33	22	22	2	2	28	28	23	23	29	29
W51	23	23	28	28	24	24	1	1	33	33	22	22	2	2	28	28	23	23	29	29
W52	23	23	27	28	24	24	1	1	33	33	22	22	2	2	28	28	23	23	29	29
Comp	31	52	43	52	44	52	51	52	51	52	51	52	52	52	45	52	51	52	44	52
%	60		83		85		98		98		98		100		87		98		85	

Fig: 8 Percentage of completeness of reports of al the PHC in Dhenkanal district.

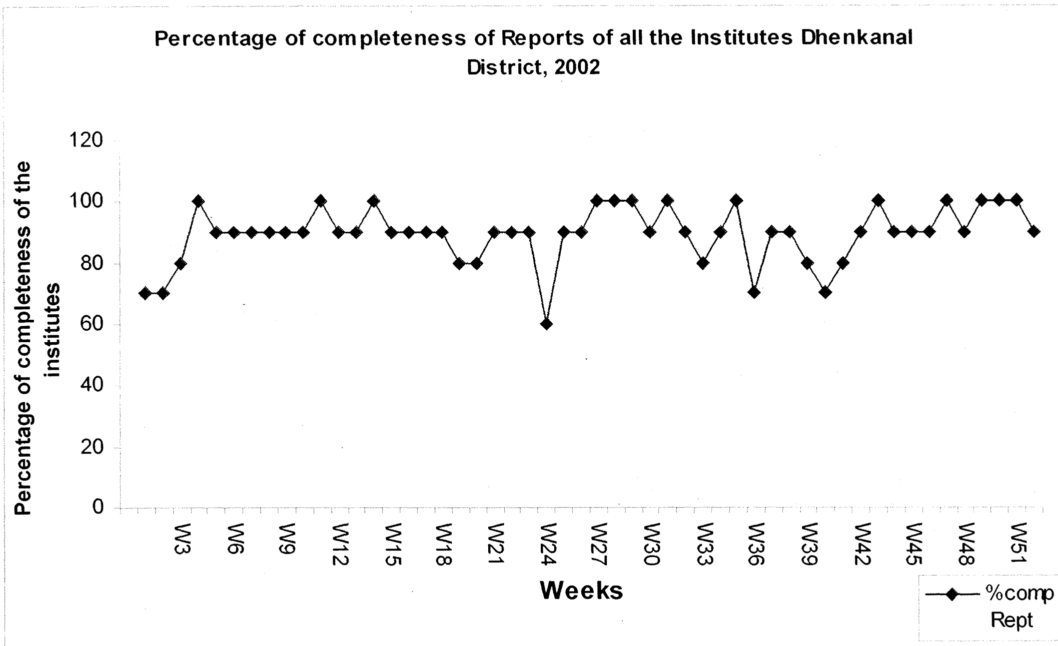


Table 9: Timeliness of reports of the PHC for the year 2002.

Timeliness of reports of the PHC and institutes for the year 2002.					
Week	Reporting Institutes	Complete reports in week	% Complete reports in the week	Institutes reporting on time	% Institute reporting on time
W1	10	7	70	9	90
W2	10	7	70	10	100
W3	10	8	80	9	90
W4	10	10	100	10	100
W5	10	9	90	10	100
W6	10	9	90	9	90
W7	10	9	90	10	100
W8	10	9	90	10	100
W9	10	9	90	10	100
W10	10	9	90	10	100
W11	10	10	100	10	100
W12	10	9	90	10	100
W13	10	9	90	10	100
W14	10	10	100	10	100
W15	10	9	90	10	100
W16	10	9	90	10	100

Fig:10 Timeliness of reports of the PHC/CHC of Dhenkanal District

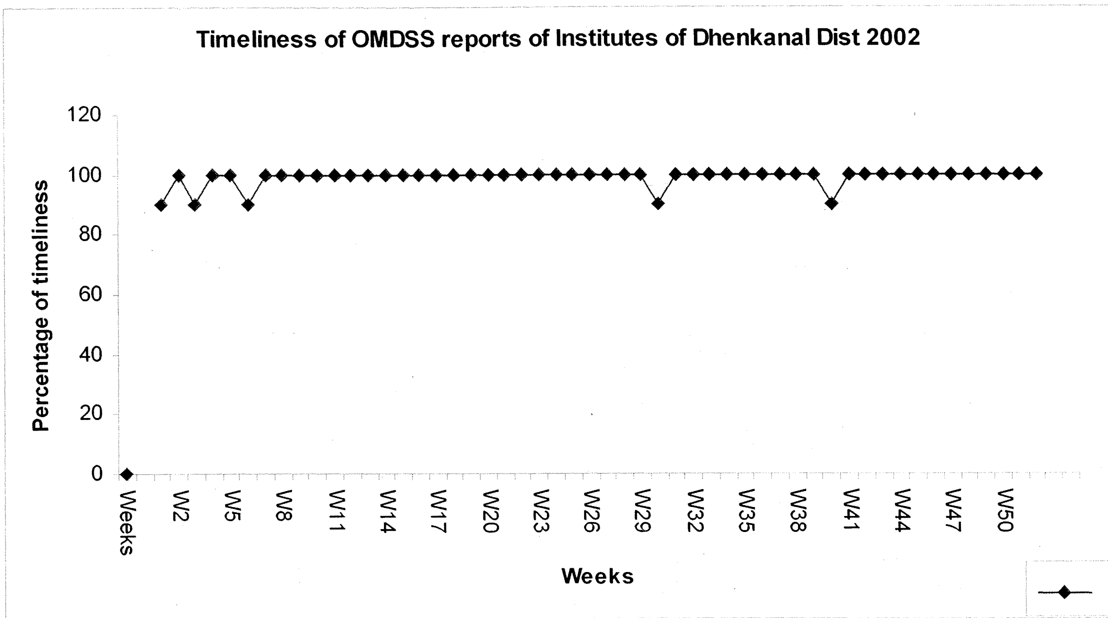


Fig: 11 Completeliness of reports of different PHC/CHC of Dhenkanal district during 2002.

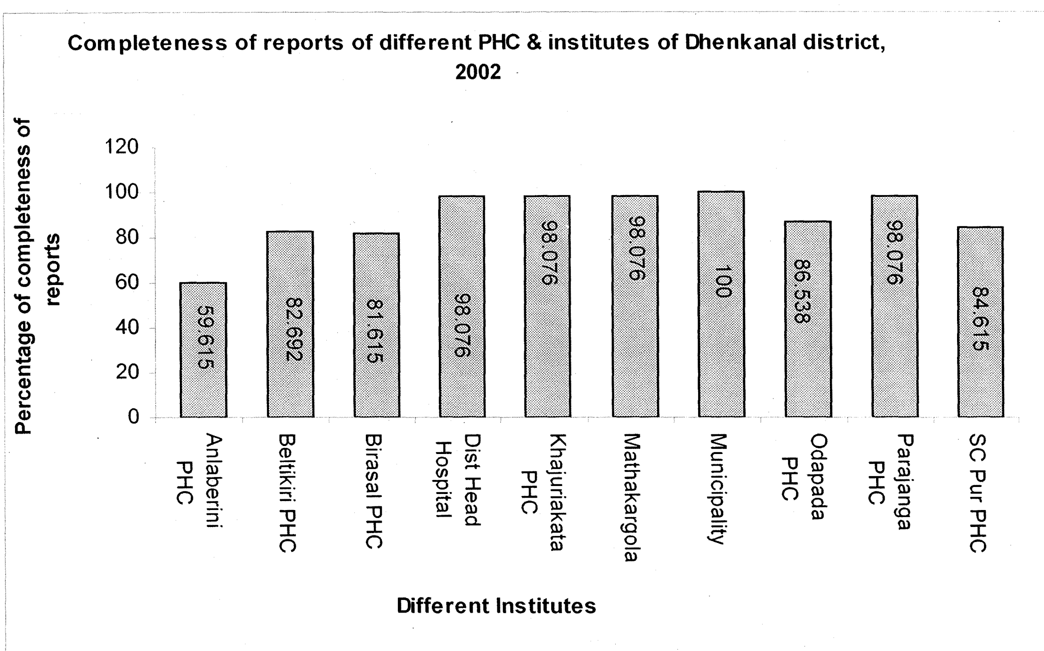


Fig:12 Reports of the PHC / CHC of Dhenkanal districts in color code.

Report of the PHC & other Institutes of Dhenkanal District for the Year 2002										
Insti tutes	Anlaberini PHC	Beltikiri PHC	Birasal PHC	Dist HQ Hospital	Khajuriak ata PHC	Mathakar gola PHC	Municipa lity	Odapada PHC	Parajang PHC	SC pur PHC
W1										
W2										
W3										
W4										
W5										
W6										
W7										
W8										
W9										
W10										
W11										
W12										
W13										
W14										
W15										
W16										
W17										
W18										
W19										
W20										
W21										
W22										
W23										
W24										
W25										
W26										
W27										
W28										
W29										
W30										
W31										
W32										
W33										
W34										
W35										
W36										
W37										
W38										
W39										
W40										
W41										
W42										

W43										
W44										
W45										
W46										
W47										
W48										
W49										
W50										
W51										
W52										
%age	59.62	82.69	81.6	98.08	98.08	98.1	100	86.5	98.1	84.6

Table 10: Completeness and timeliness of reports during year 2002

Completeness and timeliness of reports during year 2002.					
Weeks	Complete timely	Incomplete timely	Compete late	Incomplete late	Not submitted
W1	70%	20%	0%	0%	10%
W2	70%	30%	0%	0%	0%
W3	80%	10%	0%	0%	10%
W4	100%	0%	0%	0%	0%
W5	90%	10%	0%	0%	0%
W6	80%	10%	10%	0%	0%
W7	90%	10%	0%	0%	0%
W8	90%	10%	0%	0%	0%
W9	90%	10%	0%	0%	0%
W10	90%	10%	0%	0%	0%
W11	90%	10%	0%	0%	0%
W12	90%	10%	0%	0%	0%
W13	90%	10%	0%	0%	0%
W14	100%	0%	0%	0%	0%
W15	90%	10%	0%	0%	0%
W16	90%	10%	0%	0%	0%
W17	90%	10%	0%	0%	0%
W18	90%	10%	0%	0%	0%
W19	80%	20%	0%	0%	0%
W20	80%	20%	0%	0%	0%
W21	90%	10%	0%	0%	0%
W22	90%	10%	0%	0%	0%
W23	90%	10%	0%	0%	0%
W24	60%	40%	0%	0%	0%
W25	90%	10%	0%	0%	0%
W26	90%	10%	0%	0%	0%
W27	100%	0%	0%	0%	0%

Table: 11 Timeliness of the District in transmission of report for the year 2002

Timeliness of the District in transmission of report for the year 2002								
Weeks	From date	To date	Color code	Complete timely	Incompl timely	Complete late	Incomp late	Not sub mitted
W1	29.12.01	4.1.02		Yes	Nil	Nil	Nil	Nil
W2	5.1.02	11.1.02		Yes	Nil	Nil	Nil	Nil
W3	12.1.02	18.1.02		Yes	Nil	Nil	Nil	Nil
W4	19.1.02	25.1.02		Yes	Nil	Nil	Nil	Nil
W5	26.1.02	1.2.02		Yes	Nil	Nil	Nil	Nil
W6	2.2.02	8.2.02		Yes	Nil	Nil	Nil	Nil
W7	9.2.02	15.2.02		Yes	Nil	Nil	Nil	Nil
W8	16.2.02	22.2.02		Yes	Nil	Nil	Nil	Nil
W9	23.2.02	1.3.02		Yes	Nil	Nil	Nil	Nil
W10	2.3.02	8.3.02		Yes	Nil	Nil	Nil	Nil
W11	9.3.02	15.3.02		Yes	Nil	Nil	Nil	Nil
W12	16.3.02	22.3.02		Nil	Yes	Nil	Nil	Nil
W13	23.3.02	29.3.02		Nil	Yes	Nil	Nil	Nil
W14	30.3.02	5.4.02		Yes	Nil	Nil	Nil	Nil
W15	6.4.02	12.4.02		Yes	Nil	Nil	Nil	Nil
W16	13.4.02	19.4.02		Yes	Nil	Nil	Nil	Nil
W17	20.4.02	26.4.02		Yes	Nil	Nil	Nil	Nil
W18	27.4.02	3.5.02		Yes	Nil	Nil	Nil	Nil
W19	4.5.02	10.5.02		Yes	Nil	Nil	Nil	Nil
W20	11.5.02	17.5.02		Yes	Nil	Nil	Nil	Nil
W21	18.5.02	24.5.02		Yes	Nil	Nil	Nil	Nil
W22	25.5.20	31.5.02		Yes	Nil	Nil	Nil	Nil
W23	1.6.02	7.6.02		Yes	Nil	Nil	Nil	Nil
W24	8.6.02	14.6.02		Yes	Nil	Nil	Nil	Nil
W25	15.6.02	21.6.02		Yes	Nil	Nil	Nil	Nil
W26	22.6.02	28.6.02		Yes	Nil	Nil	Nil	Nil
W27	29.6.02	5.7.02		Yes	Nil	Nil	Nil	Nil
W28	6.7.02	12.7.02		Yes	Nil	Nil	Nil	Nil
W29	13.7.02	19.7.02		Yes	Nil	Nil	Nil	Nil
W30	20.7.02	26.7.02		Yes	Nil	Nil	Nil	Nil
W31	27.7.02	2.8.02		Yes	Nil	Nil	Nil	Nil
W32	3.8.02	9.8.02		Yes	Nil	Nil	Nil	Nil
W33	10.8.02	16.8.02		Yes	Nil	Nil	Nil	Nil
W34	17.8.02	23.8.02		Yes	Nil	Nil	Nil	Nil
W35	24.8.02	30.8.02		Yes	Nil	Nil	Nil	Nil
W36	31.8.02	6.9.02		Yes	Nil	Nil	Nil	Nil
W37	7.9.02	13.9.02		Yes	Nil	Nil	Nil	Nil
W38	14.9.02	20.9.02		Yes	Nil	Nil	Nil	Nil
W39	21.9.02	27.9.02		Yes	Nil	Nil	Nil	Nil
W40	28.9.02	4.10.02		Yes	Nil	Nil	Nil	Nil
W41	5.10.02	11.10.02		Nil	Yes	Nil	Nil	Nil
W42	12.10.02	18.10.02		Yes	Nil	Nil	Nil	Nil
W43	19.10.02	25.10.02		Yes	Nil	Nil	Nil	Nil
W44	26.10.02	1.11.02		Yes	Nil	Nil	Nil	Nil

W45	2.11.02	8.11.02		Yes	Nil	Nil	Nil	Nil
W46	9.11.02	15.11.02		Yes	Nil	Nil	Nil	Nil
W47	16.11.02	22.11.02		Yes	Nil	Nil	Nil	Nil
W48	23.11.02	29.11.02		Yes	Nil	Nil	Nil	Nil
W49	30.11.02	6.12.02		Yes	Nil	Nil	Nil	Nil
W50	7.12.02	13.12.02		Yes	Nil	Nil	Nil	Nil
W51	14.12.02	20.12.02		Yes	Nil	Nil	Nil	Nil
W52	21.12.02	27.12.02		Yes	Nil	Nil	Nil	Nil
Percentage of timeliness				94.23%	5.77%	0%	0%	0%

Table:12 Color coding of complete and timeliness of the data transmission of Dhenkanal district during 2002 and 2003.

Color coding of complete and timeliness of the data transmission of Dhenkanal district.					
			2003		2002
Week	From date	To date	Color code	Week	
W1	28.12.02	3.1.03		W1	
W2	4.1.03	10.1.03		W2	
W3	11.1.03	17.1.03		W3	
W4	18.1.03	24.1.03		W4	
W5	25.1.03	31.1.03		W5	
W6	1.2.03	7.2.03		W6	
W7	8.2.03	14.2.03		W7	
W8	15.2.03	21.2.03		W8	
W9	22.2.03	28.2.03		W9	
W10	1.3.03	7.3.03		W10	
W11	8.3.03	14.3.03		W11	
W12	15.3.03	21.3.03		W12	
W13	22.3.03	28.3.03		W13	
W14	29.3.03	4.4.03		W14	
W15	5.4.03	11.4.03		W15	
W16	12.4.03	18.4.03		W16	
W17	19.4.03	25.4.03		W17	
W18	26.4.03	2.5.03		W18	
W19	3.5.03	9.5.03		W19	
W20	10.5.03	16.5.03		W20	
W21	17.5.03	23.5.03		W21	
W22	24.5.03	30.5.03		W22	
W23	31.5.03	6.6.03		W23	
W24	7.6.03	13.6.03		W24	

W25	14.6.03	20.6.03		W25	
W26	21.6.03	27.6.03		W26	
W27	28.6.03	4.7.03		W27	
W28	5.7.03	11.7.03		W28	
W29	12.7.03	18.7.03		W29	
W30	19.7.03	25.7.03		W30	
W31	26.7.03	1.8.03		W31	
W32	2.8.03	8.8.03		W32	
W33	9.8.03	15.8.03		W33	
W34	16.8.03	22.8.03		W34	
W35	23.8.03	29.8.03		W35	
W36	30.8.03	5.9.03		W36	
W37	6.9.03	12.9.03		W37	
W38	13.9.03	19.9.03		W38	
W39	20.9.03	26.9.03		W39	
W40	27.9.03	3.10.03		W40	
W41	4.10.03	10.10.03		W41	
W42	11.10.03	17.10.03		W42	
W43	18.10.03	24.10.03		W43	
W44	25.10.03	31.10.03		W44	
W45	1.11.03	7.11.03		W45	
W46	8.11.03	14.11.03		W46	
W47	15.11.03	21.11.03		W47	
W48	22.11.03	28.11.03		W48	
W49	29.11.03	5.12.03		W49	
W50	6.12.03	12.12.03		W50	
W51	13.12.03	19.12.03		W51	
W52	20.12.03	26.12.03		W52	
Complete in time		28	53.84%		94.23%
Incomplete intime		24	46.10%		5.77%
Incomplete late		0	0%		0%
Not submitted		0	0%		0%

E.3.6. Analysis:

Table: 13 Answers from the questionnaires for health workers and health supervisors.

Objectives	No of ques tionniares	Persons agreed	Persons disagreed	Percentage of agreement	Percentage of dis agreement
The prevention and control of diseases	40	40	0	100%	0%
Detection of changes in trends of diseases	40	0	40	0%	100%
Detection of epidemics.	40	38	2	95%	5%
Estimation of morbidity and mortality of diseases included	40	40	0	100%	0%
Assessment of control measures	40	40	0	100%	0%
Improved clinical practice for diseases included	40	26	14	65%	35%

- Questionnaire attached at the appendix No 2.

The answers from the medical officers about the collection and analysis of data it was found that the surveillance has contributed for

1. The prevention and control of diseases.
2. Detection of changes in trends of diseases.
3. Detection of epidemics.
4. Estimation of morbidity and mortality of diseases included.
5. Assessment of control measures.
6. Improved clinical practice for diseases included.

In the district meeting 40 medical officers from all the PHC, CHC and District headquarter hospital, SDH were present. 40 questionnaires were distributed among them. All the medical officers agreed that OMDSS has contributed in prevention and control of diseases. All of the medical officers agreed that OMDSS has not detected any change in the trend of any disease but it will detect in future, it has partially detected epidemics but gradually it will detect all. About estimation of morbidity and mortality of the diseases, all of the medical officers agreed that the OMDSS can estimate the morbidity and mortality of the diseases. 16 of the total 40 medical officers expressed doubt about the truthfulness of the reports given by the health workers. 32 medical officers agreed that control measures could be taken and 8 commented that it is as before, by this OMDSS but all commented that laboratory facility should be strengthened. 22 agreed there is improvement in clinical practice and rest 18 commented the clinical change is at it's due course and there is no improvement by OMDSS.

Table: 14 Answers from the questionnaires to the medical officers.

Objectives	No of ques tionniares	Persons agreed	Persons disagreed	Percentage of agreement	Percentage of dis agreement
The prevention and control of diseases	40	40	0	100%	0%
Detection of changes in trends of diseases	40	36	4	90%	10%
Detection of epidemics. (Partial)	40	40	2	100%	0%
Estimation of morbidity and mortality of diseases included	40	40	0	100%	0%
Assessment of control measures	40	32	8	80%	20%
Improved clinical practice for diseases included	40	22	18	55%	45%

- Questionnaire attached at the appendix No 3.

- **Whether the AHO in the district and MO (PHC), district pharmacist/ health supervisor in charge of surveillance, health supervisor in the PHC are capable to analyze the data?**

The AHO and medical officer in charge of PHC are capable of analysis of data and it is possible as because there was a training session for them in the month of December 2003.

Health supervisor of the district who is in charge of OMDSS as well as PHC are capable of analyzing the data but they commented that there should be another training for them.

Discussion: Now the training program for the health workers, health supervisors, pharmacist, BEE, Vital statistics clerk is going on.

E.3.7. Decision making:

Method: Within this year, what is the percentage of proper decisions taken for epidemics in the district?

It was found that in the year 2003, 42 outbreaks of diarrhea have been reported in the district, out of which 15 were true outbreaks and others are over reporting of outbreaks. 35% right decisions have been taken about the outbreaks. No other outbreaks have been reported in the district during this year. The PHC, which was the study area, that is Beltikiri PHC has reported 6 outbreaks of diarrhea and it was 100% correct.

E.3.8. Feedback:

From the questionnaires to the health workers, supervisors, medical officers it was found that in the PHC level the PHC medical officer gets some feed back from the district level but not found any feed back from the state level. They have received the feed back about the submission of reports. The health supervisors and workers get feed back from the PHC every month. Here remain some lacunae that the medical officers do not review the trend of the diseases and they do not clarify the analysis of data. In a few sectors the medical officers gives feed back to the health workers. All the health workers told that they have received feedbacks from the PHC medical officer every month and during outbreaks only. They have agreed that the feedbacks during the outbreaks were proper and timely. They have not received any feedback from the district level within the year 2003.

In December 2003 one-day reorientation training program for medical officers were undergone in the district headquarter. Now the PHC level reorientation training program for health supervisors, health workers, pharmacists is going on. Till 30 June 2004, the training program was complete in 5PHC. In each week reorientation training program will be held in 2 PHC. Gradually all the workers, supervisors, pharmacists will be trained within this year. Firstly the sanitary inspectors, pharmacists, data entry operators from the district headquarter should be trained first which has not been done yet.

Resources available:

There is one vehicle, one driver, for the rapid response team, but the resources for fuel of the vehicle is very less. During emergencies from other budgets as malaria and leprosy money is adjusted. There is necessity to increase the budget for fuel. The supply of necessary drugs and other materials are very less which should be increased.

- Methodology for identification of "Outcome" indicators.

Objective is to detect Epidemics.

1. How many epidemics of particular diseases, has the OMDSS detected since its establishment?
2. Are the numbers detected substantially more than those detected prior to the OMDSS.
3. How many of the outbreaks detected were true outbreaks and how many were false?
4. Of those detected as the true outbreaks how early they were detected and how early the control measures initiated.
5. On what day from the start / detection of the first / index case did the "opportunity for control" begin.
6. Did the attack rates and case fatality rates came down significantly since the establishment of the OMDSS for diseases of high outbreak potentials.
7. Effectiveness of containment measures and preventive actions initiated against future outbreaks.

During the year 2003, 42 outbreaks of diarrhea have been reported through out the district out of which 15 were true outbreaks. So that 35% was true and 65% overestimation was there. Out of the reported 42 outbreaks, the Assistant health officer visited the villages for 34 outbreaks and the respective PHC medical officers managed others. Out of the true outbreaks proper decision was taken 100% but for 4 outbreaks decision was not in time. So timely feedbacks were 93%. I could not find any data about the outbreaks before the year 2000 so that I could not compare the number of outbreaks before and after the establishment of OMDSS. 8 outbreaks were investigated when those were at the verge of getting the peak or at peak and 48% investigation was in time.

If we compare the prevalence and case fatality rate it is found that these rate have been increased after implementation of OMDSS than before the implementation. Because there might be less reporting of diseases and deaths due to the particular diseases before the implementation of this program. The prevalence of diseases are decreasing after the implementation of OMDSS,

Diseases trends:

Objective is to detect the changes in disease trends over time.

We have to look for the following events.

1. Annual morbidity and mortality data.
2. Whether the pattern is increasing or decreasing.

Fig:13 Attack rate per 1000 population of severe diarrhea in Dhenkanal district during 2001, 2002, 2003.

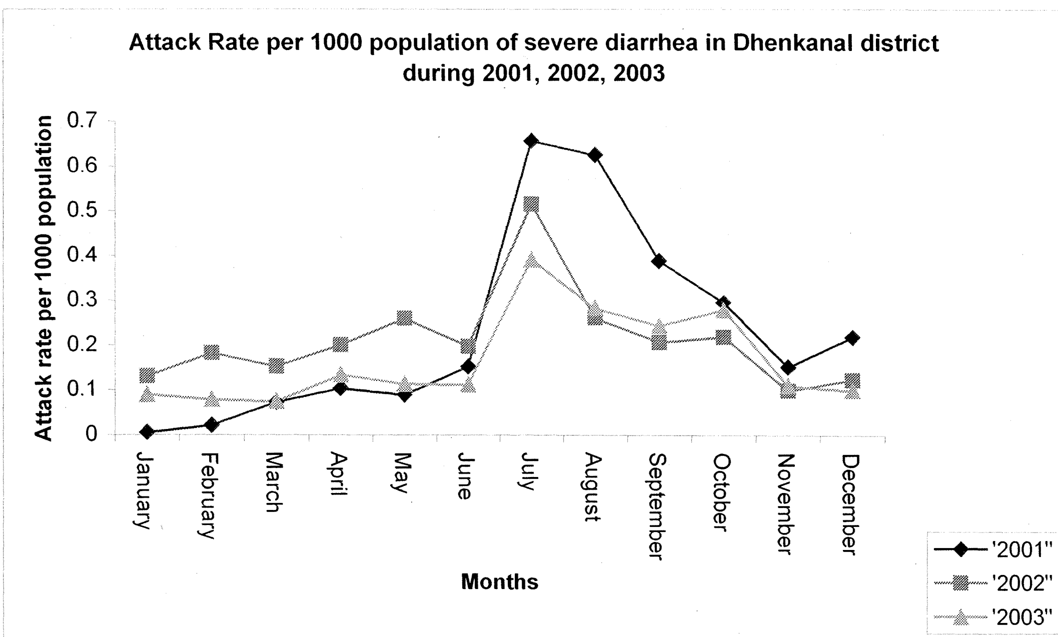
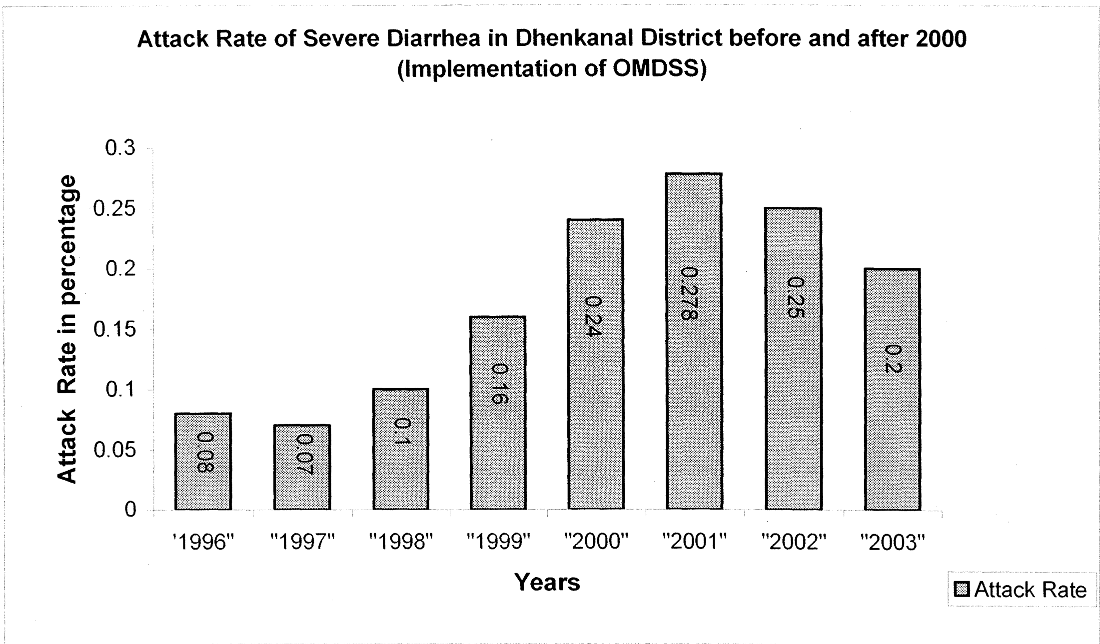


Fig:13 Attack rate of severe diarrhea in Dhenkanal district during 2001, 2002, 2003.



The incidence of severe diarrhea has been decreased within these three years. Though during the month of June it starts increasing and reaches the peak during July then decreases gradually. The trend of the disease has remained the same for these three years. From the graph it is found that the incidence has decreased. From the graph for the prevalence rate of severe diarrhea per 100 population since 1996 to 2003 it was found that the it has become clear that first since 1996 it has increased till 2001 and peak is the 2001 and then it is gradually in decreasing trend. Back

Conclusion:

From the evaluation of the system it is inferred that the structural indicators are satisfactory but the laboratory facilities should be strengthened in the district level. The laboratory technicians should be trained to up to date their knowledge. More fund should be allotted for fuel, other logistics and drug. Evaluating the process indicators it is found that the case definition is 50% sensitive, flexible, positive predictive value is 0.33. It shows that the laboratory facilities can make the case definition more specific. Data collection is on time, data transmission is more or less in time but due to lack of reorientation training the health supervisors are not sending the supplementary reports so that there is no complete but late reports are not there. Only complete reports on time and no report is found. They might have sent the compiled reports later as supplementary report. The timeliness has been decreased in 2003 in relation to 2002. So the district should take some actions on these units so that the report quality may be increased. After the year 2002 no action has been taken against the units who has not sent his report repeatedly. There has been no analysis of the reports in the district epidemic cell. There is no feedback below from the district level except to the PHC medical officer in charge for submission of the compiled reports in time. There is no feedback to the lower levels. The PHC medical officer only gives feedback to the health workers or health supervisors. Care should be taken for these feedbacks. Lastly the three medical colleges, private sector hospitals, private practitioners, should be involved in the surveillance system. The surveillance system cannot detect all the cases from the state. Only now it can detect a part of the disease burdens from the communit

Annexure- 1

QUESTIONNIARIE TO HEALTH WORKERS FOR OMDSS.

Name: No:

Designation: PHC: Beltikiri.

Sub-center: District: Dhenkanal.

1.Case definitions were asked verbally.

2.Whether case definitions are simple: Yes / No

3. How often you go to one village under your sub-center within a week. Once in a week / twice in a week / thrice in a week / more than 3 times a week / once in a fortnight.

4. How often you collect the data in a week. Once / twice / write if any thing more.

5. If there is any outbreak in the area covered by him / her during the year 2003. Yes/No

6. If yes how many. ____________________

7. How many you have intimated during the year 2003. __________________________

8. Do you attend the sector meeting every week. Yes / No.

9. How many sector meetings you have attended this year.

10. Whether you get any feed back from the higher level. Yes / No.

11. From whom you get feed back. From Health supervisor / Medical officer PHC / ADMO (PH) / CDMO / State level. (You may give tick mark to more than one)

Signature of the interviewer

Anexure-2

QUESTIONNIARIE TO HEALTH SUPERVISORS FOR EVALUATION OF OMDSS.

Name: No:

Designation: PHC: Beltikiri.

Sub-center: District: Dhenkanal.

---

1. Do you compile all the reports in the sector level.
2. Do you attend all the sector meetings each week. Yes / No.
3. How many times you have attended sector meeting during the year 2003. ______
4. Do you preside sector meetings. Yes / No.
5. If yes how many times during the year 2003. ___________
6. Do you transmit the report to the PHC in time. Yes / No.
7. How you transmit the report to the PHC. By telephone / go and submit / send by the bus.
8. Whether you can analyze the data of OMDSS. Yes / No.
9. If yes, whether partially or fully. ____________________
10. Whether you have got training about OMDSS. Yes / No
11. Whether you need training for the data analysis. Yes /No
12. Whether you get any feed back from the higher level. Yes/ No.
13. From you get the feedbacks. PHC MO / ADMO (PH) / CDMO / State.
14. During the year 2003 how many outbreaks you have reported. _______________

Signature of the interviewer.

Annexure- 3

Questionnaires to medical officers for Evaluation of OMDSS, Dhenkanal district.

Serial No-

1.Whether the OMDSS works in your health institute. Yes / No

2.Whether the data collection is proper. Yes / No / should be improved.

3.Whether sector meeting is done regularly. Yes / No

4.Whether you attend the meeting regularly. Yes / No/ very often

5.Whether the health supervisor is competent for all the components of OMDSS. Yes/No

6.Whether you feel OMDSS has contributed for the factors written below. (Please give your comments)

1. The prevention and control of diseases.
2. Detection of changes in trends of diseases.
3. Detection of epidemics.
4. Estimation of morbidity and mortality of diseases included.
5. Assessment of control measures.
6. Improved clinical practice for diseases included.

7.Whether you can analyze the data of the OMDSS. Yes / No

8.Whether you have decided for some control measures during any out break in your sector? Yes / No

If yes how many, please mention the number ___________

9.Whether any feed backs you have received from the district level. Yes / No

If yes whether the feedback was proper. Yes / No

If you have received the feedback whether it was in time. Yes / No

10.Whether you have given feed back to the health supervisor or health worker for his regular works in surveillance system. Never / Always / At times.

11. Whether you have received any reorientation training about OMDSS.

12.How many times you have undergone this training. ______________

13.Do you feel whether it is necessary? Yes /No

14.Do you feel whether the reorientation training adds any knowledge to you? Yes / No

Signature of the investigator

Annxure-4.

Questionnaires for Public for evaluation of OMDSS, Dhenkanal District, 2003.

Name of the village: Date:

Name of the sub-center:

Name of the person:

Name of the head of the family:

1. Whether the health worker male or female came to your house last week. Yes / No
2. This month how many times the health worker male or female has visited to your house. 0 / 1 / 2 / 3 / 4 / more than 4 times.
3. Any body from your house suffered any disease last week (Saturday to Friday) ____
4. If any body suffered from disease, where he was treated.

   Private practitione Yes / No

   Shankarpur PHC (N). Yes / No

   Athagarh subdivisional hospital. Yes / No

   District headquarter hospital, Dhenkanal. Yes / No

   Medical College Yes / No,

   Or any where ______________________________

5. If any body suffered from disease, whether you have informed the health worker.

Yes / No

6. After information to the health worker what he did or what he advised.

____

7. If any body had fever whether blood slide has been collected or not. Yes /No
8. If he has gone to any hospital any investigation has been done. Yes / No

Signature of the interviewer

5. Evaluation of Modified Leprosy Elimination Campaign-5, Orissa, 2004.

1. Introduction:

The 4th Modified Leprosy Elimination Campaign was implemented in the state of Orissa in the year 2002-2003. Due to this MLEC-4 the Prevalence rate of Leprosy in National level came down to 3.2/ 10,000 population on March 2003 but 7.3 / 10,000 population in Orissa. Therefore Government of India decided to implement MLEC-5 in 8 high endemic states. The 8 states are Orissa, Bihar, Chatishgarh, Jharkhannd, Andhrapradesh, Maharastra, Uttar Pradesh and West Bengal. In Orissa the MLEC-5 was implemented on 10.4.04 to 15.4.04.

Leprosy [Hansen's disease] is a chronic infectious disease caused by Mycobacterium Leprae, which affects mainly the peripheral nerves. It also affects the skin, muscle, bones, testes and internal organs.

WHO operational definition is:

(1) A case of leprosy is defined as a person showing one or more of the following features, and who as yet has to complete a full course of treatment:

1. Hypo pigmented patches.
2. Partial or total loss of cutaneous sensation in the affected areas [earliest sensation to be affected is usually light touch],
3. Presence of thickened nerves,
4. Presence of acid-fast bacilli in the skin or nasal smear.

In 1966 the prevalence rate of leprosy in the world was 8.4/ 10,000 population and on 1985 it increased to 12 and decreased by this MLEC program to 1/10,000 population at the end of 2000. In India in 1981 the PR was 57/10,000 and it decreased to 3.7/10,000 by March 2001. India represents 64% of the prevalence and 78% of new case detection rate. Before implementation of MDT in 1983 the PR of Orissa was 121.4/10,000 populations and reduced to 8.33 / 10,000 population by 1998 by the use of MDT. But as the annual new case detection rate remained constant as 90 / 10,000. So on 31.1.98 the MLEC program was implemented in Orissa. After introduction of MLEC the PR has been reduced to 5.9/ 10,000 population in March 2003.In the Dhenkanal district before MLEC the PR of leprosy recorded at the commencement of MDT was 80/ 10,000 populations. After it the PR decreased gradually.

Table: 1 Prevalence Rate of Leprosy cases in Dhenkanal District.

SL. No.	Year	Prevalence Rate / 10,000 population
1	1997 - 98	34
2	1998 – 99	6
3	1999 – 2000	14
4	2000 – 01	6
5	2001 – 02	13
6	2002 – 03	12
7	31st March 2003	12.2

Leprosy is a major problem in Dhenkanal district [PR=12.2]. (2)

Table 2: Status of New Case Detection in Dhenkanal District.

Sl No	Indicator	Dhenkanal
1	Projected population	1089606
2	New case detection rate [per 10,000] based on projected population	14.8
3	% MB Cases	34.5
4	% Child cases	16.5
5	% Female cases	22.1
6	% Disability Grade 2 cases	0.2
7	% SC	17.2
8	% ST	20.3

NCDR is maximum in the district of Dhenkanal among the sample districts taken for the Leprosy Elimination Monitoring purpose in the state of Orissa. (2)

In Dhenkanal district Prevalence rate has been reduced to 12.2 / 10,000 population in March 2003. The Prevalence rate in some sub centers of Parjanga CHC was very high like 80 (Eighty) / 10,000 population. In Dhenkanal district in the Parjanga Block Special Action Project for Elimination of Leprosy (SAPEL) was implemented in the month of October 2003.

In the Dhenkanal district one SAPEL proposal at Muktaposhi, Barihapur, Basoi, Roda, Khairamunda, Kantor sub-centers under Parjanga CHC was approved on 4.9.03 and advised to complete the SAPEL before October 2003.

2. Goal: To decrease the Prevalence Rate of Leprosy, less than 1/10,000 population.

3. Objectives of MLEC-5:

1. To carry out intensive awareness campaign about Leprosy involving the community in the campaign.
2. To give one day orientation training to the Medical Officers, Health Supervisors, Health Workers (Male, Female) and village volunteers like Village Health Guide, Anganwadi Workers before engaging them in the case detection activities.
3. Detection of previous undetected and new Leprosy cases and put them on MDT immediately.

4. Elements:

1. Capacity building measures for local health workers to improve MDT services.
2. Increasing community participation to strengthen elimination activities at the peripheral levels.
3. Diagnosis and curing patients.

5. Activities:

1. Orientation work shops for local health workers and community volunteers.
2. Community awareness creation and participation.

3. Case finding.
4. Treating every detected case with MDT and making efforts to ensure that each one is cured.

6. Strategy:

The specific MLEC strategy varied according to the Prevalence Rate of different blocks in the district.

Table:3 Case detection strategy during MLEC-5

Urban	Rural	
City / Town with > 2,00000 population	(Blocks excluding town with 2,00000 population)	
	PR<5/ 10,000 population	PR> 5/ 10,000 population
Voluntary Reporting of Cases + LEC in slum areas	Voluntary Reporting of Cases	Active Search.

7. Campaign Activities:

(A) Information Education and Training.

The IEC and public awareness is a prime aim of this MLEC-5. IEC is to be done for one month and there was also Inter Personal Communication (IPC), and group meetings by Health Workers.

(B) Orientation Training (MLEC)

The training was of one day for Medical Officers, Health supervisors, Health Worker (Male & Female) in organization of MLEC and training in communication. Orientation to ICDS functionaries, Village Health Guides and Volunteers was given in the areas where they are used as search teams.

Where passive detection through Voluntary reporting centers are to be conducted, orientation training is to be given to those MO, HW, HS.

8. Case finding:

(A) Active Case Detection:

Active Case Detection through house-to-house search was planned for selected areas in Blocks with PR > 5/ 10,000. A micro plan is to be done in each district for this active search and VRC. Each search team consists of 3 members, 2 health workers and one volunteer from the same village. The period of search is the last 6 days of the month of IEC. Each search team should cover 3000 to 4000 population in 6 days and the volunteer is one from each village.

There is one conformation cum supervision team to work over 5 to 10 teams. The conformation team consists of one Medical Officer and one Health supervisor/ Para Medical Worker (PMW) who is a vertical staff. On the first day they will visit each search team and 2nd day onwards they will conform the suspected cases.

The conformed cases will be given immediate treatment and register the case.

(B) Passive search or VRC.

Voluntary Reporting Centers are to be opened in the rural blocks having PR < 5/10,000 population and all the urban areas. For every 10,000 population there will be a VRC and each VRC will be manned by one Medical Officer, a Health Supervisor, a Health Worker Male and one Health Worker Female. If MO is not available then any Senior Supervisor will head the team. Usually the VRC will be opened in the PHC (N) dispensaries or other health facilities. The VRC will open for 2 days at the end of one month of IEC. Here the cases will be conformed and immediately they will be put in to MDT.

9. Treating every detected case with MDT and making efforts to ensure that each one is cured:

- The health worker disperses MDT to all the cases of Leprosy then and there.
- Health worker meets the patient each month.
- The patient also comes to nearby health institute or sub-center to get MDT.

Evaluation

Selection of Sample units:

From Active search areas one block will be chosen at random, the block with highest Prevalnce rate, that is Parjanga block. From the Parjanga block one sector will be chosen having PR more than 10/10,000. Muktapashi sector may be chosen. From this sector all the sub-centers will be studied. As the number of patients detected in the MLEC-5 varies all the patients and all the patient records prepared during this MLEC will be studied.

From VRC areas one sector will be chosen at random, the block with lowest Prevalence rate that is the Sadar block. From VRC areas the Shankarpur Sector will be chosen. From this sector all the sub-centers will be studied. All the patients will be interviewed and all the patient records will be studied.

1. Evaluation of needs: (Selection of area for Active search or VRC)

i. Prevalence.

ii. New case MB proportions.

iii. Proportion of grade 2-disability among new cases

Table: 2 Prevalence of Leprosy in different years:

Indicators	1997-98	1998-99	99-2000	2000-01	2001-02	2002-03	2003-04
Regd PR/10000	34	6	14	6	14	12	5
A.C.D.R.	40	11	24	12.6	19	14.8	8
P/D Ratio	0.9	0.5	0.6	0.5	0.7	0.8	0.6
Proportion of children among new cases	16.5	11.5	15	15	14	16.5	12
Proportion of visible deformity among new cases	0.6	1.1	1.1	0.2	0.2	0.1	2
Proportion of MB cases among new cases	26.2	28	24.9	29.5	30.5	34.4	37
Proportion of female cases among new cases	-	-	-	-	-	22	34

As the Prevalence rate, Annual case detection rate are very high; P/D ratio is more than 0.6, proportion of Multi bacillary cases is very high Modified Leprosy Elimination Campaign 5th was been advised y the Government of India with some modifications. The blocks where the Prevalence rate is more than 5 / 10,000 population then there was active search. The blocks with prevalence rate less than 5 / 10000 population there was voluntary reporting of cases.

Table:3 Rates and Ratios of Leprosy in Dhenkanal district

RATES AND RATIOS OF LEPROSY IN DHENKANAL DISTRICT

Sl No	Indicators	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	99-2000	2000-01	2001-02	2002-03	2003-04
1	Regd PR/ 10000	79	68	55	32	21	18	17	14	34	6	14	6	14	12	5
2	A.C.D.R.	14	14	12.8	17	10.7	15	16	16	40	11	24	12.6	19	14.8	8
3	P/D Ratio	5.6	4.9	4.3	1.9	2.0	1.2	1.1	0.9	0.9	0.5	0.6	0.5	0.7	0.8	0.6
4	Proportion of children among new cases	17.8%	24.8%	29.8%	22.3%	26.2%	19.6%	20.5%	17.3%	16.5%	11.5%	15%	15%	14%	16.5%	12%
5	Proportion of visible deformity among new cases	4.4	2.9	2.8	2.4	2.2	1.3	1.2	0.7	0.6	1.1	1.1	0.2	0.2	0.1	2
6	Proportion of MB among new cases	25.4	26.4	30.6	30.9	27.7	27.9	28	21.8	26.2	28	24.9	29.5	30.5	34.4	37
7	Proportion of female among new cases	-	-	-	-	-	-	-	-	-	-	-	-	-	22	34
8	S.C. among new cases	-	-	-	-	-	-	-	-	-	-	-	-	-	17	
9	S.T. New case detection	-	-	-	-	-	-	-	-	-	-	-	-		20.2	
10	Population	1824000	1852000	1878100	1910100	1941500	1927100	1913200	1031000	1031000	1043290	1058500	1070000	1069900	1081700	1093489

2. Evaluation of plan:

Assessment of feasibility, adequacy, time period of the plan.

2.1. Internal inputs:

i. Identification and assignment of a project manager.
ii. Production of posters and pamphlets in the local language.
iii. Guidelines of workshops for volunteers and local health workers.
iv. Arrangement of transportation for use by the campaign staffs.

2.2. External inputs:

i. External resources for travel and per diem of PM and campaign team members.
ii. Funds for orientation training for local health workers.
iii. Funds for orientation training for volunteers.
iv. Templates for posters promoting MDT and early diagnosis of leprosy.
v. Funds for producing posters in local language.
vi. Funds for guidelines for eliminating leprosy in local language.
vii. Workshop guidelines for health workers and volunteers.
viii. MDT drug in blister packs.

2.1. Internal inputs:

Assistant District Medical Officer, Public Health; of Dhenkanal District was identified and assigned as the project manager and the Chief District Medical Officer was to guide him.

Posters and pamphlets in local language were being printed adequately before the program. Each PHC was supplied with 300 posters and 5000 pamphlets in local language that is in Oriya. State government supplied all of these pamphlets and posters.

The State Government of Orissa supplied guidelines of workshops for volunteers and local health workers. The district headquarters prepared the guidelines according to their necessity.

Assistant District Medical Officer, Public Health; of Dhenkanal District provided transportation for the campaign staffs or the nodal officers and Medical officer Leprosy wing. The vehicles under the Assistant District Medical Officer, Public Health and

Assistant District Medical Officer Family welfare and Immunization were used for the officers for movement.

2.2. External inputs:

2.2.1.External resources for travel and per diem of PM and campaign team members.

<u>During the training:</u> All the doctors from the sector hospitals came to Dhenkanal for training. They were provided traveling allowance 70 rupees, per diem 70 rupees and working lunch of 40 rupees each. The trainers were paid traveling allowance 100 rupees, per diem 100 rupees and working lunch of 40 rupees each. During training of the health workers and health supervisors they were paid 35 rupees as traveling allowance, 35 rupees as per diem and 40 rupees as working lunch. During the training of volunteers they were paid 20 rupees each for the half-day training.

<u>During the case detection and conformation:</u> During case detection the searchers are paid 35 rupees each per Diem with out traveling allowance. The health supervisors got 50 rupees each as per Diem without traveling allowance. The conformators received 70 rupees each as per Diem with 297 rupees as mobility support each day.

2.2.2.Funds for orientation training for local health workers.

For local health workers got training in their respective PHC. They received per diem 35 rupees and traveling allowance 35 rupees and working lunch 40 rupees each.

2.2.3.Funds for orientation training for volunteers.

The volunteers came to their respective sector for training. The training was for half day and they received 20 rupees each.

2.2.4.Templates for posters promoting MDT and early diagnosis of leprosy.

2.2.5.Funds for producing posters in local language.

2.2.6.Funds for guidelines for eliminating leprosy in local language.

The state government provided these three items.

2.2.7.Workshop guidelines for health workers and volunteers.

Assistant District Medical Officer Family welfare and Immunization were used for the officers for movement.

2.2. External inputs:

2.2.1.External resources for travel and per diem of PM and campaign team members.

<u>During the training:</u> All the doctors from the sector hospitals came to Dhenkanal for training. They were provided traveling allowance 70 rupees, per diem 70 rupees and working lunch of 40 rupees each. The trainers were paid traveling allowance 100 rupees, per diem 100 rupees and working lunch of 40 rupees each. During training of the health workers and health supervisors they were paid 35 rupees as traveling allowance, 35 rupees as per diem and 40 rupees as working lunch. During the training of volunteers they were paid 20 rupees each for the half-day training.

<u>During the case detection and conformation:</u> During case detection the searchers are paid 35 rupees each per Diem with out traveling allowance. The health supervisors got 50 rupees each as per Diem without traveling allowance. The conformators received 70 rupees each as per Diem with 297 rupees as mobility support each day.

2.2.2.Funds for orientation training for local health workers.

For local health workers got training in their respective PHC. They received per diem 35 rupees and traveling allowance 35 rupees and working lunch 40 rupees each.

2.2.3.Funds for orientation training for volunteers.

The volunteers came to their respective sector for training. The training was for half day and they received 20 rupees each.

2.2.4.Templates for posters promoting MDT and early diagnosis of leprosy.

2.2.5.Funds for producing posters in local language.

2.2.6.Funds for guidelines for eliminating leprosy in local language.

The state government provided these three items.

2.2.7.Workshop guidelines for health workers and volunteers.

This was provided to each PHC by the district headquarter.

2.2.8.MDT drug in blister packs.

Blister packs of Multi Drug Treatment drug were provided to each sub-center adequately. The drugs were for adult and children multi bacillary cases; adult and children pausi bacillary cases separately. In each blister pack there were drugs for a month. If there was necessity of more blister packs it was instructed to use the buffer stock for the regular patients, which were filled up later.

3. Evaluation of performance:

3.1.Orientation workshop on leprosy for volunteers and health workers.

3.1.1.Location: Health center (rural / nearby large village which is centrally located).

3.1.2.Trainers: Medical officer in charge PHC.

3.1.3.Number of trainees: About 40 persons.

3.1.4.Duration of training: 4 hours.

3.1.5.Number of courses: As required.

3.1.6.Topics:

The training programs were performed in all the sectors for the volunteers of the respective area and medical officer in charge of the PHC was the trainer. The guidelines were followed up strictly.

In Bhuban block and Sadar block voluntary reporting centers were opened and in all other blocks of Dhenkanal district active search went on for the case detection, registration and drug distribution to new cases. The blocks were selected according to prevalence rate.

3.2.Case detection, case holding: (patient care indicators)

3.2. (a) Diagnosis of leprosy

- Proportion of cases diagnosed and classified wrongly.

- Proportion of child cases among the new cases detected.
- Proportion of MB cases among the new cases detected.
- Proportion of SSL cases.
- Proportion of female cases.
- Proportion of new cases with disabilities.
- Proportion of recycled cases.

3.2. (b) Accessibility to MDT

- Proportions of cases have to travel longer distance (average distance).
- Proportion of cases incurred cost to collect the MDT drugs.
- Proportion of patients avail the flexible delivery of MDT services.

Purpose: To evaluate the extent to which patients have easy access (geographical, financial and technical) to MDT services.

Definition: Accessibility will be estimated through a set of indicators collected in a sample of patients diagnosed and treated during the year.

Indicators:

i. Average distance to collect monthly dose of MDT.

   Based on individual records and/ or interview of a sample of patients this is the average distance (in kilometers) patients are actually traveling monthly to receive their treatment.

ii. Estimated cost for patients.

   Based on interview of a sample of patients, ascertain whether there are any costs incurred for the service.

iii. Flexibility in delivering MDT.

Based on discussion with health worker and patients, it will be ascertained whether the health centers:

- Provides treatment only on a fixed day of the month or on several day of the month. (Specify number of days)
- Offers to patients that more than one-month treatment can be given if needed. (Accompanied MDT)
- Can manage complications (reactions, disabilities).
- Is a specialized or integrated center?
- Stocks and uses of steroid.

3.2. (c) Case holding

- Proportion of cases cured in due time for treatment. (Not possible as case detection is concerned)
- Proportion of cases defaulted out.
- Proportion of cases continuing treatment beyond the prescribed dates. (Not possible as case detection is concerned)

3.3. Availability of MDT.

Purpose: To identify potential surplus stocks or shortage of MDT supply the health center, or district and regional stores.

Definition: Availability of MDT blister packs and loose drugs at time of visit, expressed in terms of months supply, for the given patient caseload.

Prerequisites: Checking of MDT stocks and/ or stock records, discounting any expired drugs.

Calculation: Availability of blister packs in months is simply the number of registered cases for each category.

3.4. Quality of MDT services.

Purpose: To measure the extent to which MDT is given to leprosy patients.

Definition: Proportion of leprosy patients treated with MDT amount all patients registered for treatment at a given point in time.

Pre-requisites: Checking treatment registers and patient records.

Calculation: Proportion calculated by devising the number of patients registered as treated with MDT by the total number of patients registered for treatment at the time of the visit. If the sample of health facilities is representative, this indicator could be given with confidence interval for the whole region.

3.5. Quality of MDT blister packs:

Purpose: To identify potential problems in drug supply management

Definition: Proportion of blister packs showing acceptable physical condition out of a total number of blister packs checked.

Prerequisites: Examination of existing blister packs to check expiry dates shapes of packages and blister and aspect of drugs (especially clofazimine).

Interpretation: A low quality will indicate failure in supply, transport and storage of drugs.

3.6. Cost analysis:

3.7. Other activities: Administration, Manpower, and Data system.

Method: Survey of the Sub center, PHC, District office that is leprosy Office.

3.7.1.Indicators for Evaluation of manpower.

1. Percentage of sub centers where there is no Health worker.
2. Percentage of sectors without Health Supervisor.
3. Percentage of sectors without Medical Officer.

3.7.2.Indicators for Evaluation of Administration.

3.7.3. Indicators of evaluation of Data system

Percentage of regular data transmission to the Office of LEU.

3.2.(a) Diagnosis of leprosy

3.2. (a) 1 In the Parjang block two cases were classified wrongly. Out of 143 total cases two are classified wrongly. So 1.43 % of cases were diagnosed but classified wrongly.

In Sadar block no case was classified wrongly out of eleven conformed cases.

3.2.(a) 2 Proportion of child cases among new cases detected is 24 out of 143 in Parjang block that is 16.78%.

In Sadar block child cases among new cases detected is one out of eleven cases that is 9%. In the total district percentage of child cases is 82 out of 474 that is 17%.

Table: 4 New case detection in dfferent blocks:

Sl No	Name of block	Total population	Total new cases detected	Types of disease in new cases		No of new cases with visible deformity	No of new cases according to age			
							Adult		Child below 15 years	
				MB	PB		M	F	M	F
1.	Dhenkanal (Munici)	56644	9	2	7	0	4	3	1	1
2.	Sch pur	142682	49	13	36	0	29	15	3	2
3.	Odapada	129326	52	16	36	1	21	24	2	5
4.	Hindol	175451	55	14	41	0	16	19	13	7
5.	K. Nagar	129588	81	26	55	0	33	34	7	7
6.	K.had	99964	58	37	21	1	33	23	1	1
7.	Parjang	129073	143	32	111	1	58	61	15	9
8.	Total	858094	447	140	307	3	194	179	42	32

Fig: 1. Percentage of child cases among newly detected cases in MLEC-5.

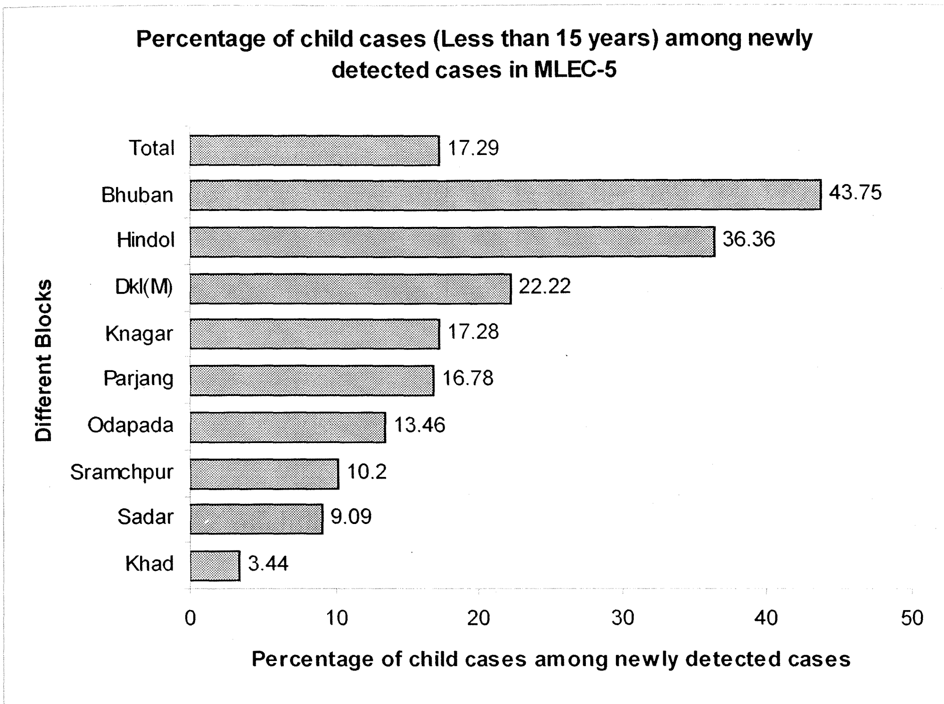


Table: 5 Percentage of child cases in different MLEC

Percentage of child cases (Less than 15 years) during different MLEC in different Blocks				
Block	MLEC-2	MLEC-3	MLEC-4	MLEC-5
Dhenkanal (Municipality)	0	16.7	0	22.22
S C pur	10.8	2.5	0	10.2
Odapada	37.7	26.2	28.3	13.46
Hindol	13.8	23.3	15	36.36
Kamakhyanagar	30.7	23.7	16	17.28
Kankada hada	17.4	15.6	9.8	3.44
Parjang	17.9	14.6	15.2	16.78
Sadar	12.9	8.3	15	9.09
Bhuban	13.9	14.7	26.2	43.75
Total	18.6	17	15.5	17.29

3.2.(a) 3 Figure 1 shows in Bhuban and Hindol Block the percentage of child cases below 15 years is very high. It shows that the undetected cases might be high. In Kankadahad Block the Prevalence is very low and it might be due to lower coverage or case detection in that block.

Fig: 2 Percentage of child cases among newly detected cases during different MLEC.

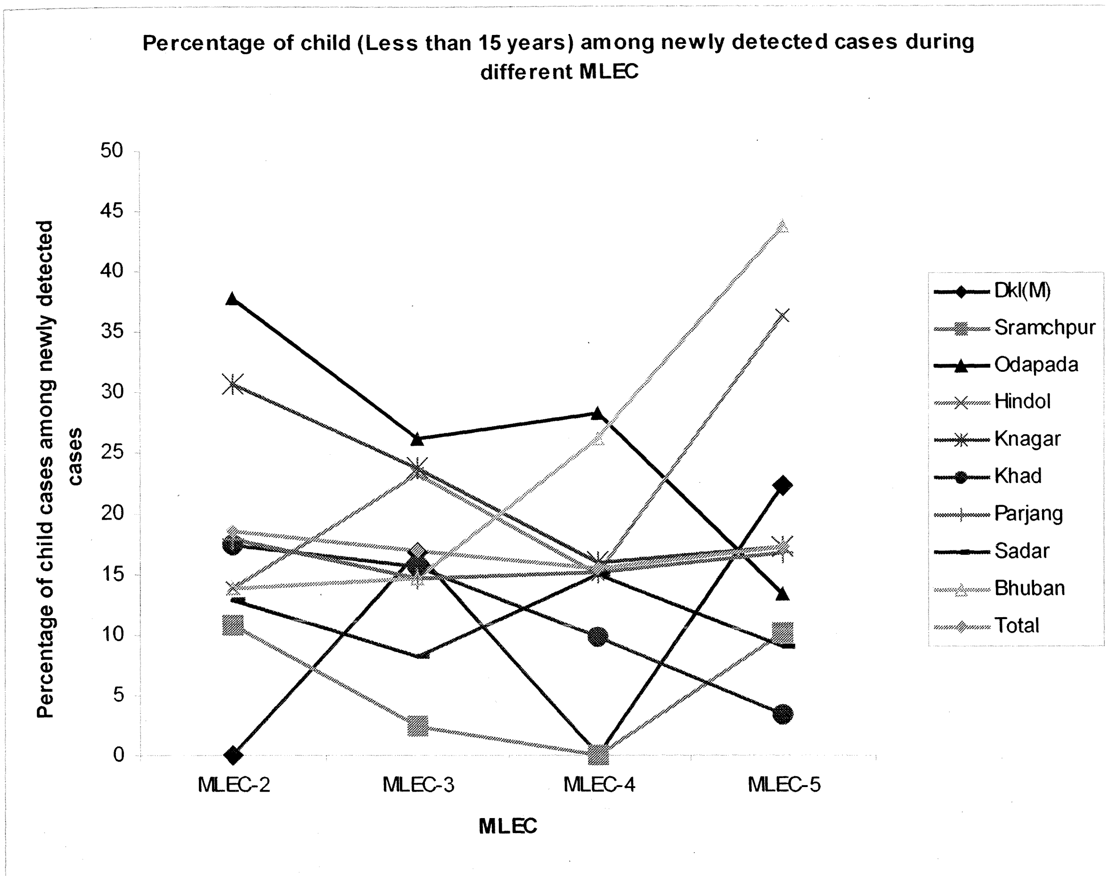


Fig-2 shows that In Bhubana, Hindol block the percentage of child cases has increased but in Odapada and Kankadahad it has come down. In the total district there is no change in the percentage within all these five MLEC.

3.2.(a) 4 It is inferred from figure:3 that as in Kankadahad block the Multi Bacillary cases are more than 50% and it is a unapproachable tribal area there should be a SAPEL in this area after six months of MLEC-5. In Kamakhyanagar and Odapada block risk of emergence of new cases is there.

Fig:3 Percentage of Multi bacillary cases among newly detected cases during MLEC-5

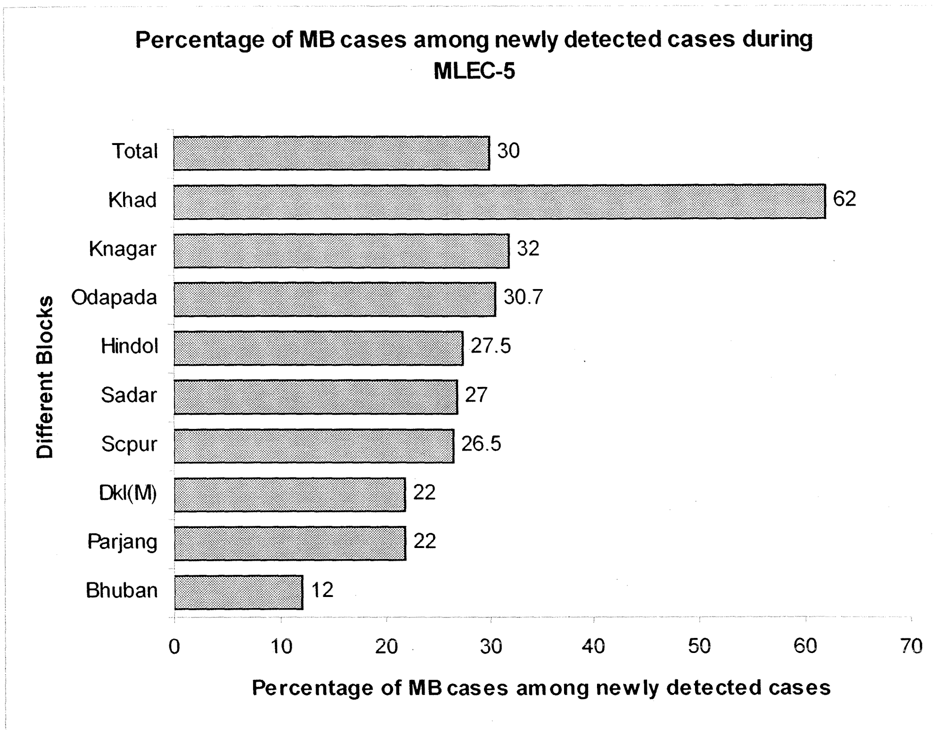


Table: 6 Percentage of MB cases in different MLEC

Percentage of MB cases among newly detected cases during MLEC					
	MLEC-1	MLEC-2	MLEC-3	MLEC-4	MLEC-5
Dkl(M)	18.5	2.6	8.3	80	22
Scpur	26.4	23.9	23.7	24	26.5
Odapada	20.9	16	13.6	24.5	30.7
Hindol	27.9	26	29.6	32	27.5
Knagar	17.7	20.5	18.6	25	32
Khad	22.8	27.8	35	43	62
Parjang	26.7	25.7	25	27	22
Sadar	27.8	28.9	18.7	25	27
Bhuban	34.3	18.2	30.8	16.6	12
Total	26	22.5	24.4	28.9	30

Fig: 4 Percentage of MB cases among newly detected cases during different MLEC

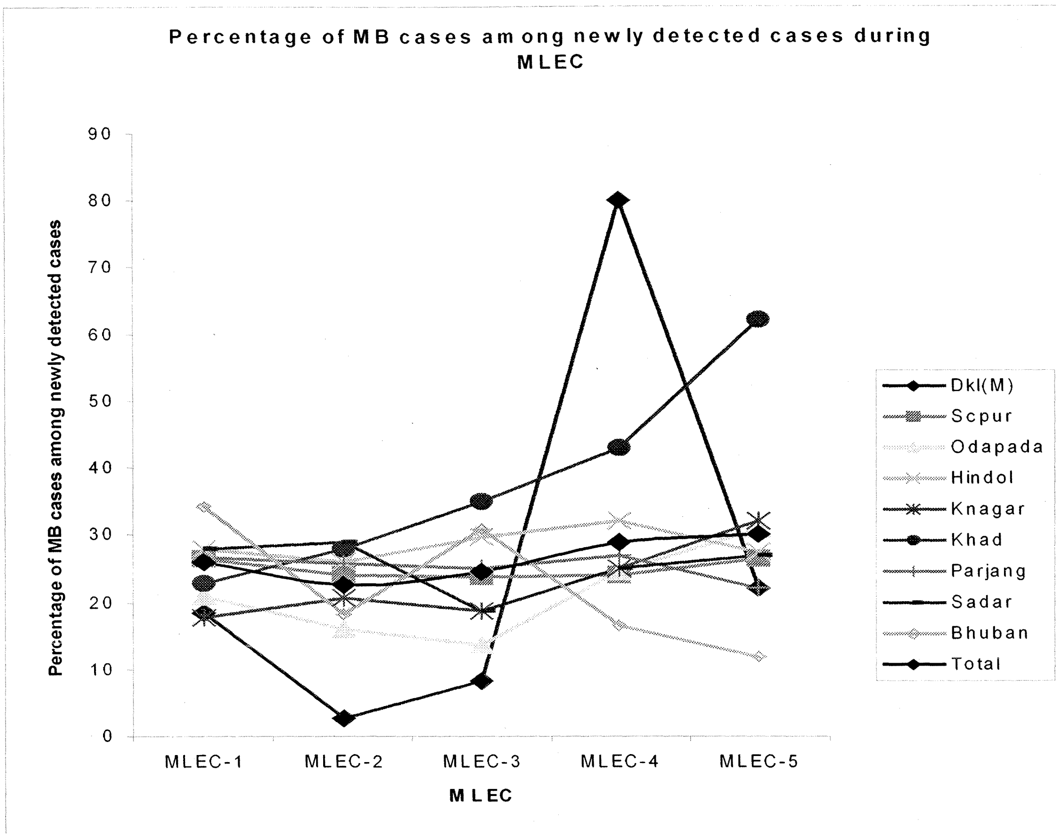


Fig-4 shows that the percentage of MB cases among the newly detected cases in the district is gradually going up. It shows that there may be more spread of the disease. So it is not in a declining stage. In Kankadahad block the percentage of MB cases is going up steadily. So in this block SAPEL should be implemented within six month.

3.2.(a) 5 Figure 5 shows that the percentage of female among the newly detected cases in MLEC-5 in Odapada PHC is highest. It shows that there might be more hidden cases in this area and care should be taken that in next years more child cases may be detected from this area. In Sadar block and Sriramchandrapur Block the percentage of prevalence is less and it shows that the coverage might be low. So it should be taken care of.

Fig: 5 Percentage of female among the newly detected cases during MLEC-5 in different blocks.

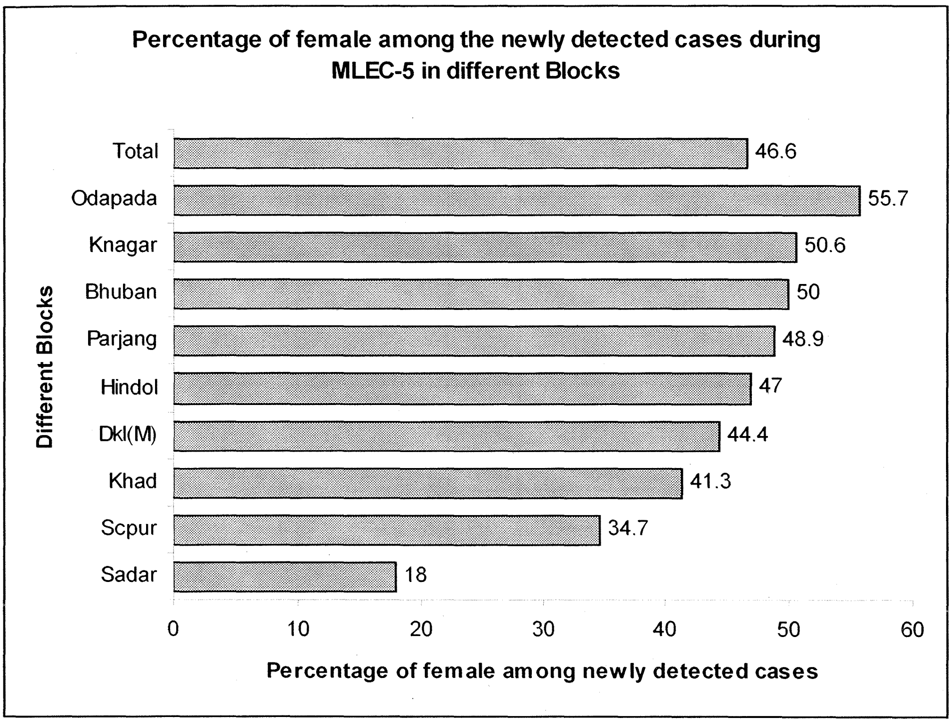
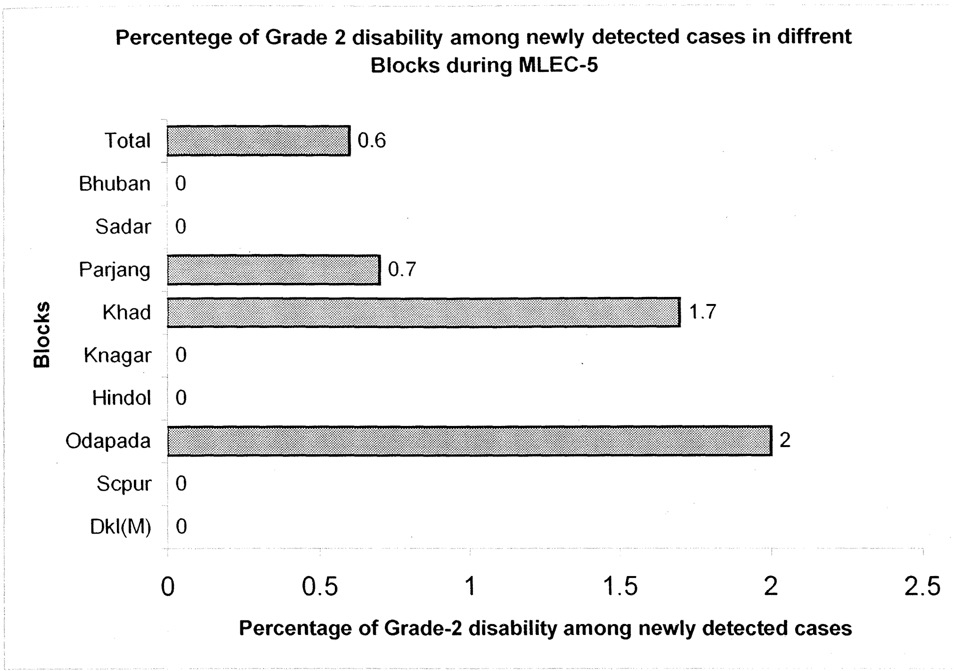


Table: 7 Percentage of Multibacillary caeses, grade 2 disability and female cases percentage in different blocks in MLECE-5.

MLEC-5	PB		MB								
	Male	Female	Male	Female	Total	MB cases	%of MB	Total Female	% of female	G2 disabil	%G2 dis
Dkl(M)	4	3	1	1	9	2	22.22	4	44.44	0	0
Scpur	23	13	9	4	49	13	26.53	17	34.69	0	0
Odapada	13	23	10	6	52	16	30.76	29	55.76	1	1.923
Hindol	38	33	14	13	98	27	27.55	46	46.93	0	0
Knagar	25	30	15	11	81	26	32.09	41	50.61	0	0
Khad	13	8	21	16	58	36	62.06	24	41.38	1	1.724
Parjang	52	53	15	17	143	32	22.37	70	48.95	1	0.699
Sadar	7	1	2	1	11	3	27.27	2	18.18	0	0
Bhuban	14	0	1	1	16	2	12.5	8	50	0	0
Total	189	164	88	70	517	157	30.36	241	46.61	3	0.580

Fig: 6 Percentage of grade 2 disability amongly newly detected cases in different blocks



3.2.(a) 6 In Odapada Block the percentage of Grade –2 disabilities among newly detected cases is higher but within normal limits. Percentage in the district is within normal limits. In the Odapada and Kankadhad Blocks there should be SAPEL within six months.

Table: 8 Percentage of MB cases and grade 2 disability in MLEC-4

MLEC-4	PB		MB		Total	MB cases	%of MB	Total female	% of female	G2 disabl	G2 dis %	Child	%Child
	Male	Female	Male	Female									
Dkl(M)	1	0	1	3	5	4	80	3	60	0	0	0	0
Scpur	17	8	8	0	33	8	24.24	8	24.24	2	6.060	0	0
Odapada	21	19	5	8	53	13	24.52	27	50.94	0	0	15	28.3
Hindol	37	26	18	12	93	30	32.25	38	40.86	7	7.526	14	15
Knagar	44	30	10	15	99	25	25.25	45	45.45	1	1.010	16	16.2
Khad	35	11	27	8	81	35	43.20	19	23.45	0	0	8	9.8
Parjang	66	96	30	31	223	61	27.35	127	56.95	3	1.345	34	15.
Sadar	7	8	2	3	20	5	25	11	55	0	0	3	15
Bhuban	23	12	6	1	42	7	16.66	13	30.95	0	0	11	26.2
Total	251	210	107	81	649	188	28.96	291	44.83	13	2.003	101	15.5

Table: 9 Percentage of MB cases and grade 2 disability in MLEC-3

MLEC-3	SSL		PB		MB								
	Male	Female	Male	Female	Male	Female	Total	MB cases	%of MB	Total female	% of female	G2 disabl	%G2 disabl
Dkl(M)	7	6	4	5	1	1	24	2	8.333	12	50	0	0
Scpur	4	2	23	32	8	11	80	19	23.75	45	56.25	1	1.25
Odapada	6	8	33	42	5	9	103	14	13.59	59	57.28	0	0
Hindol	5	9	30	32	14	18	108	32	29.63	59	54.62	2	1.85
Knagar	9	10	53	55	13	16	156	29	18.589	81	51.92	2	1.282
Khad	3	5	24	30	22	12	96	34	35.416	47	48.95	2	2.083
Parjang	6	8	72	57	35	13	191	48	25.13	78	40.83	6	3.14
Sadar	9	1	17	12	5	4	48	9	18.75	17	35.41	0	0
Bhuban	12	4	40	47	24	22	149	46	30.87	73	48.99	1	0.67
Total	61	53	296	312	127	106	955	233	24.397	471	49.32	14	1.46

Table: 10 Percentage of MB cases and grade 2 disability in MLEC-2

MLEC-2	SSL		PB		MB								
	Male	Female	Male	Female	Male	Female	Total	MB cases	% of MB	Total female	% female	G2 disabl	% G2 dis
Dkl(M)	10	17	5	5	1	0	38	1	2.631	22	57.89	0	0
Scpur	8	8	28	26	11	11	92	22	23.91	45	48.91	0	0
Odapada	12	27	44	27	10	11	131	21	16.03	65	49.61	3	2.29
Hindol	10	10	57	51	30	15	173	45	26.01	76	43.93	8	4.62
Knagar	9	14	43	27	12	12	117	24	20.51	53	45.29	0	0
Khad	6	8	39	30	18	14	115	32	27.82	52	45.21	0	0
Parjang	10	5	74	64	31	22	206	53	25.72	91	44.17	0	0
Sadar	4	5	22	28	13	11	83	24	28.91	44	53.01	0	0
Bhuban	20	17	62	36	17	13	165	30	18.18	66	40	0	0
Total	89	111	374	294	143	109	1120	252	22.5	514	45.89	11	0.98

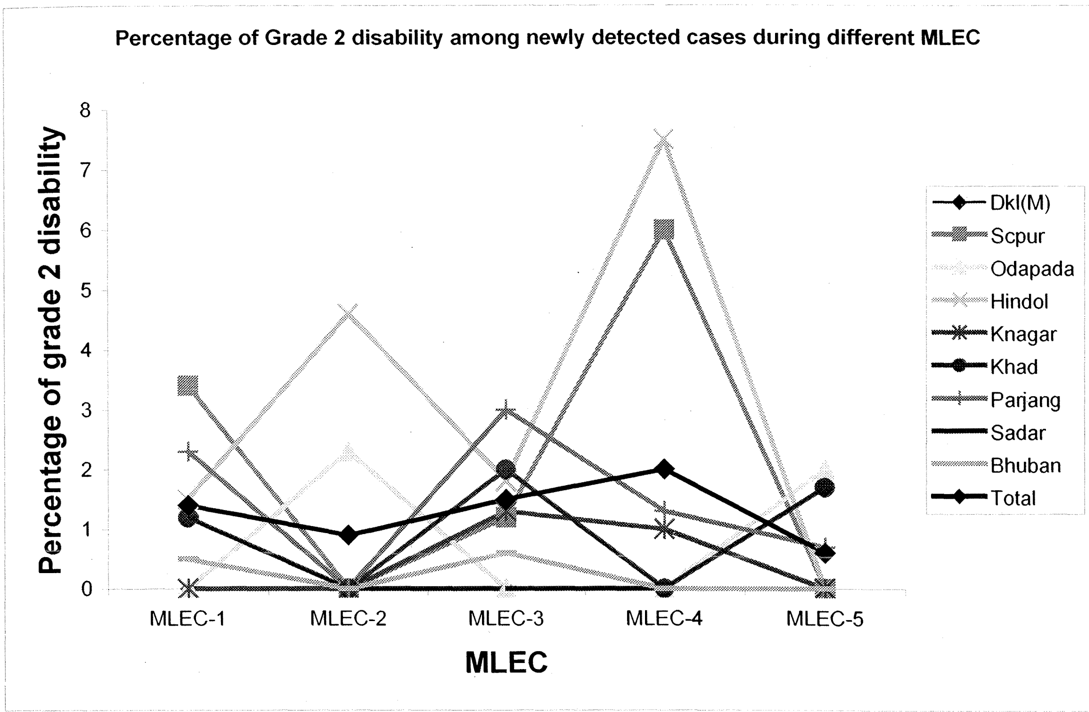
Table: 11 Percentage of MB cases and grade 2 disability in MLEC-1

MLEC-1	SSL Total	PB Total	MB Total	Total	MB cases	% of MB	G2 disabl	% G2 dis
Dkl(M)	12	41	12	65	12	18.46154	0	0
SCpur	38	90	46	174	46	26.43678	6	3.448276
Odapada	73	120	51	244	51	20.90164	0	0
Hindol	16	177	75	268	75	27.98507	4	1.492537
Knagar	94	124	47	265	47	17.73585	0	0
Kankadahad	21	172	57	250	57	22.8	3	1.2
Parjang	196	543	270	1009	270	26.75917	23	2.279485
Sadar	21	101	47	169	47	27.81065	2	1.183432
Bhuban	41	204	128	373	128	34.31635	2	0.536193
Total	512	1572	733	2817	733	26.02059	40	1.41995

Table: 12 Percentage of grade 2 disability cases in MLECs

Percentage of Grade-2 disability among newly detected cases in different Blocks during different MLEC					
	MLEC-1	MLEC-2	MLEC-3	MLEC-4	MLEC-5
Dhekanal(M)	0	0	0	0	0
Sriram chandrapur	3.4	0	1.2	6	0
Odapada	0	2.3	0	0	2
Hindol	1.5	4.6	1.8	7.5	0
Kamakhyanagar	0	0	1.3	1	0
Kankadahada	1.2	0	2	0	1.7
Parjang	2.3	0	3	1.3	0.7
Sadar	1.2	0	0	0	0
Bhuban	0.5	0	0.6	0	0
Total	1.4	0.9	1.5	2	0.6

Fig: 7 Percentage of grade 2 disability among newly detected cases in different MLEC



In the total district there is no change in the percentage of grade-2 disabilities among the newly detected cases. In Hindol and Sriramchandrapur block though the percentage has come down in other MLEC the percentage of disability was very high. In Kankadahad and Odapada block the percentage is high.

Fig: 8 Percentage of population examined in different MLEC in Sadar block Dhenkanal.

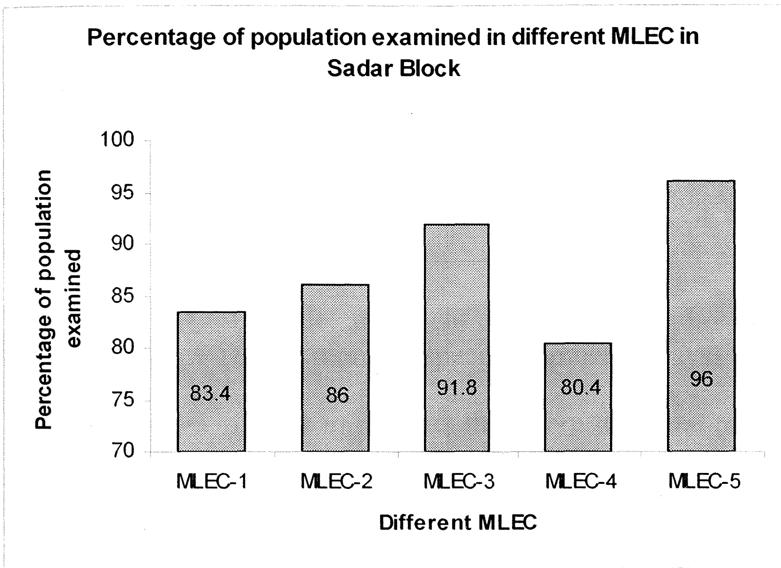
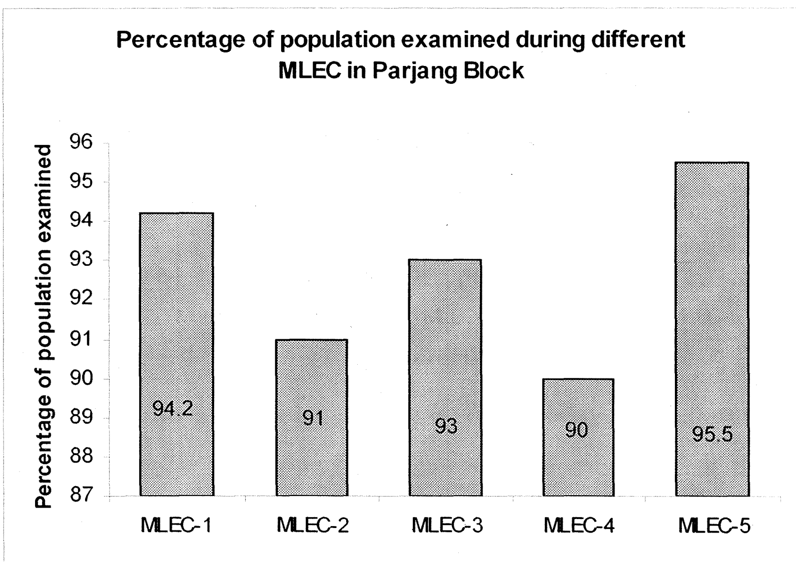


Fig: 9 Percentage of population examined in different MLEC in Parjang block



When the total population in the block is taken in to consideration it was found that in Sadar block the percentage of population examined has been increased gradually. The percentage of population examined in Sadar block is not satisfactory. In Parjang block the percentage of population examined is satisfactory.

3. 2. (b) Accessibility to MDT:

(1) Average distance to collect monthly dose of MDT.

(2) Estimated cost for patients.

(3) Flexibility in delivering MDT.

Based on discussion with health worker and patients, it will be ascertained whether the health centers:

- Provides treatment only on a fixed day of the month or on several day of the month. (Specify number of days)
- Offers to patients that more than one-month treatment can be given if needed. (Accompanied MDT)
- Can manage complications (reactions, disabilities).
- Is a specialized or integrated center?
- Stocks and uses of steroid.

3.2. (b) 1.Average distance to collect monthly dose of MDT.

I interviewed ten patients from Shnkarpur sector and 40 patients from the Parjang sector. I found the average distance to collect monthly doses of MDT was three kilometers.

3.2. (b) 2. Estimated cost for patients.

Cost for patients to collect the monthly doses is very less. They can collect their monthly dose from the sub-center on each Wednesday. The paramedical worker visits all the patients once a month and he disperses the medicine at their doorstep. He informs the patient about the due date. Now the paramedical worker post is going to be abolished and the multi purpose health worker female will distribute the drugs. The patient spends half a day to fetch the drug. The relatives may fetch the drug from the sub-center by means of a bicycle. So if we take in to account to cost of working hours then it will be negligible.

3.2.(b) 3. Flexibility in delivering MDT.

- Female health worker provides treatment on a fixed day of the week or four days a month. Usually there is no time limit for the procurement. Practically the patient may take the drug from the sub-center at any day just before completion of the continuing blister pack.

- Offers to patients that more than one-month treatment can be given if needed. (Accompanied MDT). Yes it can be given, but from my interview the health workers agreed that they have not given any **body** accompanied MDT.

- Can manage complications (reactions, disabilities). All the health workers can manage the complications.

- Is a specialized or integrated center? The specialized or integrated center is found in the district headquarter. During the interview all of them have answered that if any reactions or complications arise they would like to refer the patients to the nearby hospital.

- Stocks and uses of steroid. About the stocks of steroid, there is adequate stock of steroid tablets in all the sub-centers and sector hospitals. Now the sub-centers have been instructed to replace the old drugs with new.

3.2. (c) Case holding

- Proportion of cases cured in due time for treatment. (Not possible as case detection is concerned)

- Proportion of cases defaulted out.

- Proportion of cases continuing treatment beyond the prescribed dates. (Not possible as case detection is concerned)

- Proportion of cases cured in due time for treatment is not possible as for MB cases it takes one year to enumerate the effect and PB cases it takes six months and it can be studied in the month of November 2004 for PB and April

2005 for MB cases. After this period the cured cases can be enumerated but now it is not possible.

- From the month of May 2004, the defaulted out cases has been enumerated.

Table: 14 Percentage of default cases.

2004	Total cases	Total deleted cases	Total RFT cases	Defaulted	Percentage defaulted
April 2004	990	46	44	2	0.2%
May 2004	989	76	68	8	0.8%
June 2004	954	79	71	8	0.84%
July 2004	960	48	46	2	0.2%

Table: 15 Cases defaulted in different blocks in the month of May, June, July 2004.

Different blocks	April		May		June		July	
	PB	MB	PB	MB	PB	MB	PB	MB
Dkl (M)								
Sadar			1		1			
SC Pur								
Odapada			1					
Hindol		1						2
K.Nagar		1						
Bhuban					2			
K.had								
Parjang			3	3	3	2		
Total	2		8		8		2	

It is found that the default cases in Parjang Block are the highest within these four months.

- Proportion of cases continuing treatment beyond the prescribed dates. After the full course of treatment in the month of November 2004 for PB cases and April 2005 for MB cases it can be enumerated and now it is not possible.

3.3. Availability of MDT.

Purpose: To identify potential surplus stocks or shortage of MDT supply the health center, or district and regional stores.

Definition: Availability of MDT blister packs and loose drugs at time of visit, expressed in terms of months supply, for the given patient caseload.

Prerequisites: Checking of MDT stocks and/ or stock records, discounting any expired drugs.

Calculation: Availability of blister packs in months is simply the number of registered cases for each category.

I visited three sub-centers in Mktapashi sector, Muktapashi, Bariahpur, Basoi and four sub-centers of Shankarpur sector, Ratnapur, Baliamba, Patrabhaga, Dhirapatna and three sub-centers from Guneibili sector, Guneibilli, Ichabatipur, Kangeila total ten sub-centers. It was found blister packs of all verities PB adult and child, MB adult and child, SSL of drugs.

SSL is not available since 2003. These single lesion cases are not considered separately and considered as PB cases. In 70% of the sub-centers all the variety of drugs are available for three months for all the patients but in 100% sub-centers all the verity of drugs are available for two months for all the patients. In Dhirapatna, Ptarabhaga, Ichabatipur there were no patient in the regester but they had 3 blister packs of drugs from each veriety.

No loose drugs or expired drugs were available in all the sub-centers. All the blister packs had long expiry dates.

Table 16: Stock of MDT in different sectors:

Sub-centers	PB		MB		Total number of patients
	Child	Adult	Child	Adult	
Muktapashi	3 months	3 months	3 months	3 months	6
Bariahpur	2 months	3 months	3 months	3 months	16
Basoi	3 months	3 months	3 months	3 months	1
Ratnapur	3 months	3 months	3 months	3 months	1
Baliamba	3 months	3 months	3 months	3 months	3
Dhirapatna (no patient)	3 months	3 months	3 months	3 months	0
Patrabhaga (no patient)	3 months	3 months	3 months	3 months	0
Guneibilli	3 months	3 months	3 months	3 months	1
Ichabatipur (no patient)	3 months	3 months	3 months	3 months	0
Kangeila	3 months	3 months	2 months	3 months	2

3.4. Quality of MDT services.

Purpose: To measure the extent to which MDT is given to leprosy patients.

Definition: Proportion of leprosy patients treated with MDT amount all patients registered for treatment at a given point in time.

Pre-requisites: Checking treatment registers and patient records.

Calculation: Proportion calculated by devising the number of patients registered as treated with MDT by the total number of patients registered for treatment at the time of the visit. If the sample of health facilities is representative, this indicator could be given with confidence interval for the whole region.

In the month of June when the case records were verified in these ten sub-centers it was found that there were 30 patients in all the ten sub-centers. In Bariahpur one case was absent. So 29 cases were getting regular drugs.

So 29 / 30 = 96% cases were treated with MDT in the month of June 2004.

3.5.Quality of MDT blister packs:

Purpose: To identify potential problems in drug supply management

Definition: Proportion of blister packs showing acceptable physical condition out of a total number of blister packs checked.

Prerequisites: Examination of existing blister packs to check expiry dates shapes of packages and blister and aspect of drugs (especially clofazimine).

Interpretation: A low quality will indicate failure in supply, transport and storage of drugs.

All the blister packs were in good condition and with long expiry date. Clofazimine usually melts out when it becomes old but there were no blister packs in this condition. In all the blister packs the Clofazimine tablets were in good condition. So it shows the supply, transportation and storage was good.

3.6. Cost analysis:

The expenditure of the MLEC-5 has been divided in to Semi variable, Variable and Fixed costs. Then the total cost has been calculated and it is divided by the total cases detected. Then the unit cost for case detection can be calculated

Table 17: Orientation Training (Semi Variable Cost)

Sl No	Categories to be trained	Total number of trainees	Duration of training	No of batches to be trained	Expenditure in rupees
1.	Medical Officers	54	1 day	2 batches	12620
2.	Health Supervisors	99	1day	3 batches	18210
3	Health workers	300	1 day	10 batches	47500
4.	Volunteers	1400	1 day	46 batches	1400

First 3 categories will be trained in the District headquarter and volunteers will be trained in the respective PHC/ CHC.

DA to Trainers @ Rs100 x 1 day x 3 x 46 batches = Rs13800

DA to trainee @ Rs20 x 1400 = Rs2800

Miscellaneous expenditure @ Rs500 / course = 46 batches = Rs23000.

Total expenditure = Rs64800

The training will be utilized for 10 years except the volunteers, so that the instantaneous training cost will be the 120th of the expenditure for training.

Total expenditure in orientation training = [Rs12620/120] + [Rs18210/120] + [Rs47500/120] + Rs64800 = Rs653+Rs64800.

Total expenditure in orientation training = Rs65453 (Semi variable cost).

2. Table:18 Expenditure for Active search and Supervision (Variable Cost).

Sl No	Officials	Rates	Calculation	Total Amount
1.	CDMO	Rs100	1x10days	Rs1000
2.	ADMO (PH)	Rs100	1 x 10 days	Rs1000
3.	Confirmators	Rs70	43 x 6 days	Rs18060
4.	Health Supervisors	Rs50	43 x 6 days	Rs12900
5.	Searchers	Rs35	378 x 6 days	Rs79380
6.	Volunteers	Rs50	1330 x 1 day	Rs66500
7.		Total		Rs145590

Search team = 189 x 2 = 378. Confirmers = 43, rest 11 will supervise the VRC.

Expenditure for Active search and Supervision (Variable Cost) = Rs145590.

Table 19: Expenditure for Mobility.

Sl No	Activities	Rate	No of days	POL in litters	Total cost in rupees
1	CDMO, ADMO (PH), MO [LEU]	POL/vehicle/day	10	3x100	7050
2	Driver	PD@ Rs35/day	10	3x350	1050
3	Vehicle for periphery	POL 10 litters/ vehicle / day	6	53x6x10	74730
4	Driver	PD@ Rs35/ day	6	53x6x35	11130
5	Vehicle for IEC including PD to Driver	Rs350/ day	25	350x25	8750
6	Total		Rs102710.		

Cost of Diesel = Rs23.50

Numbrer of confirmation teams = 43 and search team = 181.

Expenditure for Mobility = Rs102710 [Variable]

Total expenditure = Rs392083

Miscellaneous expenditure = Rs392083 x 0.5% =Rs1960.

Voluntary Reporting of Cases

Supervision and VRC.

Medical Officer (LEU) = Rs70/ day for 10 days = Rs700.

13 Confirmers out side the center = Rs70/day = Rs70x2x13 = Rs1820.

DLO for 13 confirmers for 2 days = Rs4550.

Total cost of supervision and VRC= Rs7070 [Variable].

Salary of the personnels [Semi variable]

1.CDMO (monthly salary is approximately 19800):

50% work hours is devoted for MLEC for supervision works for10 days.

Cost of supervision = Rs3300.

Cost during training = 20% work for 14 days = Rs1848.

Cost during meetings = 40% works for 3 days = Rs792.

Expenditure for CDMO in context to salary = Rs5940.

2.ADMO (PH) monthly salary is approximately = Rs18500.

60% work hours is devoted for supervision for 10 days.

Cost of supervision = Rs3700.

Cost during training = 75% work hours for 14 days.

Cost during training = Rs6475.

Cost during meetings= 40% work hours per day for 3 days = Rs740.

Expenditure for ADMO (PH) in context to salary = Rs10915.

3. Medical Officers in charge of 8 PHC/CHC (Approximate monthly salary = Rs13000)

For supervision 50% Work hours is devoted for 6 days.

Cost of supervision = Rs10400.

Cost during achieving training = Rs2773. Real cost = Rs46.20.

Cost during training to 46 batches of volunteers [5 batches in 2 PHC, 6 batches in 6 PHC]

Cost during training to 5 batches = Rs1300.

Cost during training to 6 batches = Rs4680.

Cost during training to 46 batches of volunteers = Rs5980.

Cost during IEC/IPC = 5% work for 7 days = Rs1213.

Cost of MO (PHC/CHC) = Rs17639.

File works in PHC/ CHC = Rs2940.

4. Cost of confirmers: [Medical Officers and Supervisors]

[a] Cost of conformers [Medical Officer]

80% working hours is devoted for MLEC for conformation for 6 days.

Salary per month of 39 confirmers [Medical Officers] is = Rs468000

Cost of conformation= [Rs468000/30] X 80% X 6 = Rs74880/-

Costs during achieving training in district headquarter of 39 MO = 80% of work hours of a day = [468000/ 30] X 80% = Rs12480/-

As the training is for the total service period and for conformation of cases in MLEC training cost for one month is taken in to account. Average service period is 10 years. Real Training cost for MLEC is 120th of the amount = 12480/120 = Rs104/-

Cost of conformation by MO = Rs74880/- + Rs104/- = Rs74984/-

[b] Cost of conformers [Health supervisors]:

100% working hours per day is devoted for MLEC for conformation for 6 days.

Cost of confirmation = Rs58500/-

Costs during achieving training in district headquarter of 39 Supervisors =

Training cost for MLEC is 60th of the amount = [292500/30]/ 60 = 162.50

Cost of conformation by Supervisor = Rs58500/- + Rs163/- = Rs58663/-

Cost of conformation team by Medical Officers & Supervisors = Rs133647/-

5. Cost of searchers

100% working hours per day is devoted by Health Worker Male and Female & volunteers for MLEC for searching for 6 days.

Salary per month of 279 searchers HW [M&F] is = Rs1674000

Cost of searching = Rs334800/-

Costs during achieving training in district headquarter of 300 HW [M&F] = Rs60000/-

As the training is for the total service period and for conformation of cases in MLEC training cost for one month is taken in to account. Average service period is 10 years. Training cost for MLEC is 120th of the amount.

Costs during achieving training in district headquarter of 300 HW [M&F] for searching of cases in MLEC = Rs60000/- X 1/120 = Rs500/-

Cost of Searchers [HW] = Rs334800/- + Rs500/- = Rs335300/-

Cost of Searchers [volunteers] = It has already been added before Rs50/- for 3 days of searching by each volunteer.

Cost of Searchers [Health Worker male,female and volunteers] = Rs335300/-

6. Cost of driver in context to salary:

100% working hours per day is devoted by the driver for conformation, supervision, Voluntary reporting of cases.

Salary per month of a driver in average is = Rs6500, cost of 2 drivers for supervision by ADMO and CDMO for 10 days = 216.60 X2 X 10 = Rs4332/-

During conformation and supervision, 8 Government vehicles from PHC/CHC has been used. The DOL of 7 vehicles is used for the TA of other Medical Officers in the conformation team.

9 drivers for conformation for 6 days = 216.60 X 9 X 6 = Rs11696/-

During IEC activities 2 Government vehicles for 25 days are used.

2 drivers for IEC for 25 days = 216.60 X 2 X 25 = Rs10825/-

Cost of driver in context to salary = Rs4332 + Rs11696 + Rs10825 = Rs26853/-

Cost of driver in context to salary = Rs26853/-

7.Medical Officer (LEU):

To achieve training – Rs4/-

Supervision – 80% work hours/ day for 10 days = Rs3467.

Meeting – 60% work hours for 3 days = Rs780.

File processing = 10% work for 15 days = Rs650.

Total cost for MO [LEU] = Rs4901.

8. Conformer in VRC.

Achieving training – Rs4 X 8 MO = Rs32.

Cost of VRC in context to salary of MO- 10% work for 2 days = Rs80x8 = Rs360.

Cost of VRC in context to salary of 8 PMW = 100% work for 2 days= Rs4000.

Cost of VRC in context to salary of 1 HS, 2HW[M/F] for 21 centers for 2 days = Rs31500 and training cost has been added before.

search team = 181.

Fixed cost

1.Cost of the jeeps [Annualization]

2.Cost of the training halls PHC/ CHC buildings, Electricity.

3.Cost of the dispensary buildings, Electricity.

1. Cost of the jeeps [Annualization]-

Cost of one jeep- Rs300000/-.

$$\text{Annual cost of the jeep} = \frac{r(1+r)^n \text{ X Current value}}{(1+r)^n - 1}$$

Per day cost of the jeep = 30894/ 365 = Rs84.64

Jeep has been used for supervision by ADMO, CDMO, MO [LEU], 3 jeeps for 10 days each, for conformation for 6 days, 2 vehicles for 25 days for IEC.

Cost of the jeeps used = Rs2539/- + Rs4570.50 + Rs4232/- = Rs11341/-

2. (a)Cost of the training halls.

District Headquarter – Rs500 X 14= Rs7000 with electricity and water.

PHC/ CHC –The rent of the houses in these areas is one rupee per square foot. The hall is 300 square feet, which is used for training purposes, and it costs Rs 460 for 46 batches.

2 (b). Electricity:

The electricity charge is for 1200 square feet Rs300/-. For 300 square foot the electricity charge is Rs300 / 4 = Rs75/- per month.

For 46 batch cost of electricity is Rs115/-.

Cost of the training halls in district headquarter, PHC/ CHC buildings, and electricity = Rs7000 + Rs460/- + Rs115/- = Rs7575/-

3 (a). Dispensary:

Ten square feet place is used for keeping the records and the drugs used for Leprosy patients. So the cost for one month is Rs10/-.

Fixed cost - Rs11341/- + Rs7575/- + Rs10/- = Rs18926/-

Variable cost = Rs145590+ Rs102710+ Rs7070+ Rs2940 + Rs1960 = Rs260270.

Semi Variable cost = Rs64800 + Rs5940+ Rs10915+ Rs17639+ Rs133647+ Rs335300+ Rs26853+ Rs4901+ Rs35892 = Rs635887.

Fixed cost = Rs18926.

For 469 case detection total expenditure is Rs915083.

Unit cost for case detection in MLEC-5 = Rs1951/-.

MLEC-5: Expenditure in context to salary.

Expenditure in context to salary per unit case searching is Rs1166.00 and total expenditure per unit case searching is Rs1951.00.

Percentage of expenditure in context to salary per unit case searching = 59.7%

Expenditure in context to mobility support:

Expenditure for mobility = Rs102710.

Expenditure of driver in context to salary = Rs26853.

Cost of jeeps used = Rs11341.

Total Expenditure in context of mobility = Rs140904.

Expenditure in context to mobility per unit case searching = Rs300.40

Percentage of expenditure in context to salary per unit case searching = 15.4%

Others:

In context to DA to HW, Volunteers, Training and other expenditure = 25%

3.7. Other activities: Administration, Manpower, and Data system.

Method: Survey of the Sub center, PHC, District office that is leprosy Office.

3.7.1.Indicators for Evaluation of manpower.

1. Percentage of sub centers where there is no Health worker.
2. Percentage of sectors without Health Supervisor.
3. Percentage of sectors without Medical Officer.

1. Health workers: There are 165 sub-centers in Dhenkanal district and 30 sub-centers are lying vacant of multi purpose health workers. So that18.2% sub-centers are without multi purpose health workers.

2. Health supervisors: There are 24 health supervisors in 38 sectors. So that 37% sectors are without health supervisor male.

3. Medical officers: Out of 38, 7 have remained vacant, so that 18% sectors are without medical officers.

Though so many posts lies vacant in the sectors, during the MLEC-5 these vacancies were managed by the preparation of micro plan properly and effectively.

3.7.2.Indicators for Evaluation of Administration.

1. Percentage of weekly sector meetings.
2. Percentage of weekly sector meetings presided by the Medical Officer.
3. Percentage of weekly sector meetings verified by the PHC staff or district officers. It should be minimum once in a month.

Shankarapur Sector:

Number of Sector meeting done =51.

Number of Sector meetings done = 98%.

Presence of health workers at least 47 times (90% of the total weeks) = 100%.

Number of meetings participated by the medical officer = 38 = 73% attendance.

ADMO (PH) presided over the meeting = 75% of the allotted times.

Persons from the PHC came for supervision= 50%

CDMO presided the sector meeting = 100%.

Muktapashi Sector:

Number of Sector meeting done =51.

Number of Sector meetings done = 98%.

Presence of health workers at least 47 times (90% of the total weeks) = 100%.

Number of meetings participated by the medical officer = 39 = 75% attendance.

ADMO (FW IMM) presided over the meeting = 75% of the allotted times.

Persons from the PHC came for supervision= 41%

CDMO presided the sector meeting = 100%.

3.7.3.Indicators of evaluation of Data system

Percentage of regular data transmission to the Office of Medical officer LEU. Then form the office of ADMO (PH) to the state Leprosy cell.

On 4th of each month the MPR report comes from all the sectors. These are compiled in the office of ADMO (PH) and sent to the state leprosy cell by fax. It has been found that 100% MPR reports have been sent to the State Leprosy Cell every month. A quarterly assessment report has been sent to the Joint Director (L & T) every three months interval in the month of June. It contains PD ratio, percentage of female patients, and percentage of grade two deformity among newly detected cases, SC and ST rate, percentage of sub-centers involved, stocks of medicines.

(4) Evaluation of Effect:

Method-

1. Questionnaire to the beneficiaries about their knowledge about leprosy and case detection of leprosy and treatment of leprosy.
2. Questionnaire to the health workers, local volunteers, about their knowledge about leprosy and case detection of leprosy and treatment of leprosy.

1. We examined 30 patients clinically and interviewed as well. All the 30 patients were diagnosed correctly and put in to correct category. 20 out of 30 that is 66.6% agreed that Leprosy can be cured fully after taking MDT and other 10 argued that after taking full

course of MDT the Grade-2 disabilities are not cured but others are cured completely. They argued to increase the duration of treatment.

2. In Sankarpur secotr there was Voluntary Reporting of cases and in Muktapashi sector Active search was done.18 health workers and Anganwadi workers and 44 volunteers were engaged in case searching in Muktapashi sector and no volunteers engaged in Sadar block as there was VRC. 40 volunteers in Muktapashi were interviewed out of 44 volunteers worked for MLEC-5. Out of 20 health workers; 18 from Muktapashi sector, 8 from Shankarpur sector 90% of the health workers have knowledge about leprosy, case detection of leprosy and treatment of leprosy according to their knowledge. Out of 40 volunteers 80% volunteer could tell about leprosy, case detection and treatment of leprosy. 100% could tell about minimum of leprosy and case detection.

(5) Evaluation of impact:

5.1: Elimination indicators:

Case finding activities:

Internal validity of information on prevalence and detection (crude and specific) and analysis of trends. This will be based on analysis of trends. This will be based on analysis of existing information and review/ updating of leprosy registers.

Purpose: To assess the effectiveness of case finding activities.

Definition: Case finding activities will be evaluated through a set of six indicators, describing the status of patients diagnosed during the MLEC-5 and who have never been treated for leprosy.

Indicators:

- 5.1.1 Proportion of newly detected cases with grade 2 disability:

The number of patients newly diagnosed with disability grade 2, devised by the number of newly detected patients for whom disability status is recorded.

- 5.1.2. Proportion of children (Age specific detection):

  The number of newly diagnosed patients below the age of 15 divided by the number of newly detected patients for whom age is recorded.

- 5.1.3. Proportion of MB cases.

  (a) Clinical classification: the number of newly diagnosed patients classified as MB cases divided by the number of newly detected cases for whom classification is recorded.

  (b) Bacteriological classification:

- 5.1.4. Proportion of single lesion:

  The number of newly diagnosed patients showing a single patch at the time of detection divided by the number of newly detected patients for whom the number of lesion and/ or classification of MB/PB/ SSL is recorded.

- 5.1.5. Proportion of female:

  The number of newly diagnosed female patients divided by the number of newly detected patients for whom gender is recorded.

Prerequisites: Checking leprosy registers and individual record and when ever necessary by interviewing a sample of patients.

The case detection indicators of MLEC-5 can be gone through.

5.1.1. Proportion of newly detected cases with grade 2 disability: (Table: 7, 8, 9, 10, 11, 12 and Figure 6, 7)

Odapada block the percentage of visible grade-2 disability is highest and Kankadahad block is the second highest that is 1.7% though the average 0.6% in the district. It shows the hidden cases and delay of the patient to come out for case detection.

The Odapada block and Kankadahad block should be taken care of.

5.1.2. Proportion of children (Age specific detection): (Table 4,5 & Figure 1)

Proportion of child cases among new cases detected is 24 out of 143 in Parjang block that is 16.78%.

In Sadar block child cases among new cases detected is one out of eleven cases that is 9% but in the district percentage of child cases is 82 out of 474 that is 17%.

In Bhuban and Hindol Block the percentage of child cases below 15 years is very high. It shows that the undetected cases might be high. In Kankadahad Block the Prevalence is very low and it might be due to lower coverage or case detection in that block. The Bhuban, Hindol blocks should be taken care as prevalence rate is very high and **Kankadahad block** should be taken care of as the prevalence is very low and there may be some problem in coverage.

5.1.3: Percentage of Multi Bacillary cases among the newly detected cases: (Table 6, 7, 8, 9, 10, 11 Figure 3, 4, 7)

As in Kankadahad block the Multi Bacillary cases are more than 50%. It shows that the emergence of new cases may be very high. Then the grade –2 disability cases in this block is also high showing the concealing of cases. It is also an unapproachable tribal area and SAPEL in this area after six months of MLEC-5 may be recommended. In Kamakhyanagar and Odapada block risk of emergence of new cases is there.

5.1.4.: Percentage of female cases among detected cases: (Table 7, 8, 9, 10, 11, Figure 5)

In Sadar block and Sriramchandrapur Block the percentage of prevalence of female cases among newly detected cases is less and it shows that the coverage might be low. So it should be taken care of.

5.2.Prevalence:

Purpose: To measure the progress towards the elimination of leprosy.

Definition: Calculation of prevalence indicators at a given point in time; A case of leprosy is a person presenting clinical signs of leprosy (with or without bacteriological examination) who has yet to complete as full course of treatment.

A patient who has completed a full course of fixed duration MDT (6 doses for PB and 12 doses for MB) is cured.

A patient who has not collected treatment for more than 12 consecutive months is a defaulter and should be removed from the prevalence.

Following Prevalence indicators should be collected

- Reported prevalence; absolute number and rates.
- Prevalence after applying standard definitions.
- Prevalence trends over the last 5 years.

Prerequisites: Compiling the district level reports, checking leprosy registers at health center level.

Table 20: Prevalence rate of Leprosy in different MLEC.

	Blocks	Population	Total No of conformed cases				Prevalence rate per 10000
			SSL	PB	MB	Total	
MLEC-1 30.1.98 to 5.2.98	Sadar	107717	21	101	47	169	15.6
	Parjang	93929	196	543	270	1009	107.4
MLEC-2 30.1.2000 - 5.2.2000	Sadar	125020	9	50	24	83	6.6
	Parjang	94565	15	138	53	206	21.7
MLEC-3 5.11.01 to 10.11.01	Sadar	128246	10	29	9	48	3.7
	Parjang	109925	14	129	48	191	17.3
MLEC-4 30.1.03 to 5.2.03	Sadar	139499		15	5	20	1.4
	Parjang	122939		162	61	223	18
MLEC-5 10.4.04 to 15.4.04	Sadar	140600		8	3	11	0.78
	Parjang	129073		111	32	143	11

Figure 10: Absolute number of Leprosy in Sadar block Dhenkanal district

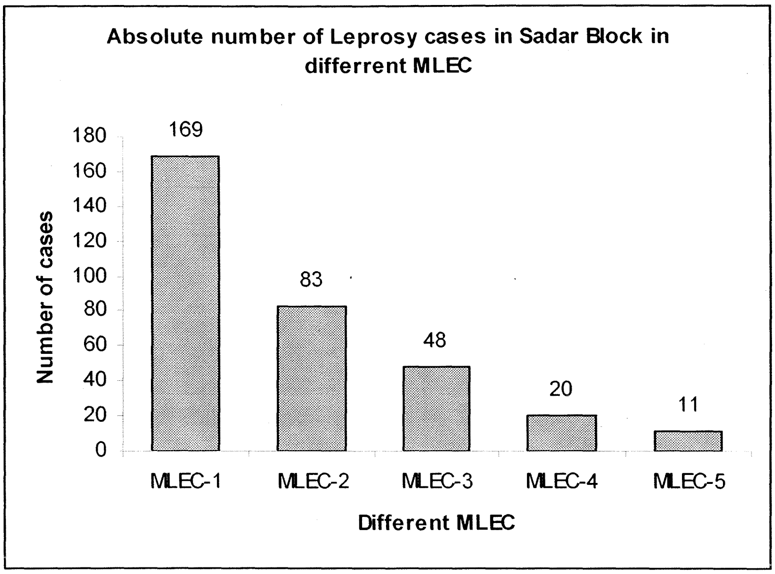


Figure 11: Prevalence rate of Leprosy in Sadar block Dhenkanal district

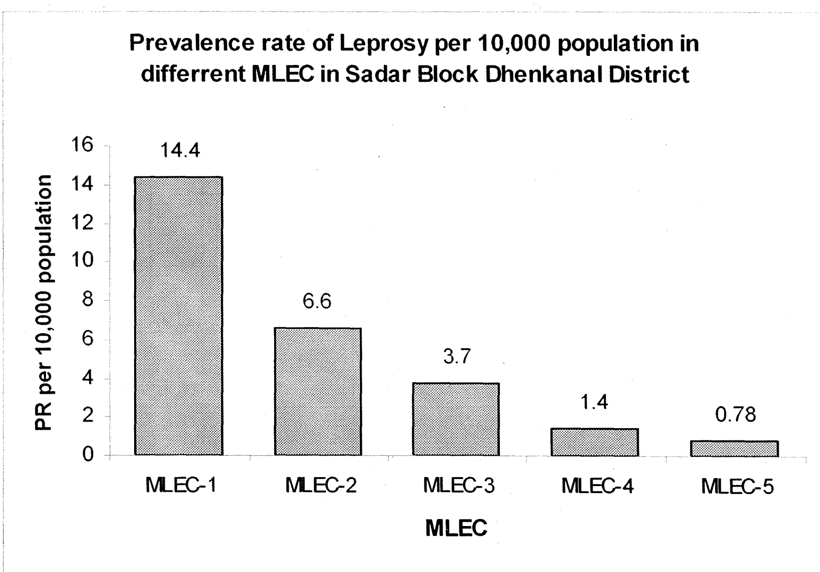


Figure 10, 11 shows that in Sadar Block Dhenkanal district both the absolute number and prevalence rate of Leprosy cases have been decreased gradually and it has reached at a very low level.

Fig: 12 Absolute number of Leprosy cases in Parjang Block in different MLEC

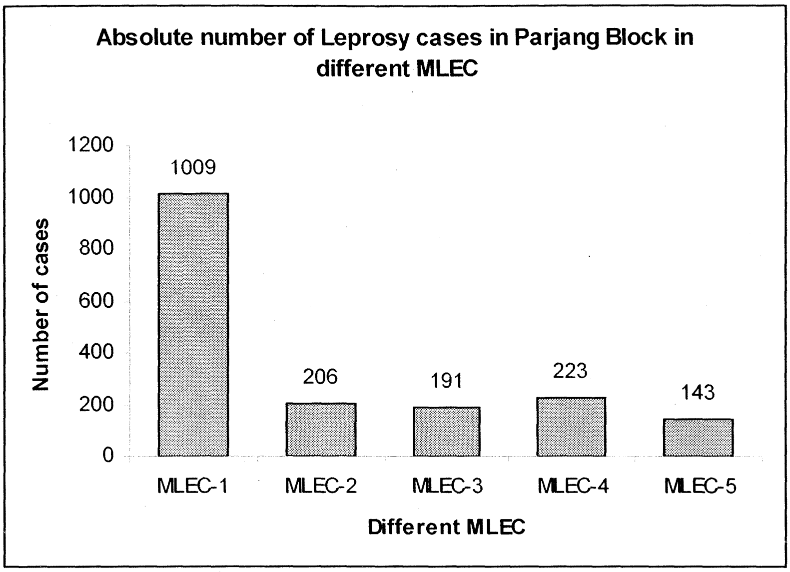


Figure 13: Prevalence rate of Leprosy in Parjang block Dhenkanal district

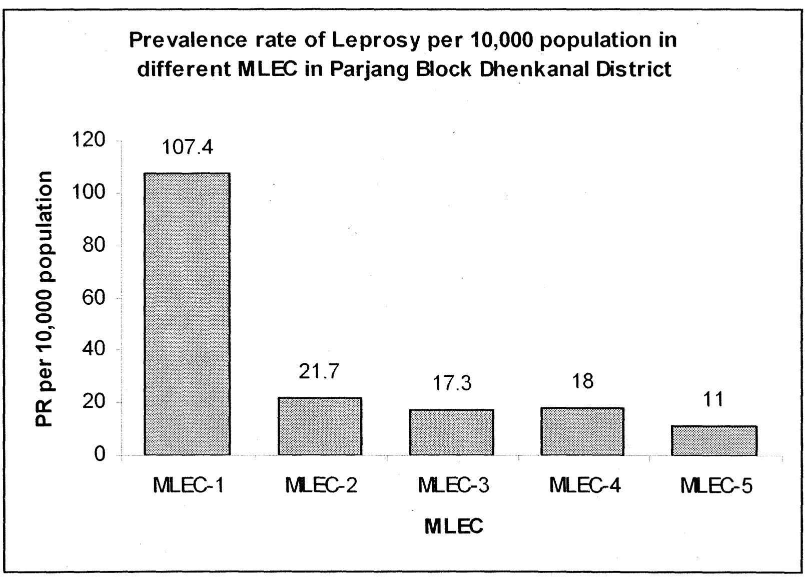


Figure 12, 13 show that the prevalence rate and absolute number of Leprosy cases have been decreased gradually and approachs towards the goal.

5.3. Detection:

Purpose: To evaluate the leprosy situation changes over time in two blocks, Sadar block and Parjang block.

Definition: Information about 3 detection indicators will be collected.

- Detection trend over the last 5 years.
- MB detection trend.
- Child detection trend.

Prerequisites: Compiling the district level reports, checking leprosy registers at health center level.

Data source: The monitoring work is retrospective in nature.

Fig 14: Percentage of Multi bacillary cases in Sadar block Dhenkanal district

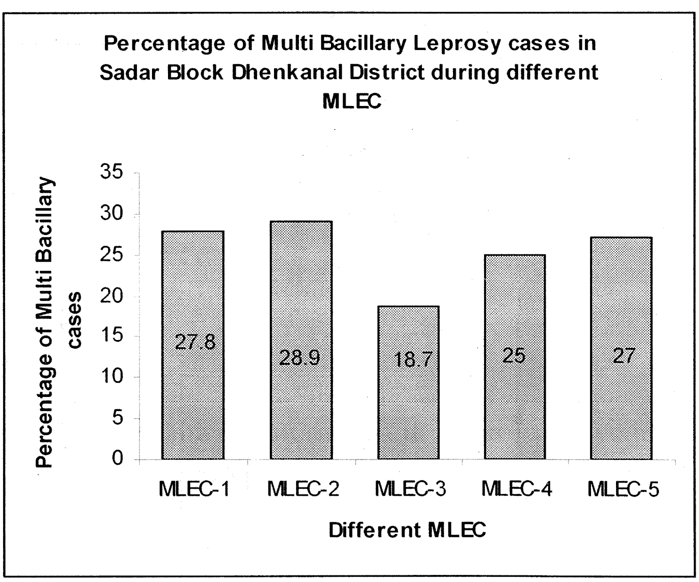
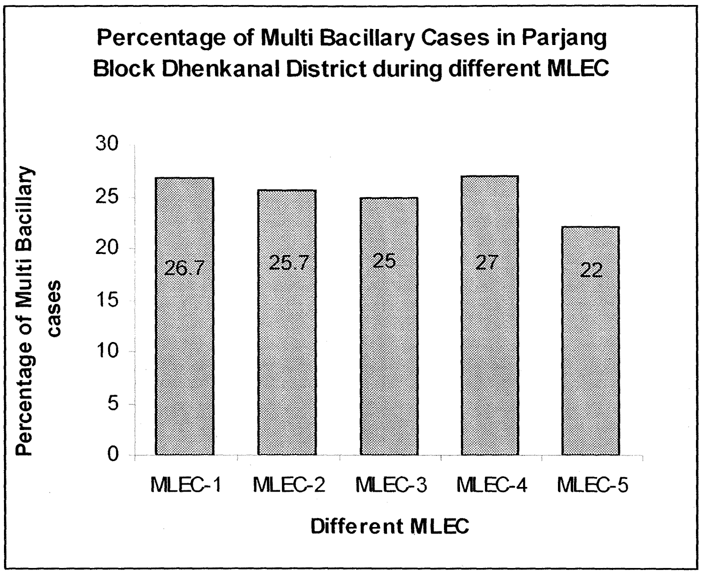


Fig: 15 Percentage of Multi bacillary cases in Parjang block in different MLEC



The percentage of multi bacillary cases has not been decreased yet, and it is now also in the same level as before. Though the number of cases has been decreased the percentage of multi bacillary cases remains same. It shows that there is a lot of hidden cases are there and the case detection is not proper, the transmission is same as before. There is no early detection of cases. It is recommended that there should be improvement in IEC and the case detection should be proper.

Fig: 16 Percentage of child cases among the newly detected cases in Sadar block

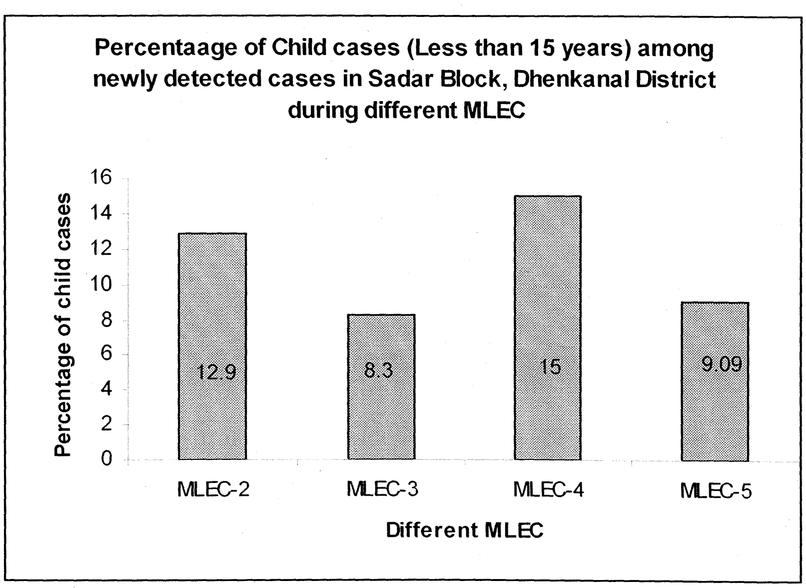
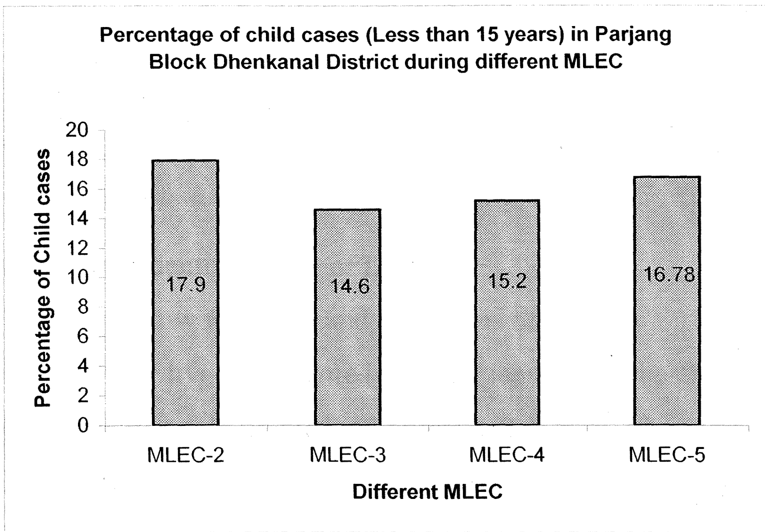


Fig: 16 Percentage of child cases among the newly detected cases in Parjang block



It shows that there is no decrease in the percentage of child cases in both the blocks in Dhenkanal district. It implies there are a lot of hidden cases in the district and the transmission is high due to higher percentage of Multi bacillary cases. The case detection is not proper. The absolute number and the prevalence rate has been decreased due to active search in the Modified Leprosy Elemination Campaigns but the transmission has not been decreased.

It is recommended that the case detection should be proper and the hidden pockets of Leprosy cases should be searched for. The information education and communication should be improved.

Questionniares for Health workers.

Id No:
Sector:

Date:
District – Dhenkanal

1. Can you identify a case of Leprosy?
2. Do you know the signs and symptoms of Leprosy?
3. Are all the hypo-pigmented patches, leprosy patches? Yes / No.
4. How you can distinguish a Leprosy patch from other patches.
5. Do you distribute MDT to the leprosy patient?
6. If there is any fixed day in the month, you distribute drug to the patient
   - On a fixed day in a month
   - On a fixed day in a week.
   - Any day in a month.
   - Whether you go to their doorsteps to disperse the blister packs.
7. If a patient does not take his medicine during the stipulated time then what will you do.
   - Send the drug to him by any known person.
   - Keep it with you and maintains the record as absent.
   - Send message to the patient to come and fetch his drug.
8. What may be the average distance the patients travel to get their medicine.
   - Whether the patients lose a day to get their drug,
   - Whether the patients lose half a day to fetch drug.
   - How long they expend to get the drug from the sub-center.
9. Can you identify a patient with drug reaction?
10. Can you give treatment to the patients with drug reaction?
11. If a patient with drug reaction comes to you, what will you like to do?
    - Refer the patient to the nearby hospital.
    - May try first to treat the patient with steroid and if failed then refer him to nearby hospital.
12. Who maintains the case records and leprosy registers. You / some body else.
13. If you do not who maintains it.

14. Do you give the report to health supervisor every month and do the health supervisor sends the report to the district headquarter every month regularly. Yes / No.

15. Is sector meeting held in your sector every week? Yes / No.

16. Out of 52 sector meetings how many meetings have been done?

17. How many sector meetings you have attended this year (Verification to be done from the meeting register).

Signature of the interviewer.

Questionnaires for Beneficiaries

Name of the beneficiary

Age Sex

Village Block

District Date

Questions

1. Whether leprosy is a disease Yes / No
2. Leprosy is caused by any organism / any curse / both.
3. Whether it is curable Yes / No
4. Have you the idea that it will be cured by MDT
5. If a patient conceals his disease what will happen to him ________________
6. What are the signs and symptoms of the disease.
7. Where do they get their medicine. Sub-center / Sector hospital / PHC / district leprosy office.
8. Whether they get their medicine regularly. Yes / No
9. They get their medicine in a fixed day of a week / fixed day in a month / when ever they want / whether the date has been fixed before.
10. If some one is late and if he asks for medicine then whether they get it. Yes / No.
11. If some body does not take his medicine for some days whether he is called for Yes / No

Signature of interviewer.

OUTBREAK INVESTIGATION AND DISASTER MANAGEMENT

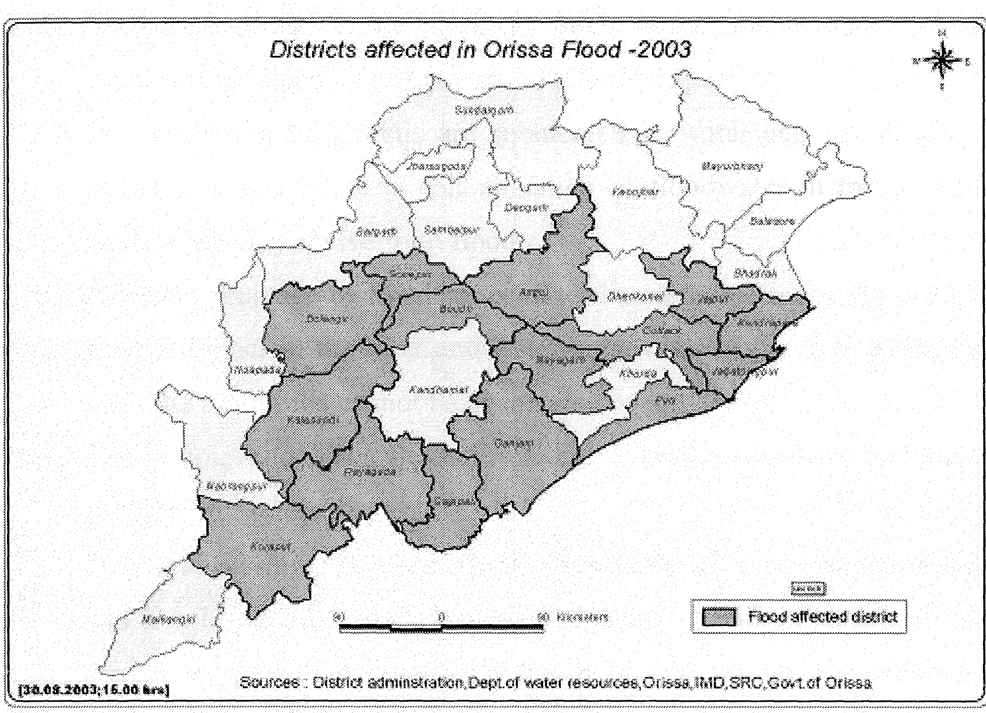
1.An experience in Disaster management, Orissa flood, Jagatsinghpur district 2003.

1. Introducton:

Orissa is a state, which is full of rivers. The important rivers are Mahanadi, Bramhani, Baitarani, Kuakhai, Rusikulya, Subarnarekha, Budhabalanga and their branches. Most important river is Mahanadi and its tributaries. The branches are Kathajuri, Birupa, Debi, Biluakhai, Luna, Chitrotpala, Karandia, Bhargabi.

During the month of August and September some times there is low pressure in the Bay of Bengal. This low pressure passes through the coastal district of Orissa and heavy rain in the costal districts and makes the river full of water. Some times due to this low pressure there is heavy rainfall in Chatissgarh. So heavy water flows in the river Mahanadi. The level of water in Hirakud dam that is the water reservoir on the river Mahanadi becomes full and the gates of the dam are opened to vacate excess water. By that time the flow of water in the river is heavy from Hirakud and the lower portion of the river is full of water due to heavy rain in the coastal districts. This causes flood situation in the coastal districts. Though there are dikes on both sides of the river the river is full and water flows one to two feet below the dikes. The village remains in a lower level than the level of water in the rivers. If there is any weak point in the dikes or there is any holes made by rats in the dikes, the dike may break down and water flows in to the villages and destroys the houses and properties of the people. Water flows over the paddy fields and destroys the crops, and sometimes digs the field in to water logged area and sometimes put meters of sand on the paddy fields. Water logging occurs till the floodwater drained to the sea. By that time the people take shelter on the dikes of the river. The wells and tube wells of the villages are submerged in the floodwater. So there is problem in the drinking water. There is problem in defecation and excreta disposal.

Figure: Districts of Orissa affected by flood 2003, Orissa.



2. Problem during flood:

2.1. (A) Problem due to floodwater itself.

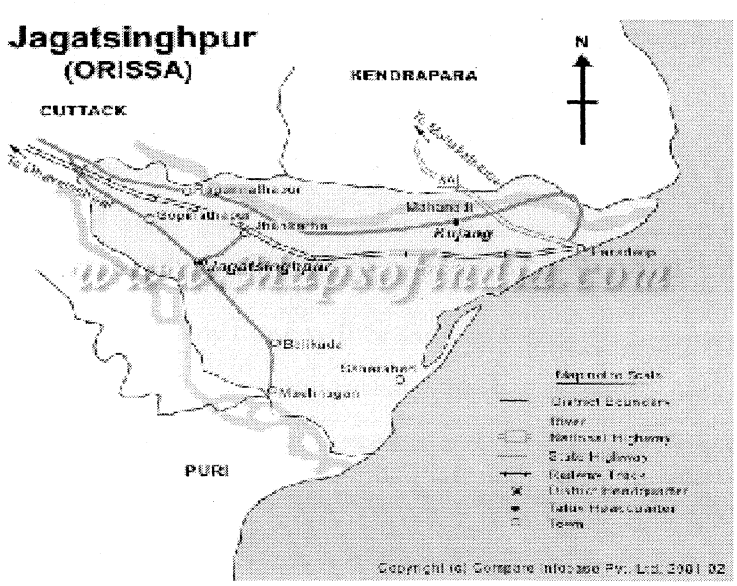
1. Some villages are between the river and dike. During the floodwater flow some people remain back in the houses surrounded by water and here comes the rescue problem.
2. People make the temporary sheds on the high embankment of the river. As they leave their house as quick as possible they have no sufficient food and adequate drinking water and they cannot cook their food.
3. Clustering of people and animal in a small place.
4. The roadways to the area are cut off and people cannot get their minimum commodities and relief.
5. There may be every chance of washing away and drowning.
6. Telephone cables are washed away and there is problem in communication of massages.
7. Always there are rumors of breakage of embankment or out break of epidemics.

2.1. (B) Public health problems.

1. The people remain in the temporary sheds on the embankment of the river. There is clustering of people and animal on a limited space.
2. The wells and tube wells are submerged in water and people cannot get safe drinking water. There is contamination of floodwater in to the wells and tube wells when they revive from flood.
3. After the drainage of flood water in to the sea some times the water level in the river is higher in the river and water comes out of the tube wells automatically. Here the tube wells cannot be disinfected by any means.
4. The people and cows defecate on the embankments here and there. There is problem in excreta disposal.
5. Due to clustering of a lot of people and animals on a swampy area and due to wet and humid climatic conditions there is every chance of health problems mainly viral fever, fungal infection of the feet and palms and other zoonotic diseases.
6. The snakes come in the river water and also take shelter on the riverbanks, so there is every chance of snakebites in the flood-affected areas.
7. Due to slippery condition of the earth there is every chance of minor injuries.
8. Due to logging of water everywhere, there is increase in the number of drowning cases. During this time sometimes the inexperienced people sail the boats and face boat accidents and increase in cases of drowning may take place.
9. Water logging areas are very good breeding sites of vectors and there is increase in vector born diseases after the flood.

3. Background:

There was low pressure in the Bay of Bengal continuously twice since 20th August 2003. There was continuous rain for seven days in Chatissgarh area and there was heavy flow of water in the river Mahanadi. In Hirakud dam first 40 then 52 slues gates were opened to release the floodwater. So there was alarming situation in the lower lands in the coastal districts of Orissa. On 29th August, water level increased up to the danger level and there was every chance of flood in the state. On the same day, Additional Secretary of Health Services sent Fax messages to the Chief District Medical Officers of different districts where there is no danger of flood to depute medical teams to the coastal districts. The Chief District Medical Officer Dhenkanal deputed two medical teams to the district of Jagatsinghpur. In each team there was a medical officer who was the team leader and the team consisted of one pharmacist, one attendant and one Jeep with driver. I was one of the team leaders. I took permission from my Institute before leaving for Jagatsinghpur. We reached Jagatsinghpur at 9 P.M. on 29th August and reported before Chief District Medical Officer Jagatsinghpur. Chief District Medical Officer got news that there may be a breach in the embankment near the Mandasahi PHC and the embankment is going to be collapsed and after this news we were placed in the Mandasahi PHC in the next morning. We reported in the working place before the Medical Officer PHC Mandasahi on 30th forenoon. We went to the flood affected areas, had an overview and planned our duties. We saw the people preparing temporary sheds on the embankment of the river. On the next day morning we went to the embankment and found, the people have vacated the houses the night before and they were staying in the temporary rest sheds. We walked along the temporary sheds and asked about the health conditions of the people. We treated the minor ailments, distributed medicines. We planned how to provide safe drinking water and how to disinfect water. Another three groups were also deputed to the PHC and we did the area distribution and planned out our works.



4. Preplan for the flood emergency:

1. Identification of weak points of the dike, where usually the breach occurs. If in any place the dike breaks, then in which path the floodwater will flow and which villages will be affected.
2. Which roads will be cutoff if the particular points are broken?
3. How the rescue operation will be carried out.
4. Communication by road or by boat and how to travel, and how the relief materials will be supplied to the flood affected populations.
5. Communication of message and information as there may be failure of telephone facilities due to washing away of telephone cables.
6. Coordination among revenue, health, irrigation, police, veterinary departments.
7. The officers who will take the charge of which area and for any information to whom we have to contact.

5. Duties during flood:

5.1.Rescue works: The fire brigades, the army and naval personnel were doing the rescue works with the coordination of police. There should be a map in the district showing the villages that are prone for submersion.

5.2. Communication: We should have a detailed plan about the alternate roadways, which are in a higher level, and usually those are not affected by flood. In the PCH there should be a map of that.

5.3. Communication of messages: During the flood the telephone cables are usually washed away and there appears the problem in communication of message. We should have a map showing the areas where the WILL phone, VHF and wireless system is present, and how these will be utilized during flood emergency.

5.4. Coordination among revenue, health, irrigation, police, veterinary departments:

There should be a preplanned file about how the departments will be coordinated with each other in these districts. By this file we can know for which act who will be intimated. Who will be intimated for kerosene, who will be intimated for any solution of communication problem by which the health team or any team can move. This should be kept for the next years. Because these districts usually face the flood situation every year.

5.5. Activities of the health teams:

1.Treatment of minor elements.

2.Halogen tablet distribution to chlorinate the drinking water instantaneously.

3.Chlorination of the existing wells, and the wells which revived from floodwater.

4.Gave the plan to the Sarpanchas for excreta disposal during the period when they were staying on the river embankment.

5.IEC activities -Information, Education and Communication activities.

6. Georaphy of the villages:

The two rivers Biluakhai and Debi meet together and become one river at the end portion of the village Narayanpadia. The river has two embankments. There are two dikes at both the sides of the river. Water passed the embankment and the water came upto the dikes. At the outer side of the dike there is one canal parallel to it. The villages are situated at the side of the embankment of the canal. The water of the canal was 2 meters above the village. The dikes are 5 meters high. The water level was one foot below the upper level of the dike. So the water level in the river was 4.5 meters higher than the ground level of the villages. The villages are surrounded by the paddy fields. The rainwater was logging in the fields surrounding the villages. There were leakage of water from the dike in some places and these were patched by the sand bags. There were siphons in the dikes for drainage of water from the surrounding area, during the other times than flood. Water from the river flows back through the siphons, though the gates are closed and the excess water cannot be drained in to the river, so there is logging of water. As the villages are in lower level than the river the floodwater enters into the villages. In all these affected villages the communicating roads were flooded with water. There was also breakdown of the dike and floodwater entered in to the lower lands. The most affected areas were these 31 villages. The tube wells of the villages were 4.5 meters lower than the water level so that there was overflow of water from these tube wells. The wells were submerged in floodwater. The MandaSahi PHC area is a thickly populated area. There are 5 Gramapanchayats within the radius of 5 kilometers.

Living condition of the people:

Most of the people live in thatched houses in the villages. As the land is very fertile the houses are surrounded by green plants and make the environment clumsy and dirty. Now-a-days after the supercyclone people have made pucca houses. Most of the people have tube wells and there is a few wells in the villages. The villagers, that were nearer the dike of the river prepared the temporary sheds on the dike. They were staying in those sheds with their badly necessary items, like clothes, utensils since 29/8/03. The cattle were also staying on the dikes. The people who were staying on the dike they were using the water from some of the tube wells, which were on higher levels and not yet submerged. Then the weather changed on the next day only and the weather was dry. Then on 31/9/03 again there was low pressure and again there was rain for six days. But the rain was not so heavy like the days before 29/8/03. After 6 days the rain stopped and the weather became dry. On 31^{st} the water level decreased 2feet and then it remained constant as again 12 more gates of Hirakud dam were opened during that period to accommodate the excess water. Then after two weeks the water level decreased and the water of the river flew in its normal path. The people remained on the dike for a week and then they went back to their houses. After 30^{th} onwards, cooked food, dry food like pressed rice, sugar, biscuits, candles, kerosene were distributed in the relief sheds.

7. Rescue works in the flood affected area:

On 29^{th} August the floodwater entered into the villages. Before two days there was announced by the revenue department to vacant the houses and to go to high and safe places. The villagers packed their articles and kept those in safe places in their home. With the badly necessary items they went to the temporary sheds. Some people were in their houses. The village Narayanpadia is situated in between the dike and the stream of the river. Those people remained back in this village. Water could not enter into it, as the level of the village is very high. The villagers along their cattle remained back in the village. Some people remained back in the villages, which were submerged in water. The country boats rescued them and some people remained back in the houses that were in a higher level and the houses were not submerged.

8. Duties of the medical team:

8.1. Planning our works:

1. We discussed which are the weak points of the dike, and where there is chance of breakage of the dike.

2. If there is a breakage of the dike then on which way the food water will move and which area will be submerged according to the points of breakage.
3. How and on which way the team will approach to the area, according to the points of breakage of dike.
4. Area distribution for the teams. If the embankment breaks then where to stay and what to do and by that time what the others will do.
5. On reaching the people we have to see the following things.
    - Whether the family has safe drinking water.
    - If any body is suffering from any disease.
    - Whether they are using the latrines prepared for them or not.

8.2. Method of work.

The affected villages were listed. There were 31 affected villages in the block. I was assigned 17 revenue villages and hamlets. Other 3 teams were assigned the rest 14 villages.

Date	Name of Gramapanchayat	Name of the villages to be attended	Population actual	Population Affected
30/8/03	Kantilo	1.Narayanapadia,	300	300
		2.Ghadimula,	1079	630
		3.Mundilo,	1588	360
		4.Bada Mundilo[hamlet of Mundilo].		
		5.Bhokanji,	1314	1268
		6.Kantilo.	1446	1287
31/8/03	Patenigan	1.Patenigaon,	1219	1219
		2.Nakulanga,	569	569
		3.Urali	1028	419
		4.Narayanpadia.		
1/9/03	Rambhadeipur	1.Rambhadeipur,	1659	1120
		2.Naranapur,	894	600
		3.Jadilogada.	359	70
		4.Kulamundilo,	400	80
		5.Birabarapatana.	1025	537
		6.Rohiapatana.	[population	220
		7.Khosalirampatna	5+6+7]	150
		8.Sanamandasahi,	196	170
		9.Narayanpadia		
2/9/03	Jahanpur	1.Jahanpur,	1553	1395
		2.Nachipur,	1467	1019

		3.Narayanpadia		
3/9/03	Sabhamula	1.Palasha 2.Kodala 3.Narayanpadia. the remaining villages which has not been touched.	1639 544	1639 544
4/9/03	Again the villages of the date 30/8/03, likewise.			

[Narayanpadia was the village, which was inside the river. There were 60 households in the village, so it was touched every day.]

Everyday the Block Extension Educator or the Headquarter sanitary inspector was accompanying me. The Health worker male and female of that area to be touched were accompanying me. On the next 4 days the health worker male and female touched the villages. Then on the fifth day the medical officer again touched the villages. So every day the health personnel touched all the villages.

8.3. Working in the field:

On 30/8/003 in the after noon we wore life jackets, which were supplied for the medial teams and started our duties. I have to walk a long distance and we reached near the dike of the river. I saw the people gradually coming to the temporary sheds. The people of the village Narayanpadia remained in their village, because the ground level of the houses in the village was very high. Though the water entered into their backyards, water did not enter into their houses. We had to cross the river by country boat every day and performed our duties. We had to travel to some villages by boat because the roadways were cutoff by the floodwater. On that day a ghai was opened in the Balikuda block, which was nearer to this area and floodwater entered in to the villages by back flow. This Kujanga block, Balikuda area, Alipingal area and partially this Mndasahi area were affected.

8.3.1.Supply of food- The collector ordered the Anganwadi workers to cook food and serve to the people staying on the embankment. They did it two days then the other members of the revenue department came and did this work, and then they joined with us. People were supplied cooked food for all the days they remained in the temporary sheds.

8.3.2.Construction of latrines-I met the sarpanch and advised to dig trench latrines by the side of the canal embanckment. There were the people of four villages in the temporary sheds. The sarpanch agreed with us and gathered some youths and gave them the proposal. We selected some sites, which are comparatively higher place and where the people can go across the canal. We made trench latrines two in number for each village. They surrounded those latrines with polythenes. On the next day we found most of the people using those latrines but the children were not using those. We advised the mothers to use those. Some people defecated here and there and there was foul smell with the cow dung. We proposed the villagers not to bring the cattle to the main dike and we proposed to keep them on the embankment of the canal, as due to the weight, the wet dike may become muddy and that may not remain as safe as before. The people realized and they kept our proposal and tied those cows on the embankment of the canal.

8.3.3.Water supply- There were some tube wells on higher places which were not submerged yet. We advised the people to bring water from those tube wells though water overflow was there. We advised the people not to use the canal water for washing their mouth, hands, face and utensils that is a very bad habit of them. But after repeated advice some people were doing that as before. Revenue department arranged water tankers and they could supply safe drinking water once a day. The villagers were supplied with Halogen tablets and advised to use "one tablet in one litter of water and keep it for half an hour and stir it well before drinking." We advised all the families to use this halogen tablets for instantaneous disinfection of water, as we were to unable to disinfect the tube wells. We got a very good response from the people. The villagers were distributed with halogen tablets, and bleaching powder every day. Gradually the water level decreased and the submerged wells reappeared. Our health workers disinfected the wells personally with a large amount of bleaching powder. The wells were disinfected every day till third round. They were instructed to give the figure everyday. The people were also advised to drink boiled water.

4.3.4.Treatment of Minor ailments- Another important duty was the treatment of minor ailments. The most common diseases were

Acute respiratory infections, Tinea of the feet and palm, Simple diarrhea, Bloody dysentery, Scabies, Suspected malaria, Cases of fever, Acute jaundice and Snake bite.

- **Acute respiratory infection-** Acute respiratory infection was a very common disease there. The climatic condition was very much favorable for the symptoms. We distributed Cetrizine, Antibiotics and Analgesic tablets for the symptoms.
- **Tinea of the feet and palm-** People were suffering from tinea pedis of hand and foot. We distributed Gentian violet, Whitfield ointment, Miconazole cream tubes for these.
- **Simple diarrhea-** We distributed Oral Rehydration Solution powder and the antidiarrheals as Norfloxacin, and Ciprofloxacin tablets. The number of diarrhea patients was very less. We stocked some ORS with the Health worker and with some volunteers of the villages. We advised to use the ORS to add the full packet to 5 glasses of water and drink it sufficiently when ever there is attack of diarrhea.
- **Bloody dysentery-** The number of dysentery was also very very negligible. It was due to the use of tube well water and sufficient distribution and use of halogen tablets.
- **Scabies-** We distributed antibiotics and Benzylebaenzoate lotion to the patient.
- **Suspected malaria-** Blood slides were collected and chloroquine tablets along with other analgesics and antibiotics were distributed to the patients. We found the blood slides negative for malaria.
- **Snake bite-** I have not come across any case of snakebite.
- **Acute jaundice-** I could not find any case of acute Jaundice within this period.

8.3. 5. Preventive measures

After the people went back to their houses after five days, preventive measures as well as treatment of minor ailments were our important work.

Preventive measures taken

- Information Education and Communication.
- Halogen tablet distribution.
- ORS distribution

- Spraying of larvicidal oil over the small collections of water to prevent the growth of mosquitoes.
- Daily village visit by the team to detect any outbreak. During the village visit if they find any single case of loose motion, they were advised to give contact doses to their family members, and personally they should inspect the use of halogen tablets, and inform immediately to take necessary steps to check the spread.
- Chlorination of wells, which revived from floodwater. Heavy chlorination was done to these types of wells every day for a week.

8.3.6. Daily reporting.

In the after noon we have to collect the data from each team and compile PHC wise.

The form contains the name of the medicines, then quantity of medicine, then in the day how much distributed and how much remained back, the number of cases treated and according to OMDSS we have to categorize those. Then the number of halogen tablets and ORS received, how much distributed and how much remained back. How many wells and tube wells present in the villages. How many submerged and how many revived. How many were chlorinated and how many of them are for first round, and how many for second round and how many for third round. Then there was a space for signature of a village representative. Then the team members sign that form. In the afternoon these forms were submitted in the PHC. Then PHC wise abstract of diseases is calculated, the total PHC wise distribution of Halozen tablets, and ORS, were calculated. Then the stock position of the bleaching powder and halozen tablets in the PHC is mentioned. After it the need for the next day is written. The total number of well is mentioned and the number of the wells chlorinated is mentioned. The form is filled up properly and in the evening there was a review meeting in the respective blocks. At night 8 pm every day there was a review meeting in the collector's chamber and it participated by the CDMO, ADMO, Joint Director Health Services, BDOs, Subcollectors, local MLA.

8.3.7.Control of rumors:

It becomes a vital role in the flood. After the rumors we have to face the media people. During flood the rumors are breakage of embankment and outbreak of epidemic. During my works I faced both the rumors. I had to rush with lifejackets to the river embankment to save my team members. Always there was a rumor of outbreak of diarrhoea.

9. Difficulties in flood situation:

1. Staying in the in villages surrounded by water. There are lot of problems for getting food, kerosene and utensils to cook. The team members have to depend on the villagers. But this year the BDO granted us kerosene, and towards end of the flood situation the PHC were supplied with utensils for the teams.

2. Supply of life jackets to the vulnerable PHCS. This year Government has supplied 50 life jackets each to all the PHCS. As we have to work in the stream of water and we use country boats for this purpose we should wear the life jackets. If there is some boat accidents we can be saved by the life jackets.

3. There is fear of boat accidents. As there are not enough powerboats always we can not get power boats and we have to depend on country boats. The inexperienced villagers row those country boats. The people who know a little about rowing they usually row the boats and boat accidents are very common. I have faced a boat accident. During my daily village visits to the village Narayanpadia I have to cross the stream. One day one inexperienced person was rowing the boat and he could not row it properly and I floated in the stream. There were a lot of trees towards the end of the village. The boat entered into the trees and collided with a tree and a portion of the boat was broken down. The boat was floating with high speed. I caught hold of a tree to stop the boat, but I could not. The boat floated down and I remained there on the tree. The BEE jumped to another tree and rescued himself. The crew could not control the boat. By that time two young men jumped to the river with truck tubes and tied the boat with a tree and rescued us.

4. We have to walk in water and over submerged roads. By that time there is fear of snakebite. By that time we call the God to protect us from snakebite.

5. The environment by that time is very swampy, and the fields become muddy and we have to walk in the water. Some times there are ditches and we cannot see from above and accidents occur. Only the life jackets are now a hope, as we will not drown in the river during a boat accident. The people have ponds and there are ditches by the side of the village roads. When there is water everywhere we cannot see these. During walking to the houses one may fall in it. As now we are supplied with life jackets it is a hope that we will not drown atleast. Our teams have to travel by powerboat for hours through Taladanda canal to the Kujanga area to supply medical facilities.

Apendix-1

Daily reporting proforma for team.

Date- villages- team-

Sl No	Name of drugs	No of drugs received	No of drugs utilized	Halogen tablets received	Halogen tablets distributed	No of ORS received	No of ORS distributed	No of wells in village	No of wells chlorinated

Signature of team leader- Signature of village representative

Apendix-2

Proforma for PHC.

Team- team- date-

Villages tagged	Villages visited	No of wells chlorinated	No of bleaching powder in stock	No of bleaching powder utilized	No of Iv fliud in stock	No of Iv fliud utilized	Halogen in stock	Halogen utilized

Disease abstract

ARI		Simple diarrhea		Severe diarrhea		Bloody diarrhea		Suspected malaria		Snak e bite	Skin disease		others	
<5	>5	<5	>5	<5	>5	<5	>5	<5	>5		<5	>5	<5	>5

Wells disinfected-
Tube well disinfected-
Signature of the medical officer-

2.Investigation of an Outbreak of Cholera in Parbatia, Dhenkanal, Orissa, India, November 2003.

1. Abstract:

Background: An outbreak of 40 cases of severe diarrhoea was reported from Parbatia village, Dhenkanal district, Orissa during November 2003. Of these, 13 were hospitalised. A rapid response team consisting of FETP Scholar from NIE and local health authorities proceeded to investigate the outbreak. The aim of the investigation was to identify the cause of the outbreak, effectively manage existing cases and control the outbreak.

Methods: Using a clinical case definition laid down by the Orissa Multi Disease Surveillance System, active case finding was carried out. 6 rectal swabs from patients who were untreated with antibiotics for the past 24 hours were collected and sent to Regional Medical Research Center (RMRC), Bhubaneswar for isolation of causative organism. A matched case control study was done to identify the possible exposure variable. Testing of water samples was not considered useful since all the wells were heavily chlorinated immediately after news of the outbreak spread. Cases were managed symptomatically for correction/prevention of dehydration and its complications.

Results: Descriptive epidemiology suggested clustering of cases around one public well; total attack rates was 4.2%; case fatality was nil; attack rates were highest (12%) among those aged over 55 to 64 years and attack rate was similar for other age groups. Matched case control study implicated the water from (Odds Ratio: 12; 95% CI: 1.21 – 44.12) the public well to be related to the outbreak. Vibrio Cholerae El-tor O1 Ogawa was isolated from 4 out of 6 rectal swabs.

Conclusion, and Recommendations: Based on clinical, epidemiological and laboratory findings, it is concluded that the present problem is an outbreak of Cholera (Vibrio cholera O1 Ogawa). This investigation highlights the need for routine rectal swab examination of cases of diarrhoea particularly in endemic regions to enable identification of the exact causative agent with strain specificity. In this context, there is need for strengthening laboratory facilities at peripheral and district levels.

2. Background:

In the district of Dhenkanal in one village Parbatia there was an outbreak of severe diarrhea in the Autumn season in the month of November 2003. Getting a written information from the Medical Officer Shankarpur PHC (N) & Health Supervisor a team reached the village Parbatia on 15.11.03 to investigate and to take necessary measures. The team was leaded by Dr Amitav Das, Scholar FETP-MAE, National Institute of Epidemiology, Chennai and the investigation continued till 28.11.03.There were 40 cases and 13 of them were hospitalized. We investigated the outbreak to find out the etiological agent, source of infection and mode of transmission and control of the outbreak. During the routine the Multipurpose Health Workers and Health Supervisor found there was increase in the diarrhea cases on 13th November 2003. They found one case on 14th November and they informed it to the ADMO (PH) and CDMO Dhenkanal. On 15th November Dr Amitav Das and Dr Amarendra Mohanty reached the village and started the investigation and on that day we got 12 cases. In the morning before our arrival the Multipurpose Health Workers chlorinated the public wells heavily. On that day we deputed Health Supervisor in the Hospital and the Multipurpose Health Workers in the village to camp until the outbreak has been subsided. On 16.11.03 again we went to that village and found 5 cases. On 17.11.03 ADMO (Family Welfare) Dr Bhabanishankar Tripathy went to the village for supervision. On that day we found 7 cases. On the same day I found the CB Transport media in the store in damaged condition and I rushed to RMRC Bhubaneswar to procure these media. On 18th I could be able to collect rectal swabs from the patients. From 18th I had to investigate and supervise the Multipurpose Health Workers and Health Supervisor alone. Then the outbreak came to an end on 22nd November and there were no case till 28th November. I stopped my visit on 28th and ordered the Health Supervisor for daily reporting for the next week.

3. Method:

3.1: Descriptive Epidemiology:

3.1.1: Geography of the village:

The village is situated in a plane area in the district of Dhenkanal. It is on the old Cuttack Sambalapur road. This village is 30 kilometers away from the district headquarter Dhenkanal. The road is situated on its South side and there is a canal on the North of the village. There are paddy fields on its east and another village on its west direction. The village is thickly populated. There are 105 households in the village.

3.1.2: Housing pattern:

People stay in very small pucca houses. The houses are like the buggies of the train. There is a very narrow path, which is two feet in width from the village road. There are eight to ten houses in two rows on both side of the path. These houses are very clumsy and the kitchens are dirty and very small, in some houses there is no separate kitchen. I found some people were cooking in the cowshed. Most of the people have cowshed near their houses. The village road was clean and wide but the road to these houses from the village road is very narrow only two feet in width and some are swampy, although it is dry season.

3.1.4: Water supply:

There are total 16 dug wells in the village. Among them 6 are public wells and the rest are private wells. The public wells are on the roadside and the private wells are in the backyard of the houses. There are 5 tube wells in that village and all are public tube wells. There is no pipe water supply in the village. The people do not use the canal, which is at the North side of the village.

3.1.5: Occupation: Most of the people of the village depend on cultivation and business.

3.1.6: Demography:

Total population = 946.

Table-1: Population by Age group and Sex in Parbatia village, Orissa, India, November 2003.

Age group in years	Male	Female	Total
0-4	57	56	113
5-14	96	94	190
15-24	57	71	128
25-34	79	65	144
35-44	70	59	129
45-54	42	46	88
55-64	32	35	67
>65	48	39	87

Methodology:

Public health surveillance:

We searched door to door for active cases with a case definition, any person with three or more loose stool with or without vomiting and with or without dehydration in the hamlet of Sankarpur since 11.8.04 might be treated as a case, on the basis of Orissa Multi Disease Surveillance System proposed case definition for diarrhea. We line listed the cases according to the date of onset. We looked at for different causes of the outbreak. There were no common festival or mass gathering within a week of starting of the outbreak. There was no street food vendor coming to the village. We could not find any relevant clues for the outbreak except the water sources.

Analytical study:

We did a matched case control study. We selected controls from the neighborhoods, matched for age and sex. The controls were selected after matching for age, was one year on either side of the age of the case and sex was same for cases and controls, they were from similar housing conditions and similar socio economical status. The number of controls was double the number of cases. Then we prepared questionnaire for the cases and controls. The questionnaire was same for both cases and controls. We asked both cases and controls; about their address, symptoms, treatment history and about the source of drinking water, because we could not find any other suspected causes of the outbreak. Then manually we calculated the odd's ratio for the suspected well water according to matched case control study and put those data in to Epi Info 6.4 (CDC, Atlanta, GA, USA) and did a matched case control study for conformation of the manual results.

Laboratory procedure:

We collected six rectal swabs in the transport media that were procured from Regional Medical Research Center, Bhubaneswar, state capital of Orissa, from the untreated cases. We sent those rectal swabs to the Regional Medical Research Center, Bhubaneswar for isolation of the suspected microorganisms.

We collected water samples from the suspected well and some other public water sources from the village and sent to the Public Health laboratory Bhubaneswar, the state capital of Orissa.

Result:

1. Conformation of Outbreak

The attack rate of Diarrhea during November 2001, 2002, 2003 in Parbatia village, Shankarpur Sector, Beltikiri PHC, Dhenkanal district was compared and found that the attack rate of diarrhea in Parbatia village for November 2003 was clearly in excess.

The figure-1 shows that there is no considerable change of the attack rate in the total Dhenkanal district, Beltikiri PHC during November 2001,2002, 2003. There is increase in attack rate during November 2003 and there is increase of attack rate clearly in excess in the village Parbatia during this month than other two years.

Figure-1: Comparison of Attack rate of the District, PHC, Sector and Village during the month of November 2001,2002, 2003 (line diagram).

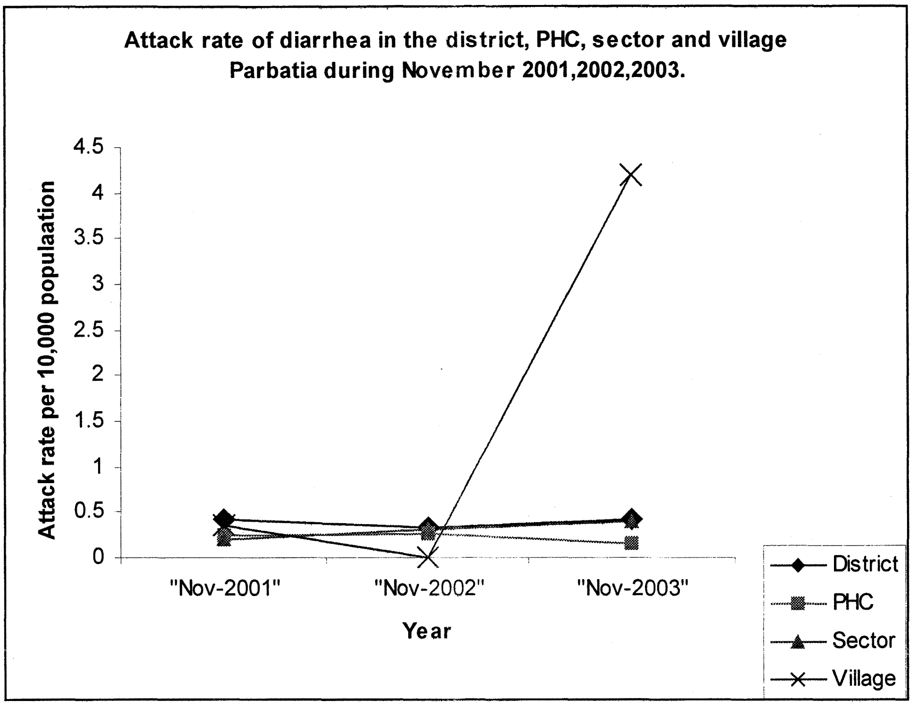
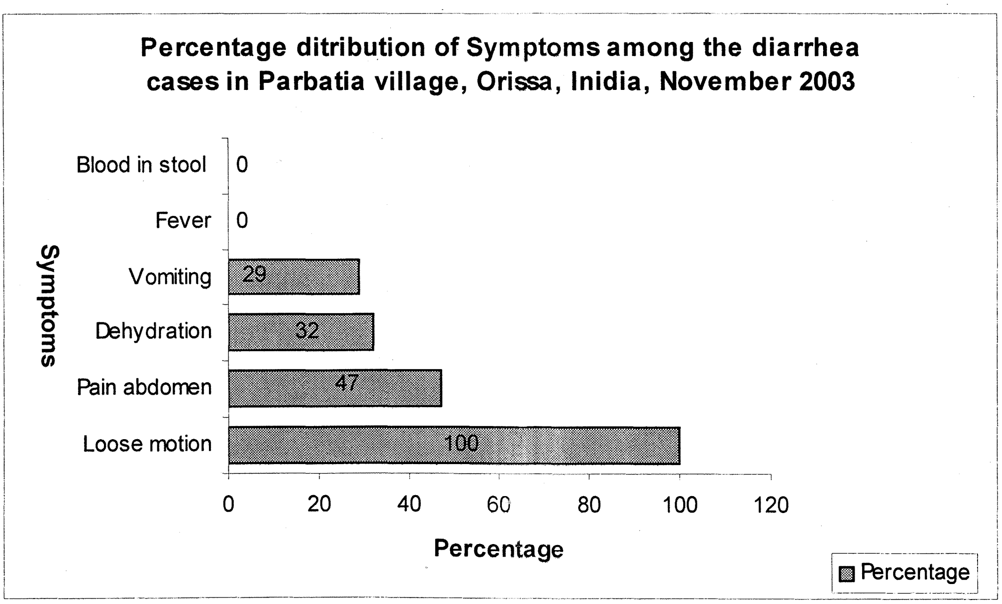


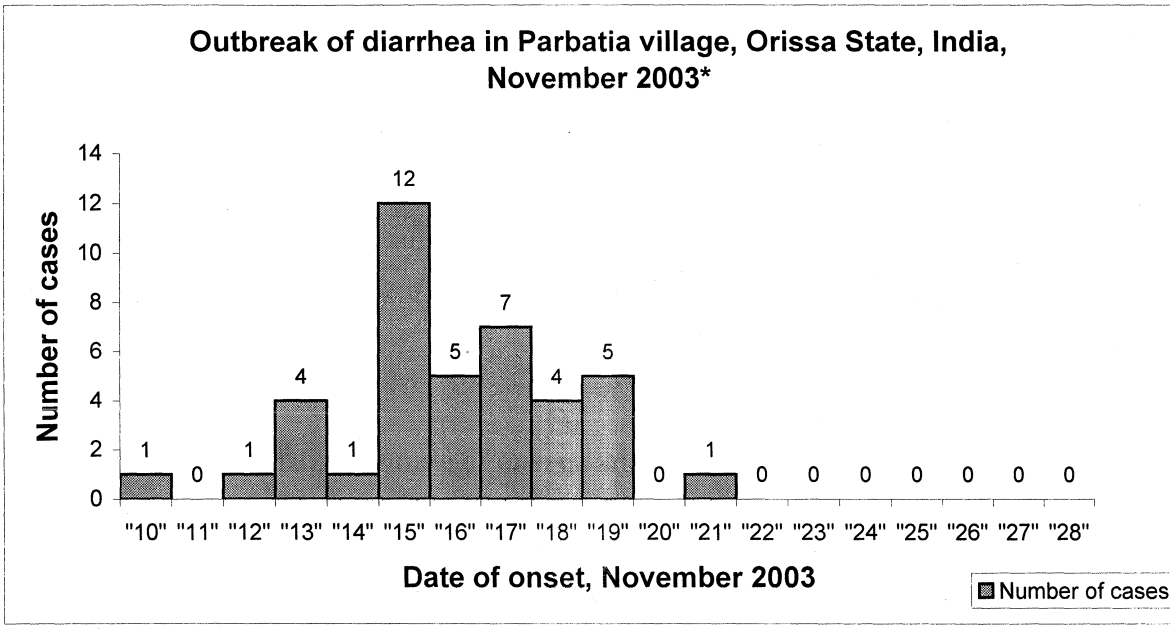
Figure-4: Percentage distribution of Symptoms among the diarrhea cases in Parbatia village, Orissa state November

200



We found 41 cases according to the case definition. ID No 20 suffered twice, so that the number of case patients was 40 but the number of attack was 41 and from the line listing of cases we found percentage distribution of symptoms among the patients.

Figure: 5 Cases according to date of onset, Parbatia village, Orissa state November 2003



* Total number of cases = 41

Line listing of cases: On 10.11.03 there was the index case. Then the number of cases increased suddenly on 15.11.03. Then the number gradually decreased after contentment measures. The curve might be point source and propagative in nature. There was no death in this outbreak.

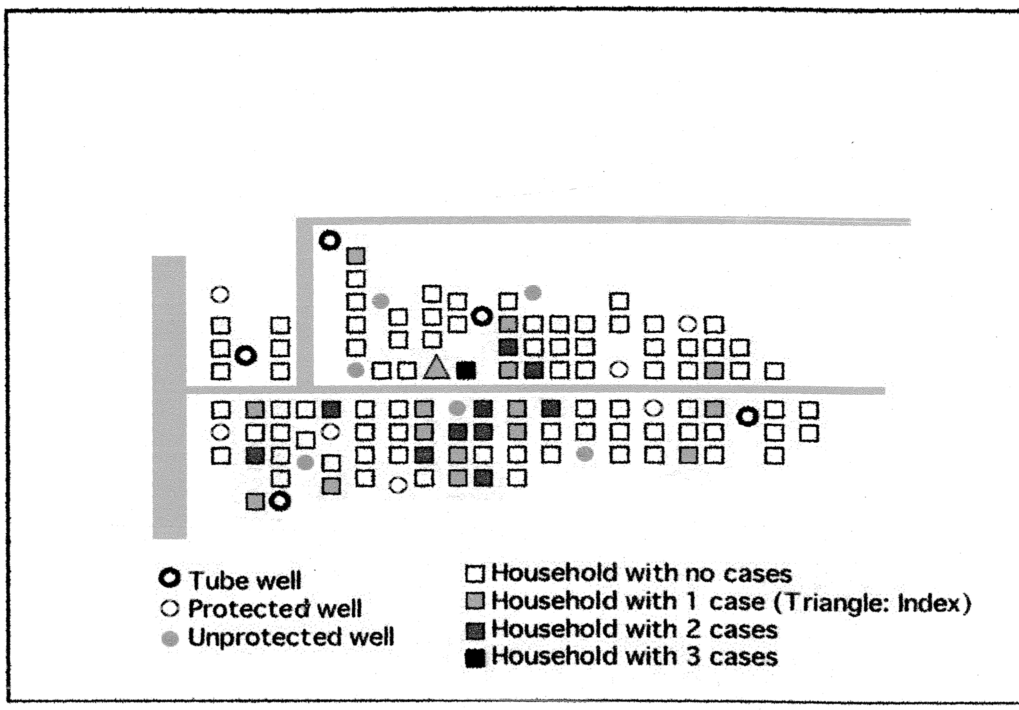
Age and sex wise attack rate of diarrhea:

Table-5: Age and Sex wise attack rate of Diarrhea in Parbatia village, Orissa state, India, November 2003

	Number of cases		Population	Incidence
Age group in years	0 to 4	6	113	5.3%
	5 to 14	4	190	2.1%
	15 to 24	5	128	3.9%
	25 to 34	5	144	3.5%
	35 to 44	6	129	4.7%
	45 to 54	4	88	4.5%
	55 to 64	8	67	11.9%
	>65	3	87	3.4%
Sex	Male	17	481	3.65%
	Female	24	465	5.2%
Total	Total	41	946	4.3%

Attack Rate among 55 to 64 years age group people was the highest and the attack rate of female is more than that of male. For other age groups the attack rates are similar.

Figure- 7: Spot map showing the village Parbatia, Orissa state, November 2003.



Spot Map: The spot map shows that there were 105 households out of which 25 (25%) were affected. It is found that there is clustering of cases around one unprotected public well, which had no brim.

Fig: 8 The well where the index case-patient came to wash clothes, Parbatia, Orissa, India, 2003 [1]

Laboratory findings:

Rectal Swab: Rectal swabs six in number were collected from the patients having ID No- 32, 33, 20, 34, 36, 37 and out of those six samples four (67%) samples that is ID No- 32, 33, 20, 36 came positive for Vibrio cholerae El-tor 01 Ogawa.

Water samples from the suspected wells: The water samples could not be tested as those wells were chlorinated heavily.

---

[1] Note the absence of brim, margin and protection.

Analysis of the results:

Generation of Hypothesis:

From the spot map and the interrogation of the index case it was suspected that, there might be some association between the well No-1 and cholera. The hypothesis was that there was association between the water of the well No-1 and cholera.

Calculation: Out of the 40 cases,

Users of the suspected well No-1 water = 29.

Users from other sources = 11.

Out of the 80 controls,

Users of the suspected well No-1 water = 23.

Users from other sources = 57.

Table: 6 (a) Two by Two tables for paired matched controls has been drawn here.

	1		2		3	
Exposure	Case	Control	Case	Control	Case	Control
+	1	2	1	1	1	0
-	0	0	0	1	0	2
$a_i\, d_i$	0		1		2	
$b_i\, c_i$	0		0		0	
Outcome	Outcome (+++)		Outcome (++-)		Outcome (+--)	
Frequency	(n_0)= 8		(n_1+n_2) = 4		(n_3) = 16	

Table: 6 (b) Two by Two tables for paired matched controls has been drawn here.

	4		5		6	
Exposure	Case	Control	Case	Control	Case	Control
+	0	2	0	1	0	0
-	1	0	1	1	1	2
$a_i\, d_i$	0		1		0	
$b_i\, c_i$	0		0		0	
Outcome	Outcome (-++)		Outcome (--+)		Outcome (---)	
Frequency	(n_4) = 1		(n_5+n_6) = 1		(n_7) = 10	

Table: 7 Frequencies of Eight Possible Exposure Outcomes

Outcome	Frequency	Outcome	Frequency
+++	$(n_0)= 8$	-++	$(n_4) = 1$
++- +-+	$(n_1+n_2) = 4$	-+- --+	$(n_5+n_6) = 1$
+--	$(n_3) = 16$	---	$(n_7) = 10$

Mantel-Haenszel Odds ratio $\Psi_{mh} = (n_1 + n_2 + 2n_3) / (2n_4 + n_5 + n_6)$

Mantel-Haenszel Odds ratio $\Psi_{mh} = (4+32) / (2+1) = 12$

Table: 8 Consumption of well water by the case patients in the village Parbatia, Orissa, India, November 2003

Exposure	Diarrhea	No diarrhea	Total
Well No-1	29	23	52
Other source	11	57	68
Total	40	80	120

Table: 9 Results of the matched analysis, case control study, cholera outbreak, Parbatia, Orissa, India, 2003.

<table>
<tr><th>Status of the case</th><th>Number of controls exposed to the well</th><th>Number of discordant pair in the set</th><th>Number of sets in the category</th><th>Total number of discordant pairs in the category</th><th>Total number of discordant pairs</th></tr>
<tr><td rowspan="3">Exposed to the well</td><td>2 controls exposed</td><td>0</td><td>8</td><td>0</td><td rowspan="3">36 (f)</td></tr>
<tr><td>1 control exposed, 1 unexposed</td><td>1</td><td>4</td><td>4</td></tr>
<tr><td>0 control exposed</td><td>2</td><td>16</td><td>32</td></tr>
<tr><td rowspan="3">Unexposed to the well</td><td>2 controls exposed</td><td>2</td><td>1</td><td>2</td><td rowspan="3">3 (g)</td></tr>
<tr><td>1 control exposed, 1 unexposed</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>0 control exposed</td><td>0</td><td>10</td><td>0</td></tr>
</table>

The matched odds ratio is the number of discordant sets where the case is exposed (f) divided by the number of discordant sets where the case is unexposed (g). In this case, the odds ratio is 36/3 = 12. The formula for the Mac Nemar Chi-square is:

$$\text{Chi-square}_{MN} = \frac{(f-g)^2}{f+g}$$

In this case, chi-square is $(36-3)^2 / (36-3) = 28$ for a p value < 0.0000001.

The odd's ratio was significant as p-value is less than 0.05.

Using the Epi Info 6.4:

The Mantel-Haenszel matched odd's ratio = 12.

Exact confidence interval of the maximum likelihood estimate = 1.2 < OR < 44.

The Mantel-Haenszel chi-square for maximum likelihood estimate (corrected) = 22 with p-value 0.000002.

So the people using the suspected brim less unprotected well had 12 times more risk of diarrhea than the people using other sources.

We determined the population attributable risk fraction, whether the exposure to the water of the suspected well explains the majority of cases?

The cases exposed to the well are 40/28 = 70%.

$$\text{But Population attributable risk fraction (PAF)} = \text{Proportion of cases exposed} \times \frac{OR-1}{OR}$$

$$PAF = (28 / 40) \times \frac{12 - 1}{12} = 64\ \%$$

So it suggests that the exposure to the well explained most of the cases but not the total cases. It could not explain all the cases because there might be some digree of person transmission in the second part of the outbreak.

Conclusion:

The cholera outbreak might have been caused by an unprotected well that had been contaminated by the index case patient, who washed his clothes soiled with faeces while he was convalescent.

Discussion:

(1) In the community there was a festival 10 days prior to the index case, where Lord Siva is worshipped. In this festival people used to prepare a kind of foodstuff and consume it for three days. It cannot be kept more than 3 days. So the possibility of diarrhea due to contamination and spreading due to this particular foodstuff is ruled out.

(2) The water sample of the suspected well, that is Well No-1, could not be tested, but after complete stoppage of the use of the water of that particular well the cholera cases decreased. The cases continued for some days because of person-to-person contact.

(3) The water samples of another suspected well and a tube well were tested but no microorganism could be detected.

(4) The attack rate in the pediatric age group and the males of age group >55 year is more. These groups of people remain in the home and move around the village road. They take bath and use the well water more.

(5) The Vibrio cholerae 01 Ogawa strain is very common in Orissa. The epidemic due to this strain commonly occurs in the dry season as winter.

(6) There is a clear food history and the person could remember that after some hours of taking the food from pain abdomen and he suffered from diarrhea. As it is winter there is no such collection of water surrounding the village. The people use the canal water for bathing purposes. But the people remaining towards the end of the village take bath there but spot map shows that they have suffered less. I also investigated the previous village on the bank of the canal and could not find any case and there was no outbreak.

Lessons learnt:

1. Due to the carelessness of the index case cholera spreaded through out the village. The villagers should be careful when using the public wells or public places. The patients with the communicable diseases should not use the public wells or public water sources because it may end with this type of outbreak.

2. The public wells should be constructed properly with brims. If the well might have a brim, then there was less chance of admixture of the contaminated water with the well water and there might not be the outbreak.

3. If the public water sources were not hygienic then the people should use other sources. Here we found the people were using a tube well, which was just opposite side the well for bathing purpose and this unhygienic well water for drinking purpose. The health workers and health supervisor who visit the village every week might have given health education to the villagers about the safe water sources in the particular village.

4. The Medical officer and health supervisor could detect this outbreak in time and appropriate measures could be taken and death could be checked. It was possible due the Orissa Multi Disease Surveillance System. By the use of the surveillance system during the routine village visit the health supervisor could find out the abrupt increase of diarrhea cases in the community and could take appropriate measures.

5. By collection of the rectal swab and isolation of the micro-organism the cause of the outbreak and the source of infection and mode of transmission could be identified and it became easy to control the outbreak.

6. There were 54 outbreaks of diarrhea during 2000-01, 57 outbreaks during 2001-02, 57 outbreaks during 2002-03, 42 outbreaks during 2003-2004. Due to lack of laboratory facilities, unavailability of the transport media, moreover the rectal swab collection during the investigation of an outbreak of diarrhea is not mandatory so that a number of cholera outbreaks might have been missed.

7. By chlorination of the well and by complete cessation of the use of the particular well water and personal hygiene maintained by the villagers could bring the outbreak to an end with out loss of any valuable life.

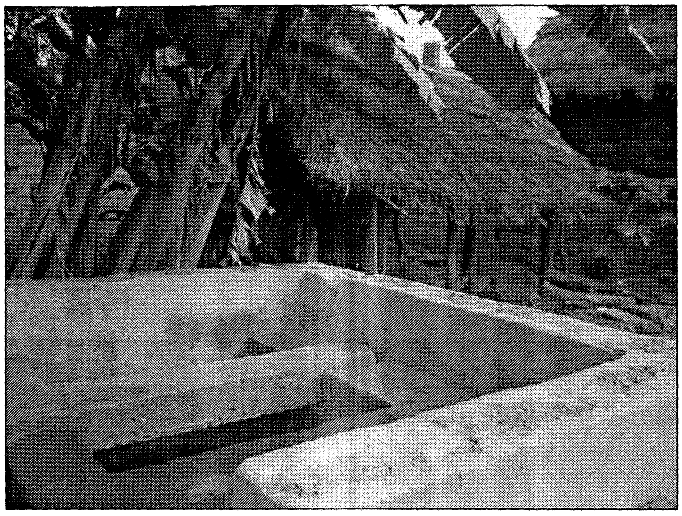
Conclusion and recommendations:

In Orissa, rectal swab is not collected for isolation organism during the outbreak investigation of diarrhea routinely and there is no facility in the district level laboratories for isolation of causative organism. So it is difficult and time consuming to transport the samples to distant places and the causative organisms cannot be identified then and there and it takes time for control of the outbreak. So it is recommended that laboratory facilities might be strengthened in the district level, the laboratory technicians might be trained for isolation of organism during any outbreak investigation of diarrhea so that the causative factors of the outbreak could be identified. Routine rectal swab collection during outbreak investigation might be mandatory to identify the cause of the outbreak and to know the endemicity of the disease. At last the prevalence of cholera outbreaks and the prevalence of the type of vibreo cholarae causing outbreaks could be studied.

For the longer term, the investigators recommended to protect wells used for drinking water (including the one involved in the outbreak) with brims and platform. Also, because of the delay in the diagnosis due to the lack of transport medium in the district, it was suggested to make transport media available in district laboratories and to seek laboratory diagnosis for all clusters of watery diarrhea.

Basing upon the recommendations, there was an initiation for the protection of unprotected wells and in the village all the wells could be protected by brims and platforms and the wells, which were newly constructed those were constructed with brims and platforms. (Fig: 9, Fig: 10). Transport media are available in the district headquarter laboratory for the outbreak investigation of diarrhea and there is a standing circular in the district that when ever there is an outbreak of diarrhea, collection of stool samples and organism detection is mandatory.

Fig: 9 The well that lead to the cholera outbreak in Parbatia, Orissa, India, with a new platform, brim and protection, 2004



(This paper was presented in the Third TEPHINET Global Scientific Conference, Beijing, China, 8th to 12th November 2004.)

Appendix-1 **Questionnaires**

Outbreak investigation of diarrheal diseases.

Date: ---------------------- ID No: ----------------------

District- Dhenkanal. Block-

Health sub-center- Village-

PHC –

1.Name of the head of the family: ---

2.Name of patient: ---Age -------- Sex ---------

3. Date & time of onset: ---------------------------------------

4. Outcome: Cured [1] / Continuing [2] / Dead [3] ☐

5. Date & time of suspected food intake: --

6. Item of suspected food materials and source --

7. Source of Drinking Water: --

8. Sanitary and hygienic aspects of the water and food source:

9.Clinical signs and symptoms:

Loose motion	Fever	Vomiting	Dehydration	Pain Abdomen	Blood in stool

10. Treatment History:

I.V drip – Y/ N,

Hospitalized / At home / Private Practitioner / None:

11. Containment measure at household level:

12. Sample taken for Laboratory investigation:

Name and Signature of the investigators

Date:

3.Investigation of an Outbreak of Cholera in Sankarpur, Dhenkanal, Orissa, India, August 2004.

1. Abstract:

Background: An outbreak of 31 cases of severe diarrhoea was reported from Sankarapur village, Dhenkanal district, Orissa in August 2004 following the death of a patient from diarrhea and dehydration. A rapid response team consisting a FETP Scholar from NIE investigated the outbreak. The aim of the investigation was to identify the cause of the outbreak, effectively manage existing cases and control the outbreak.

Methods: Using a clinical case definition proposed by the Orissa Multi Disease Surveillance System we searched for active cases. We dollected two rectal swabs from untreated patients and sent to Regional Medical Research Center (RMRC), Bhubaneswar for isolation of causative organism. We conducted a cohort study to identify the source of the outbreak. Result of water sample test for microorganism was negative.

Result: Descriptive epidemiology suggested that, 73% (eleven out of sixteen) households were affected; total attack rates was 39% (thirty one out of seventy nine); case fatality was 1,2% (one out of seventy nine people); attack rate was highest 78.5%(eleven out of fourteen) among those aged over 5 to14 years and attack rate was similar for other age groups. A multi variate analysis implicated no hand washing after visiting the household of a diseased person (Adjusted odd's ratio is 57with 95% confidence interval 9-354), p-value = 0.00000 to be associated with the outbreak. Vibrio Cholerae El-tor O1 Ogawa was isolated from the two rectal swabs.

Conclusion, and Recommendations: Based on clinical, epidemiological and laboratory findings, it was concluded that it was an outbreak of Cholera (Vibrio cholera O1 Ogawa). This investigation highlighted the need for health education about maintenance of personal hygiene. There should be interpersonal communication about the simplest and

general personal hygiene measures as hand washing with soap before taking food and after defecation, to drink boiled or chlorinated water, using latrines particularly in the regions of Orissa endemic for outbreak of cholera.

2. Background:

The outbreak of cholera is very common in the Gangetic area of India and Bangladesh. A long ago outbreak of choloera was due to vibreo choleare classical, which is now been replaced by vibreo cholerae eltor that has less severe symptoms than classical. The outbreak of vibreo cholerae eltor is now very common in India and in Orissa. Cholera commonly spreads through fecal oral contamination and lack of personal hygiene is the common cause of spread of the disease. In Orissa, as the stool samples are not collected and examined during the outbreaks of diarrhea, the magnitude of the outbeak is not known fully.

Getting written information from the Medical Officer Shankarpur Primary Health Center and health supervisor following one death due to diarrhea and seven clustered cases in one hamlet of village Sankarpur, Dhenkanal a rapid response team from district headquarter reached the village on 14.8.04 to investigate the outbreak and to take necessary measures. We investigated the outbreak to find out the etiological agent, source of infection and mode of transmission and tried to control the outbreak as quick as possible.

3.Methodology

Public health surveillance:

We searched door to door for active cases with a case definition, any person with three or more loose stool with or without vomiting and with or without dehydration in the hamlet of Sankarpur since 11.8.04 might be treated as a case. We line listed the cases according to the date of onset.

Cohort study: As it was a small hamlet of a village and the attack rate was very high we did a cohort study. We interviewed some persons about recent marriages or large gatherings as festivals, other suspected common food contaminations. Then we prepared a questionnaire taking their food habits and drinking water sources and common health practices in to account.

We lookde at the following factors for the outbreak of cholera in the community.

1. Bathing habit, in the canal or in the tube well because during taking bath people put water in their mouth to wash, so that there might be propagation of the disease.
2. Food habit: People take watered rice as their staple food. There might be some contamination due to water or there might be unhygienic storage procedure. Usually people put cold unboiled water in to the pot of rice and they stir it with their hand and keep for six to eight hours. When it tests sour it is consumed.
3. Drinking water from the tube well: All the people take water from the tube well as drinking water.
4. Street vendor: One street vender was selling tiffin early in the morning regularly. Other street vendors come to the village occasionally.
5. Taking fish and non-vegetarian diet: As the villagers were from low socio economic status they used to take fishes that were left behind with the fish shop. So it might be another factor.
6. Hand washing: These people do not wash their hand before taking their food. If at all they wash their hand, they do not wash properly and pour a little water on their hand. In that community it was a practice that the neighbors had to visit the house of the diseased person.

We trained the health supervisor about the questionnare, to interview the people. He interviewed all the people except the children below twelve years. We asked the people about their name, age, sex, food habits consumption of watered rice, fish, food from street vendor, the drinking water source, as there were only one tube well and a dugwell in the hamlet. We enquired about the bathing habit which was either in a nearby canal or the tube well; and we enquired whether the people wash their hands after visiting the ill neighbourer's house as in those area it is costomary to visit the ill person. The answers were analyzed in the EpiInfo 2002. As we had multiple factoers we did a single table univariate analysis for all the factors to get their odd's ratio. Then taking its products we went for a multivariate analysis by logistic regression method to get the adjusted odd's ratio by checking the confounders and effect modifiers.

Laboratory methods: We collected two rectal swabs from the cases who did not take any antibiotics in the transport medium, the water samples from both the dug well and the tube well and sent those to the Regional Medical Research Center, Bhubaneswar (ICMR) to isolate the causative organism.

4. Result:

Demography:

Total population = 79.

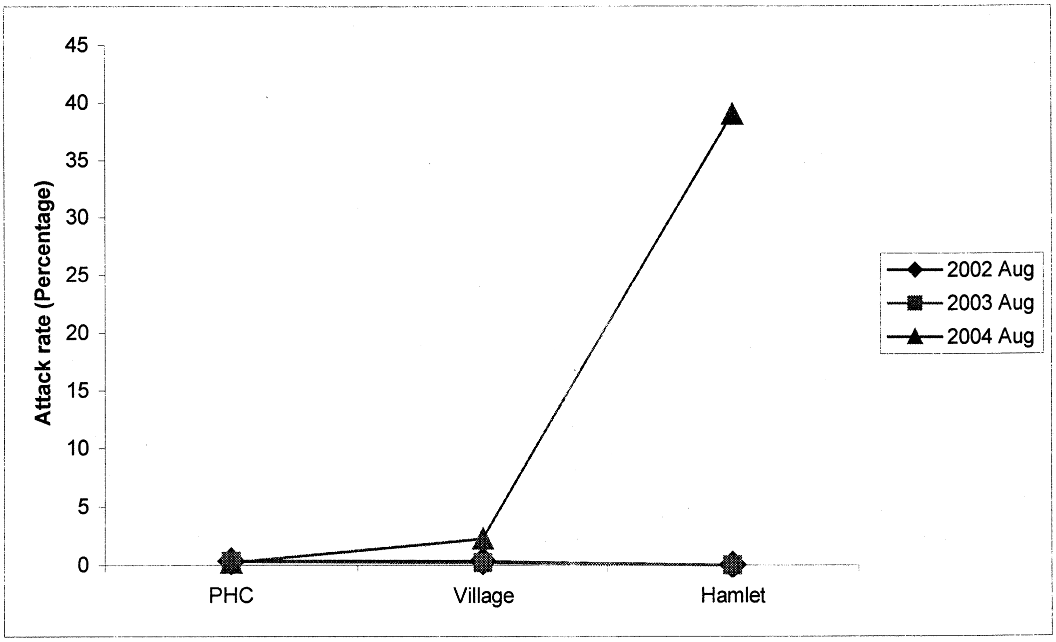
Table-1: Population by Age group and Sex in a hamlet Sankarapur village, Orissa, India, August 2004 (acdording to the survey regester, 20004 of the female health worker Shankarpur sub-center).

Age group in years	Male	Female	Total
0-4	6	4	10
5-14	6	8	14
15-24	9	6	15
25-34	7	4	11
35-44	6	5	11
45-54	4	4	8
55-64	3	2	5
>65	2	3	5

Data anlysis:

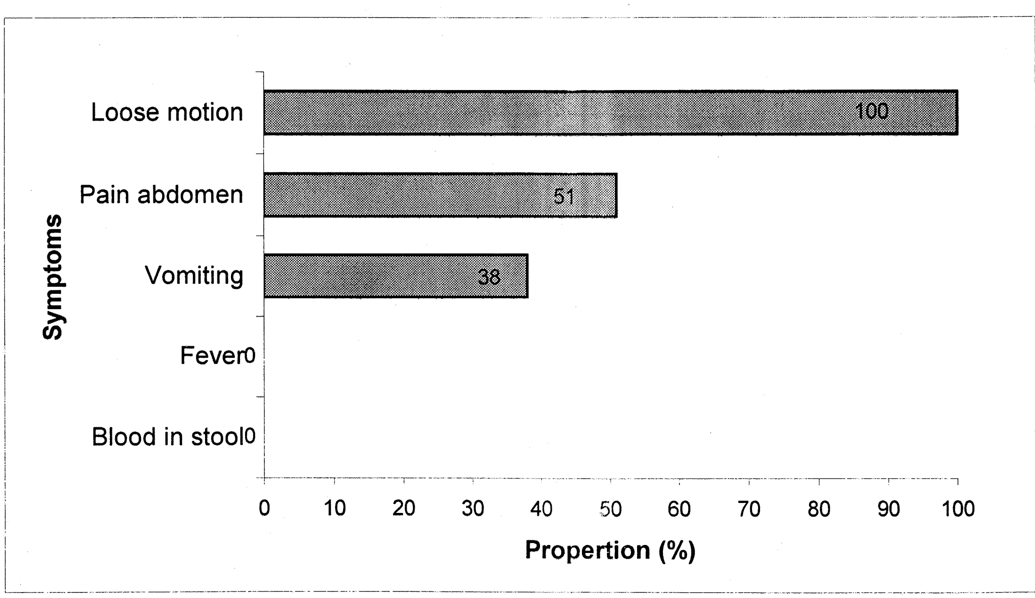
The attack Rate of Diarrhea during November 2001,2002, 2003 in Shankarpur village, Shankarpur Sector, Beltikiri PHC, Dhenkanal district is compared here.

Figure:1 Attack Rate of Diarrhea during August 2001,2002, 2003 in Shankarpur village, Shankarpur Sector, Beltikiri PHC, Dhenkanal district



The attack rate in August 2004 in the hamlet was clearly in excess, so that it was an outbreak of diarrhea in the hamlet of Sankarpur in August 2004.

Figure-2: Percentage distribution of Symptoms among the diarrhea cases in the hamlet of Sankarpur village, Orissa state August 2004.

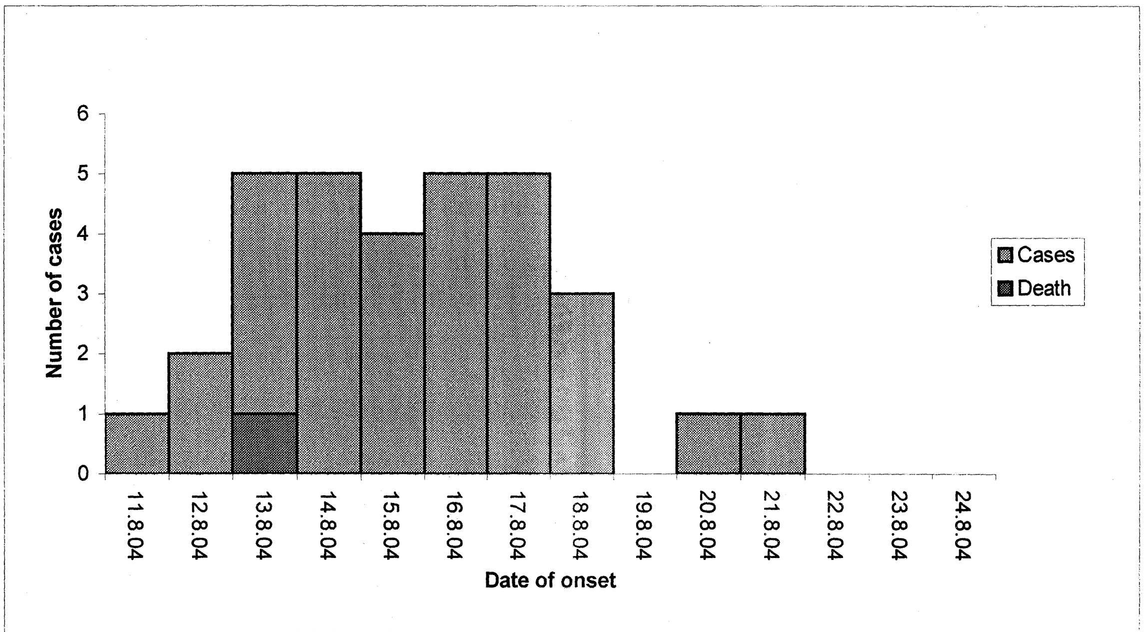


I found 31 cases according to the case definition and did a line listing of cases. From the line listing of cases, frequency of distribution of cases according to symptoms has been given below.

Description of of the epi curve: (Figure-3)

The index case was on 11.8.04, then the cases increased every day. There was a death on 13.8.04, and on 14.8.04 investigation started. When a graph was plotted taking the number of cases according to date of onset, it looked like a common source oputbreak.

Figure: 3 Cases of acute diarrhea by date of onset, Shanakarpur village, Orissa state India, August 2004 (n=31).



*n = 31 cases.

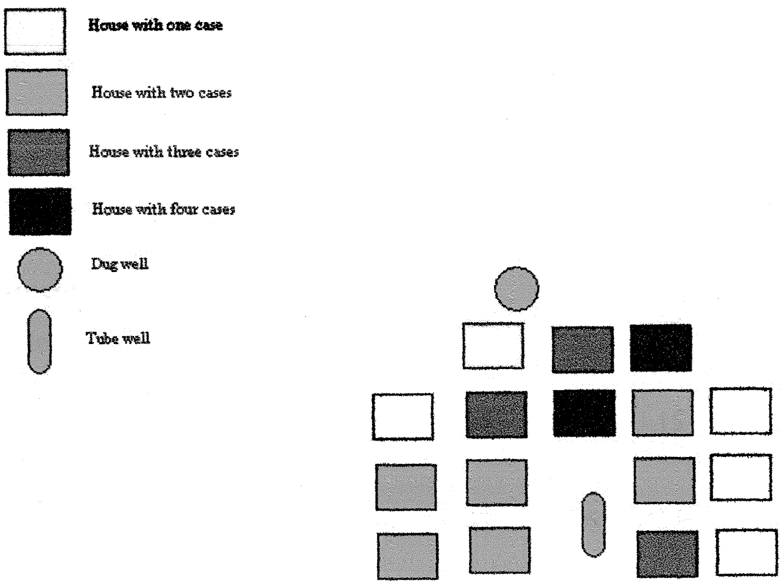
Table-3: Age and Sex wise attack rate of Diarrhea in the hamlet of Sankarpur village, Orissa state, India, August 2004

		Number of cases	Population	Incidence
Age in years	0-4 years	0	10	0%
	5-14 years	11	14	79%
	15-24 years	6	15	40%
	25-34 years	5	11	45%
	35-44 years	3	11	27%
	45-54 years	3	8	38%
	>55years	3	10	30%
Sex	Male	15	43	35%
	Female	16	36	44%
Total		31	79	39%

Analysis of the Attack Rate: (Table-3)

The age and sex wise attack rate depicts that the attack rate is highest 79% (11 out of 14) in the age group 5 to 14 years. The attack rate was similar in all other age groups except in the age group 0-4 years which was zero, The females are affected more attack rate was 44% (16 out of 36) which was more than that of male, 35% (15 out of 43).

Figure: 4. Spot map of the hamlet of Sankarpur village, Dhenkanal district, Orissa, India, August 2004.



Analysis of the spot map: The village was situated in the plane lands of Dhenkanal district 20 kilometers away from the district headquarter. The outbreak occurred in a hamltet of the village, which was situated one kilometer away from the main village. The hamlet was sorounded by paddy fields on its east, north and south side. There was a canal on the south side of the village. Water sources are two in number, one tube well and one dug well situated at both the ends of the hamlet. Cases came from all the houses of the hamlet leaving aside only 26% (4 out of 16) of households.

Table:4 Prevalence of cholera according to different risk factors, Shankarpur, Dhenkanal, Orissa, 2004. (Univariate analysis)

Risk factors	Prevalence among exposed			Prevalence among unexposed			Risk Ratio	95% CI
	Number	Total	%	Number	Total	%		
Female sex	14	29	48%	17	32	53%	0.9	0.5-1.4
Not drinking tube well water	8	12	67%	23	49	47%	1.4	0.9-2.3
Consumed watered rice	16	26	61%	15	35	43%	1.4	0.9-2.3
Consumed food from street vendor	20	32	62%	11	61	18%	1.6	0.96-2.8
Who consumed fish	5	6	83%	26	55	47%	1.7	1.1-2.8
Who took bath in canal water	12	25	48%	19	36	53%	0.9	0.5-1.5
Visited ill but did not wash hand with soap before taking food	28	33	85%	3	28	11%	8	2.7-23.3

Univariate analysis: We did an univariate analysis taking all the risk factors in to consideration. The risk factors were the female sex as always they remain in home and the males go out for work, not drinking the tube well water, consumption of watered rice, consumption of food from street vendor, consumption of the left out fish in the shop, bathing in the canal water and not washing hand before taking food after visiting the ill neighbour's house.

The person being a female had 0.9 times chance of being affected by cholera. The chance of being affected by cholera was 1.4 times more among the people who were not drinking the tube well water, 1.4 times higher among the people consuming watered rice, 1.6 times higher chance among the people who were consuming food from the street vendor, had 1.7 times more chance among those who consumed fish, 0.9 times chance among those who were taking bath in the canal water and 8 times more among those people who did not wash their hand with soap and water before taking food after a visit to the ill neighbour's house.

Multi variate analysis: A multivariate analysis was done by logistic regression method taking all the risk factors in to account to get rid of the confounders among the risk factors. The adjusted odd's ratios was highly significant for the risk factor, who did not wash their hand before taking food after a visit to the ill neighbour's house. After control of the confounders it was found that, the chance of being affected by cholera is 57 times higher among the people who were not washing their hand before taking their food after visiting their ill neighbour's house.

Tabale:5 Multivariate analysis by logistic regression method for the associated risk factors for cholera in Sankarpur, Dhenkanal district, Orissa, 2004.

Risk factors	Univariate odd's ratio (95% confidence interval)	p-value	Adjusted odd's ratio (95% confidence interval)	p-value
Female	0.8 (0.3-2.3)	0.7	1.5 (0.2-10)	0.67
Not take tube well water	2.3 (0.6-8.5)	0.2	2.3 (0.36-19.6)	0.5
Took watered rice	2.1 (0.8-6)	0.2	2.8 (0.5-15.9)	0.2
Took food from street vendor	2.7 (1-7.7)	0.06	1.3 (2.3-7.3)	0.8
Who took fish	5.6 (0.6-50.9)	0.1	12.3 (0.6-242.7)	0.1
Who took bath in canal water	0.8 (0.3-2.3)	0.7	1.1 (0.2-7.8)	0.9
Did not wash hand before taking food, after a visit to the ill neighbour's house.	46.7 (10.1-215.4)	0.0000	56.9 (9.1-354.4)	0.0000

From the multi variate analysis the adjusted odd's ratio for hand washing after visiting the ill neighbours house was 56.9, wit p value less than 0.05 and it was highly significant.

Laboratory findings:

The stool samples were positive for vibreo cholerae eltor 01 ogawa, and there was no microorganism growth in the water samples.

5. Discussion:

There was no festival or ceremony just before the outbreak. So the chance of outbreak from a common gathering or festival could be ruled out. The index case was working in a private clinic as an attendant. He might acquire the infection from the clinic and after it other two family members might have been affected due to contamination. In the scheduled caste community of Dhenkanal district, it is customary to visit the diseased person. So all the neighbors might have come to the house of the index case and due to lack of personal hygiene they might have been infected and in this way 40% 31 out of 79 of the populations of the small hamlet were affected from cholera. The statistical analysis shows that there was an association between the outbreak and no hand washing with soap and water before consuming food after visiting the ill neighbour's house. The death of one person was due to improper treatment and improper transportation. At last the outbreak could be controlled due to good interpersonal communication and good health education and maintenance of proper personal hygiene. Population attributable risk is 92%, which is very high, that is the no hand washing with soap and water after visiting the ill neighbour's house could suggest the association for 92% of the total population.

6. Conclusion:

In a hamlet of Sankarpur village, Dhenkanal district, Orissa there was an outbreak of cholera during the month of August. One person died during the outbreak due to improper treatment and transportation and 73% (11 out of 16) households and 39% (31 out of 79) population were affected due to the outbreak. The outbreak was notified on time and investigation was started as soon as it was noticed. The outbreak of cholera was due to lack of maintenance of personal hygiene that was no hand washing with soap and water after a visit to the house hold of the diseased person. We did inter personal communication and health education to all the individuals. As it created panic in a small hamlet, the people obeyed our advice and all the villagers started washing their hand soap and water before taking food. The water sources were chlorinated and people used boiled water for drinking purposes. Then the outbreak came to an end with loss of a precious life.

PAPER PRESENTATION AND LITERATURE REVIEW

1. Abstract presented in The Third TEPHINET Global Scientific Conference, Beijing, China, 8th to 12th November 2004.

"Investigation of an Outbreak of Cholera in a community- Parbatia, Dhenkanal, Orissa, India, November 2003" was accepted for oral presentation and presented in the Third TEPHINET Global Scientific Conference, Beijing, China, 8th to 12th November 2004.

Abstract:

Scientific Track: COMMUNICABLE DISEASES

Amitav Das*, MBBS

Address: National Institute of Epidemiology (Indian Council of Medical Research)

Post Box No. 2577, Mayor V.R.Ramanathan Road, Chetpet, Chennai-600031, India

Phone number: +91-44-28361980/1642, 28360663

Number of abstracts submitted: 2; **Priority** : First

Prefer oral **presentation form**

Amitav Das 1, Venkat Rao T V 2, Gupte M D 2

Affiliations:

FETP Scholar1, FETP faculty, National Institute of Epidemiology, Chennai 2

"Investigation of an Outbreak of Cholera in a community- Parbatia, Dhenkanal, Orissa, India, November 2003."

Background: An outbreak of 40 cases of severe diarrhoea was reported from Parbatia village, Dhenkanal district, Orissa during November 2003. Of these, 13 were hospitalised. A rapid response team (RRT) consisting of FETP Scholar from NIE and local health authorities proceeded to investigate the outbreak. The aim of the investigation was to identify the cause of the outbreak, effectively manage existing cases and control the outbreak.

Methods: Using a clinical case definition laid down by the Orissa Multi Disease Surveillance System, active case finding was carried out. 6 rectal swabs from patients who were untreated with antibiotics for the past 24 hours were collected and sent to Regional Medical Research Center (RMRC), Bhubaneswar for isolation of causative organism. A matched case control study was done to identify the possible exposure variable. Testing of water samples was not considered useful since all the wells were heavily chlorinated immediately after news of the outbreak spread. Cases were managed symptomatically for correction/prevention of dehydration and its complications.

Results: Descriptive epidemiology suggested clustering of cases around one public well; total attack rates was 4.2%; case fatality was nil; attack rates were highest (11.9%) among those aged over 55 to 64 years. Matched case control study implicated the water from (Odds Ratio: 2.43; 95% CI: 1.37 – 4.31) the public well to be related to the outbreak. Vibrio Cholerae O1 Ogawa was isolated from 4 out of 6 rectal swabs.

Conclusion, and Recommendations: Based on clinical, epidemiological and laboratory findings, it is concluded that the present problem is an outbreak of Cholera (Vibrio cholera O1 Ogawa). This investigation highlights the need for routine rectal swab examination of cases of diarrhoea particularly in endemic regions to enable identification of the exact causative agent with strain specificity. In this context, there is need for strengthening laboratory facilities at peripheral and district levels.

Key words: Outbreak, cholera, O1 Ogawa

2. Abstract for the 48th All India Conference Indian Public Health Association, Bhubaneswar, Orissa, 24th to 26th January 2004.

The abstract, "Disaster management during flood emergency" was presented in the Indian Association of Public Health conference, organized in Bhubaneswar, Orissa and presented on 25th January 2004.

Abstract:

Background: Due to continuous heavy rain and less water drainage to the sea by the rivers due to high tide, gives rise to flood in the plain lands and triangles of the rivers. On 31st August 2003 there was an alarming situation of flood in Orissa, which is full of rivers. Amongst 30 districts, 21districts were affected and 6175 villages were affected, moreover 1370 villages were marooned. Due to adequate supply of logistics and effective management of disaster in context to health, death due to severe diarrhea in the flood-affected areas of the state, could be restricted to 2 and persons affected from other communicable diseases were less.

Structuring health disaster management: Fundamental aspects of disaster management are Disaster response, Disaster preparedness and Disaster mitigation.

In the Disaster response here comes the National Health Disaster Management Program whose areas of responsibility are, 1. Promotion of health, social aspects and public education through mass media. 2.Establishment of standards of buildings, maintenance standards of health facilities in flood affected areas, norms for contingencies and other preparedness; lists of essential drugs and other logistics; standardized telecommunication protocols. 3. Collaboration with other associated sectors. 4. Disaster management training.

Disaster preparedness includes 1. Preparedness in the health sectors 2. Preparation of disaster plans, 3. Preparedness of co-ordination mechanism, 4. Relation with media, 5. Technical health program includes (1) Treatment of causalities (2) Identification of bodies. (3) Epidemiological surveillance and disease control. (4) Basic sanitation and sanitary engineering, (5) Health management in temporary shelters, which includes [a] Surveillance and control system for infectious diseases, [b] Nutritional surveillance, [c]

Proper immunization (6) Training health personnel and public (7) Logistical resources and supports and (8) Simulation exercises.

Then comes Disaster Mitigation in (1) Health facilities and (2) Drinking water supply and sewerage system.

According to this type of management we can face flood situation in context to health that we face in the state of Orissa in every 2 to 3 years gap.

3. Abstract for the 22nd Annual Conference Indian Association of Preventive and Social Medicine (Orissa state branch) SCB Medical College Cuttack, 13th, 14th March 2004.

"Cost effectiveness analysis of case detection in modified leprosy elimination campaign Orissa 2003" was presented in the 22nd Annual Conference Indian Association of Preventive and Social Medicine (Orissa state branch) SCB Medical College Cuttack, 13th, 14th March 2004.

"Cost effectiveness analysis of case detection in modified leprosy elimination campaign Orissa 2003"

Introduction: Orissa is one of the leprosy endemic states in India. The prevalence of leprosy in Orissa has come down from 57 per10,000 in1981 to 3.7 per10,000 in 2001. However, annual new case detection rate remained 90 per10,000. Hence, Modified leprosy elimination (MLEC) programme was being implemented since 1998. The objective of the present study is to determine the cost-effectiveness of different modes of case detection used in Dhenkanal district in Orissa.

Methods: We consider five different strategies for case detection: the fourth round of MLEC (S-0); Intensive Personal Communication (IPC) for 6 days (S1); Voluntary reporting of cases (VRC) for one month (S2) Information Education and Communication (IEC) for one week & active search for six days (S3); Strategy 4 (S4) includes both IEC, IPC for one month followed by special strategy. Strategy-5 (S5) is IEC for one week followed by VRC for 2 days. We calculated variable, semi-variable and fixed costs. During MLEC-4, 660 cases were detected. For all strategies unit costs for case detection is calculated, assuming that the same number of cases will be detected in the district applying each method of case detection.

Results: The unit cost for detection of a leprosy case in S0, S1, S2, S3, S4 and S5 were as follows: Indian Rupees (INR) 1682, 2319, 2095, 1495, 1477 and 588. The expenditure in unit case detection in S5 is the lowest. Variable cost is highest in S2 and lowest in S4;

Semi variable cost is just the reverse; fixed cost in S4 is highest and S3 is lowest. Hence S5 is very cost effective among all the strategies, around one fourth of the highest uni cost of case detection. The cost of IEC is less than IPC, and VRC is less costly thar active search.

Conclusion: Hence, the strategy of IEC followed by VRC is found be (S5) the most cos effective for the case detection of leprosy in the MLEC programme.

Key words: Cost-effectiveness, leprosy case detection

Training Programs in Epidemiology and Public Health Interventions Network (TEPHINET)

in conjunction with

Chinese Center for Disease Control and Prevention (China CDC)

presents this

Certificate of Appearance

to

Dr. Amitav Das, FETP, India.

for having attended

The Third TEPHINET Global Scientific Conference

from 8-12 November 2004 at

Beijing International Convention Center, Beijing, China

Wang Yu, M.D., Ph.D.
Director, China CDC

Dionisio J Herrera Guibert, M.D., F.M.S., M.A.E., Ph.D.
Chair, TEPHINET

INDIAN PUBLIC HEALTH ASSOCIATION

48TH ALL INDIA ANNUAL CONFERENCE

State Institute of Health & Family Welfare, Nayapalli,
Bhubaneswar - 751012, Orissa

Certificate

This is to certify that Prof./Dr./Mr./Ms. Amitav Das

has participated as Rapporteur/Penalist of Scientific Session/Resource Person/Guest Speaker/Delegate in the 48th All India Annual Conference of the Indian Public Health Association at Bhubaneswar, Orissa from 24th to 26th January, 2004.

He / She has also presented a Scientific Paper Entitled " "Disaster Management

State Institute of Health & Family Welfare Nayapalli, Bhubaneswar

Dr. B.C. Das
Organising Chairman

Dr. Trilochan Sahu
Organising Secretary

22nd Annual Conference

INDIAN ASSOCIATION OF PREVENTIVE & SOCIAL MEDICINE

(ORISSA STATE BRANCH)
S.C.B. MEDICAL COLLEGE, CUTTACK.

13th & 14th March 2004, Cuttack

I.A.P.S.M.

This is to certify that

Dr. Amitav Das

of N.I.E, Chennai *has participated in the 22nd Annual Conference of IAPSM (Orissa State Branch) at Cuttack on 13th & 14th March, 2004 as delegate / resourceperson / chairperson and presented or co-authored the scientific paper titled*

(Cost effectiveness analysis of MLEC in Dhenkanal District Orissa.)

Gopalkar

Chairperson
Organising Committee

Chief Guest

Organising Secretary

4. Literature review:

Coverage of Iron Folic acid and prevalence of anemia amon pregnant mothers during third trimester of pregnancy, Dhenkana Orissa 2004.

1.Introduction:

In a community mothers and children comprise approximately seventy percent of tl population of the developing countries. In India women of the child bearing age that is 1 to 44 years constitute 19 percent and children under 15 years of age about 40 percent ar total of 59 percent of the total population. Mothers and children not only constitute large group in the society but also they are a vulnerable group or special risk group. Tl risk among the mothers is during child bearing and risk among the infant and children intra uterine growth, development and survival. Out of all the deaths 50 percent dea occurs among the children below 5 years. In developed counties maternal mortality rate 30 per 100,000 live births and in developed countries it is 480 per 100,000 live births (1 It shows that maternal, infant and child mortality rate constitute a large part of the tot deaths in the developing countries and the cause of the death among this group preventable. Anemia is associated with high incidence of premature birth, Post partu hemorrhage, puerperal sepsis and thromboembolic phenomena in mothers; Iron and Fol acid prevent nutrition stress in the expectant mothers. Anemia leads to insufficient sto in fetus, which leads to lack of body mass and blood volume in the first year of lif Anemia during pregnancy is associated with adverse outcomes (premature delivery, lo birth weight and fetal death) (2,3). Complications of low birth weight include lung ar breathing problems, anemia, brain abnormalities, behavioral problems, difficul maintaining normal body temperature, and feeding problems, which are the importa causes of maternal mortality (4). Iron deficiency in childbearing women increas maternal mortality (7), prenatal and perinatal mortality and prematurity (8,9). Anemia directly responsible for 20% maternal deaths and is an associated cause in another 20% ir developing countries. Favorable pregnancy outcomes occur 30-45% less often in anemic mothers, and their infants have less than one half of normal iron reserves (11). Thus it is imperative to be able to not only manage a case of anemia but also implement measures for its prevention. Despite the fact that most of the anemia seen in pregnancy is largely preventable and easily treatable if detected in time, anemia still continues to be a common cause of maternal mortality and morbidity in India. Distribution of Iron and folic acid (IFA) tablets from fourth month onwards will help in preventing anemia. Government of India has introduced the provision of Iron and folic acid tablets for all the pregnant mothers as an integral part in the Maternal and Child Health program during 1991 and Reproductive and Child Health programs for the adolescent girls, expectant and lactating mothers with the objective to provide Iron and Folic Acid tablets to reduce the prevalence of anemia during pregnancy, which will lead to decrease the maternal mortality and increase the birth weight of the baby, by which the infant mortality rate will be reduced. This program has been introduced a long ago and it is one of the primary job of the health worker female in the country. The success of the program and the betterment of the individuals depend on the acceptance and attitude of the beneficiaries towards the program.

2.Historical Backgrounds:

In the ancient days the Greeks knew anemia as muscle weakness. In India, especially in the state of Orissa to reduce iron deficiency anemia, to increase the iron concentration in the blood, the lactating mothers just after delivery were given warm water to drink and the water was made hot by putting a red-hot iron rod in to a water can. The idea behind this was to increase the intake of iron salts. In the sixteenth century the sign and symptoms of anemia came to lime light. In the nineteenth century it was known about the constituents of blood, about red blood cells and its chemical composition. In this Nineteenth century Hoppe- Seylers who showed that the blood pigment or hemoglobin that is composed of hematin and the hematin contains heam that is iron and protein discovered the Hemoglobin. When different programs for the betterment of health of the population came in to practice, this iron supplementation to pregnant mothers was the first and foremost supplementation program.

3. Global scenario:

3.1. Prevalence of iron deficiency anemia:

Iron deficiency is the most common and widespread nutritional disorder in the world (5). As well as affecting a large number of children and women in non-industrialized countries, it is the only nutrient deficiency, which is also significantly prevalent in virtually all industrialized nations. There are no current global figures for iron deficiency, but using anemia as an indirect indicator it can be estimated that, most preschool children and pregnant women in non-industrialized countries, and at least 30-40% in industrialized countries, are iron deficient (6,7). Nearly half of the pregnant women in the world are estimated to be anemic: 52% in non-industrialized - as compared with 23% in industrialized – countries (6,7). Anemia is particularly prominent in south Asia. In India, for example, up to 88% of pregnant and 74% of non-pregnant women are affected. Throughout Africa, about 50% of pregnant and 40% of non-pregnant women are anemic. West Africa is the most affected, and southern Africa the least. In Latin America and the Caribbean, prevalence of anemia in pregnant and non-pregnant women is about 40% and 30% respectively. The highest levels are in the Caribbean, reaching 60% in pregnant women on some islands (6,7). In Kenya prevalence of moderate anemia is 54% while 70% of pregnant mothers in Kenya are anemic. Based on a 1998 national survey, anemia prevalence is widespread in Zambia particularly in young children (6-18 months) and pregnant women. The survey documented prevalence rates of 65% among children (of which 14.5% were severely anemic) and 46.9% among pregnant women (21)In most industrialized countries the prevalence of anemia among pregnant mothers is around 20%.

3.2.Prevention and control:

Food fortification with Iron: Iron fortification is the most common strategy currently used to control iron deficiency anemia in developed countries. General iron fortification programs are considered to be 93% effective in the long term, and this should be carried out until there is significant improvement in diet of entire populations or food fortification is achieved. Sweden has implemented iron supplementation and fortification of many food items for many years so that a relatively low prevalence of iron deficienc anemia is there in the country. In Indonesia, in May 2001, the Ministry of Industry anc Trade issued Decree Number 153/2001 on the Mandatory Application of the Nationa Standard of Indonesia (SNI) for fortified wheat flour. Both imported wheat flour anc domestically produced wheat flour must follow this Standard of Indonesia and accordin to it, the wheat flour must be fortified with 50-ppm iron, 30-ppm zinc, 2.5-ppm thiamin 4-ppm riboflavin, and 2-ppm folic acid.

Iron Supplementation: Supplementation programs for pregnant mothers are carried ou in both developed as well as developing countries, though the iron supplementatio programs are considered 70% effective in the short term. Various delivery systems an modalities, under conditions of varied efficiency, reach a wide range of target groups Small controlled studies of supplementation have been shown to be particularl successful, and a few large-scale supplementation programs clearly demonstratin positive biological impact are reported from some developing countries. Countries shoul identify specific problems and constraints limiting the effectiveness of supplementatio programs and those key elements responsible for successes and failures. Supplementatio is most often used to treat existing iron deficiency anemia. It should also be considered a a preventive public health measure to control iron deficiency in populations at high ris of iron deficiency and anemia. Supplementation programs, especially for pregnan women, operate in developed as well as in developing countries. Most of the countries o the world have policy statements and directives regarding iron supplementation o pregnant mothers, but most of these directives are not fulfilled (29).

Control of Hookworm infestation: In Zambia the prevalence of hookworm is 9.4% (21). Routine de-worming has been recommended as a cost effective strategy to contro anemia, especially in areas where hookworm infestation is heavily endemic (22) Information Education and Communication, personal hygiene and adequate sanitation i most important for the control of worm infestation. Where hookworm infestation i endemic and in areas identified as endemic for intestinal parasites, a single dose of 50 mg mebendazole at the earliest antenatal visit after first trimester may be provided (21).

4.Southeastern region:

Anemia is prominent in south Asian countries. In India prevalence of anemia is high bu the prevalence is low in countries like Thailand. In the southeastern region a lot of peopl suffer from iron deficiency anemia predominantly affecting pregnant mothers. Th prevalence of anemia is about 74% among pregnant mothers, which ranges from 13.4% in Thailand to 87% in India according to 4th report of the world nutrition situation (28). I a number of countries iron supplementation is the usual practice for prevention o anemia.

5.India:

5.1. Prevalence of anemia:

According to Iron deficiency Anemia, Assessment, Prevention and Control, A guide fo programme managers, the prevalence of anemia in India is up to 88% of pregnant an 74% of non pregnant women.

According to (Seshadri, 1998), anemia affects an estimated 50% of the population.

According to Indian Council for Medical Research (ICMR) (1977), ICMR bulletin December 1977 50 to 60 percent of women belonging to low socio economical group are anemic in the last trimester of pregnancy.

In India, Iron and Folic Acid (IFA) deficiency anemia is found in 25 to 50% of pregnan mothers attending hospitals (WHO 1972).

In India Folic Acid deficiency anemia is found in 25 to 50% of pregnant mother attending hospitals. World Health Organization 1972, WHO Chronicle 26 (4) 160. Man subjects have Iron deficiency without anemia (Srikanta, S.G. 1983, Proceed Nutritiona Society of India No 28 P 7.). Many subjects have Iron deficiency without anemia (Srikanta, S.G. 1983)

In India 20 to 40% maternal deaths are attributable to anemia WHO (1982), Worl Health Statistics Qrly 35: 52.

In National Family Health Survey-2 (NFHS-2) in 1998-1999 there was a study o prevalence of anemia among pregnant mothers and the coverage of Iron and folic aci tablets during the antenatal period in all the states of India.

According to NFHS-2 (1998-1999), 49.7 percent pregnant mothers in India suffer fron iron deficiency anemia out of which, 21.8% had mild, 25.4 % had moderate and 2.5 % had severe anemia. From all the states of India, the eastern and north eastern states ha higher prevalence of anemia, 69.7 % in Assam, 63.3% in Meghalaya, 63.4 % in Biha and 63% in Orissa. In Kerala the prevalence of anemia is lowest, 23%, Manipur 29% Goa 36% and Nagaland 38%.

5.2. Causes of anemia:

The cause of anemia among pregnant mothers is same in both industrialized and non industrialized countries of the world. Although many causes of anemia have been agree that nutritional deficiency due to low bioavailability of dietary iron accounts for majorit of cases (26). The phytates and tannins present in diet suppress iron absorption to significant extent (27). During pregnancy substantial amounts of iron are deposited in th placenta and fetus during pregnancy. This results in an increased need of 700-850 mg i body iron over the whole pregnancy. Iron absorption is increased during pregnancy an the iron loss due to stoppage of menstruation. Pregnant women still do not absor sufficient additional iron and the problem of iron deficiency anemia takes place.

Food habits: Consumption of iron-rich foods can reduce the prevalence or severity o anemia, and the absorption of iron from diet can be enhanced (by vitamin-c) or inhibite (by tea or coffee) if particular items are consumed around the time that a meal is taken Women who take fruits at least ones in a week are less likely to be anemic than wome who eat fruit less often or not at all. The consumption of green leafy vegetables does no appear to have protective effect against anemia. Women who regularly consumes gree leafy vegetables but not fruits have the highest prevalence of anemia have been recorde in National Family Health Survey-2.The prevalence of anemia is reported to be highe among the persons consuming vegetarian diet as compared to those consuming a mixed diet that includes animal food.

Worm infestation: The hookworm infestation is most common in India (15,16,17). It is believed that 60-80 percent of population of certain areas of West Bengal, Orissa, Bihar, eastern coast of Tamilnadu and Andhraprdesh are infected with hook worm. In a study done at Gulbarga Karnataka by Vinod Kumar (25) and colleagues demonstrated the prevalence of worm infestation as 86.66%, 68.16% and 82.97% in mild, moderate and severe cases of anemia.

Socio economic status: The high prevalence of anemia during the third trimester among women suggests that many low-income women have poor iron nutrition both before and during pregnancy (18).

5.3. Effect of anemia on pregnant mothers

According to (Seshadri 1998) anemia may have detrimental effects on the health of women and children, may become an underlying cause of maternal mortality and results in an increased risk of premature delivery and low birth weight

Government of India has given top priority to this iron supplementation in the Maternal and Child Health program. However, it has become increasingly evident that the main target group for supplementation to prevent iron deficiency is women of childbearing age (in addition to infants older than 6 months, preschool children, and adolescent girls). This target group is not limited to pregnant women, who are often accessible only through the health system and late in pregnancy. One problem is that all of these groups are often difficult to contact through the health services. Therefore, efforts have been concentrated on supplementation programmes for women of childbearing age. If women enter pregnancy with adequate iron reserves, iron supplements provided during pregnancy will be more efficient at improving the iron status of the mother and of the fetus. As a result, the risk of maternal anaemia at delivery and of anaemia in early infancy will be reduced.

Pregnancy: Iron deficiency in childbearing women increases maternal mortality (7), prenatal and perinatal infant loss, and prematurity (8,9). Forty percent of all maternal perinatal deaths are linked to anaemia. Favourable pregnancy outcomes occur 30-45%

less often in anaemic mothers, and their infants have less than one-half of normal iron reserves (11).

Such infants require more iron than is supplied by breast milk, at an earlier age, than do infants of normal birth weight (19). Moreover, if pregnancy-induced iron deficiency is not corrected, women and their infants suffer all the consequences as cognitive development, decrease in resistance to infection.

5.4. Prevention and control:

Iron supplementation: According to Indian Council for Medical Research (1989) a vegetarian diet contains 18-22 mg of iron, which represents 58% of recommended 40-60 mg of iron during pregnancy. So iron supplementation has been started since 1970.

Dr Chitra stiphense has sited in her study that it is the cost effective method to reduce the prevalence of anemia. 69% of pregnant women reported receiving iron supplements during the current pregnancy, with slightly less than a third purchasing iron from the private sector, and slightly more than a third receiving them free of charge from the government health services. Adequate dosage of iron per pregnancy was a problem with only 16.7% of pregnant women reporting consumption of >100 tablets. The impact of increased consumption of iron was evident in the mean hemoglobin of women: among women consuming <100 tablets, mean Hb = 10.24 gram/dL. In contrast, among women consuming >100 tablets, mean Hb = 12.30 gram/dL ($p<0.009$). When questioned about reasons for not consuming iron supplements during their current pregnancy, only 3.5% of women spontaneously cited gastrointestinal or other side effects of the tablets (23).

The impact of the Government's Reproductive and Child Health Program, which distributes iron tablets to pregnant women at no charge, has been limited due to poor supply and distribution of supplements. The latter is believed to be due to a lack of effective contact between most pregnant women and health service personnel (Shah U., 1984). However, the lack of awareness on the part of the community and the lack of motivation among the government peripheral health worker may also play a major role (24).

Food diversification: Though the female health workers are giving iron and folic acid supplementation, the pregnant mothers need some changes in food habits, which may give an addition al benefit for improving the iron level and reduction of anemia. Women who take fruits at least ones in a week are less likely to be anemic than women who eat fruit less often or not at all. . Women who regularly consumes green leafy vegetables but not fruits have the highest prevalence of anemia have been recorded in NFHS-2. The prevalence of anemia is reported to be higher among the persons consuming vegetarian diet as compared to those consuming a mixed diet that includes animal food. So Information Education and Communication is required to promote the food diversification and to take fruits like banana that is rich in iron and easily available in the Indian villages regularly and to take mixed diet.

5.5. Programs for Iron prophylaxis:

The National Nutritional Anaemia Control programme, started in 1970 and revised in 1991, aims at significantly decreasing the prevalence and incidence of anaemia among women in reproductive age group, especially pregnant & lactating women and pre-school children.

The programme focuses on the following strategies:

- Promotion of regular consumption of foods rich in iron.
- Provision of iron and folate supplements in the form of tablets (folifer) to the high-risk groups.
- Identification and treatment of severely anaemic cases.

The programme is implemented through the network of Primary Health Centres and Sub-centres. The beneficiaries and the doses are:

- Pregnant and lactating women: 100 mg of elemental Iron and 500 micro grams folic acid for 100 days after first trimester of pregnancy.
- Intra Uterine contraceptive Device users: 100 mg of elemental Iron and 500 micro grams folic acid for 100 days.

- Children aged 1-5 years: 20 mg of elemental iron and 100 micro grams of folic acid for 100 days every year.

In case of women suffering from severe anaemia (haemoglobin < 7 grams/dl), therapeutic dose of one adult tablet of iron is to be given twice daily for a minimum of 100 days. Functionaries of Integrated Child Development Scheme (ICDS) assist in the distribution of tablets to children and mothers in areas where this Integrated Child Development Scheme is in operation and also impart education to mothers on prevention of nutritional anaemia. Department of Food, Ministry of Food and Civil Supplies is responsible for promoting production of iron rich foods.

In addition to provision of Iron and folate supplements, the programme envisages to promote consumption of foods rich in Iron. The other objective was to identify and treat severely anaemic cases. An Indian Council for Medical Research evaluation in 11 states (1985-86) revealed low coverage as well as poor impact of the programme on prevalence of anaemia. (20)

According to Indian pediatrics 1999, 36: 727-728 Child and Maternal Health in rural areas in Chandigarh (30),

- Health status of the community is not dependent upon the availability of the health institutions and medical professionals, but also upon the socio economic profile, utilization and awareness level.
- Infectious diseases like diarrhea is responsible for 16.7% deaths, respiratory diseases 13%, vaccine preventable diseases 25% deaths among infants in India.
- 72.9% women are aware of iron and folic acid tablets.
- 95.8% utilized antenatal care from health workers.
- 80.8% mothers in second and third trimester of pregnancy were consuming iron and folic acid tablets. Nine out of ten (87.5%) of expectant women in their third trimester suffer from anaemia. Recent analysis of different food stuffs has shown that the iron content is very low thereby indicating that anaemia is primarily due to inadequate consumption of dietary iron rather than the poor absorption iron as believed earlier. Poor quality of environment and un-hygienic habits make the

community vulnerable to diseases such as malaria and hookworm infestation which further aggravates this situation. About 269 million Indians are estimated to suffer from anaemia and nearly 55,000 maternal deaths are attributed directly or indirectly to Iron deficiency (20).

Coverage of iron and folic acid tablets among pregnant mothers in the Maternal and Child Health program is the highest in Kerala, 95.2%, in Goa 94.75, in Manipur it is 50%, in Meghalaya it is 49.5%, in Assam it is 55%, in Orissa it is 67.6% and in Bihar it is only 24.1%

Table-1. Antenatal care indicators by state in India:

State	Percentage that received at least one antenatal check up	Percentage given iron and folic acid tablet or syrup	Percentage that received supply of Iron and folic acid tablets or syrup for more than 3 months
India	65.4	57.6	47.5
Uttar pradesh	34.6	32.4	20.6
Bihar	36.3	24.1	19.8
Orissa	79.5	67.6	62.2
West Bengal	90.0	71.6	56.4
Goa	99.0	94.7	87.8
Kerala	98.8	95.2	88.6
Tamilnadu	98.5	93.2	84.1

6. State Scenario (Orissa):

According to National Family Health Survey-2 (1998-1999) the prevalence is 60.5%, out of which 26.8% are mild, 33% are moderate and 0.7% is severe. Prevalence of anemia in rural women is higher 64% than the urban women 55%. From this study 69.3% of urban pregnant mothers and 67.4% rural pregnant mothers were given iron and folic acid tablets or syrup. Out of the mothers received iron and folic acid tablets, 94.0% urban and 91.8% rural pregnant mothers received the tablets for more than 3 months. After the National Family Health Survey -2 there is no other studies for the coverage of this Iron prophylaxis program in Orissa.

7. District scenario (Dhenkanal district):

No such study has been done in the district. An endeavor has been accomplished by National Institute of Epidemiology, Chennai for the study of coverage of the Iron prophylaxis program and prevalence of anemia in the Dhenkanal district.

8. Summary:

The prevalence of iron deficiency anemia among pregnant mothers in India is very high and it has major public health significance, as the prevalence of anemia is more than 40 according to the WHO classification. The prevalence is more due to wrong dietary habits poor nutrition, low iron storage, increased demand of iron, malaria and worm infestation Iron deficiency anemia increases the mortality and morbidity of mother and infants both directly and indirectly. To decrease the mortality and morbidity all the industrialized and non-industrialized countries have taken necessary steps as food diversification, iron supplementation, food fortification and prevention of worm infestation. The industrialized countries have adopted food fortification program which is ideal and which is more efficient in the long run. Government of India has taken steps that are iron supplementation since 1970 for the prevention of iron deficiency anemia among pregnant mothers; it has been modified on 1991 and included the adolescent girls and children Adolescent girls have been included for this iron supplementation to increase their iron store before they become mothers. It has been found from different studies that the coverage and consumption of iron and folic acid tablets by the beneficiaries is less in

India. There are no adequate studies in relation to coverage and consumption of iron and folic acid tablets and the causes of this low coverage by the beneficiaries.

We did a cluster survey of pregnant mothers in third trimester of pregnancy and in this study an attempt has been taken to assess the prevalence of iron deficiency anemia among pregnant mothers during third trimester of pregnancy, the coverage of iron and folic acid tablet among them, the prevalence of hook worm infestation among pregnant mothers and the behavior and attitude towards the consumption and the factors associated with consumption and factors associated with anemia among pregnant mothers in Dhenkanal district.

References:

1. WHO (1996), The World Health Report 1996, Report of the Director General.

2.Garn SM, Ridella SA, Petzold AS, Falkner F. Maternal hematologic levels and pregnancy outcomes. Semin Perinatol 1981;5:155-62.

3.CDC. 1983 Annual summary of pediatric nutrition surveillance system. Atlanta: US Department of Health and Human Services, Public Health Service, 1985; HHS publication no. (CDC) 85-8295.

4.Iron supplementation during pregnancy may increase birth weight. By Darin Ingels, ND

5. DeMaeyer EM, Adiels-Tegman M. The prevalence of anaemia in the world. World Health Statistics Quarterly, 1985, 38:302-316.

6. WHO Global Database on Iron Deficiency and Anaemia, Micronutrient Deficiency Information System. Geneva, World Health Organization (to be published).

7. 51. The prevalence of anaemia in women: a tabulation of available information. Geneva, World Health Organization, 1992 (WHO/MCH/MSM/92.2).

8. 52. Macgregor MW. Maternal anaemia as a factor in prematurity and perinatal mortality. Scottish Medical Journal, 1963, 8:134.

9. 53. Schorr TO, Hediger ML. Anemia and iron-deficiency anemia: compilation of data on pregnancy outcome. American Journal of Clinical Nutrition, 1994, 59 (Suppl.): 492S-501S.

10. WHO / NHD/ 0.13 Iron Deficiency Anemia Assessment, Prevention and Control A guide for programme managers.

11. 54. Bothwell TH, Charlton RW, eds. Iron deficiency in women. Washington, DC, Nutrition Foundation, 1981.

12. Kenya, May – October 1999 by Guinea Bissau.

13. J L Jenkins, M D, 2001.

14. 121. Fogelholm M, Suominen M, Rita H. Effects of low-dose iron supplementation in women with low serum ferritin concentration.
European Journal of Clinical Nutrition, 1994, 48:753-756.

15. Arora, D D et al (1971) J. com. Dis., 3 (3-4) 146- 158

16. Saxena P C and Prasad, B G (1971) Indian Journal of Public Health15(1) 31-37

17. Arora, R R et al (1976) J. com. Dis., 8 (1) 66- 76

18. Progress in Chronic Disease prevention Anemia during pregnancy in low-income women- United States, 1987.

19. 55. Llewellyn-Jones D. Severe anaemia in pregnancy. Australian and New Zealand Journal of Obstetrics and Gynaecology, 1965, 5:191.

20. UNICEF-ADB-RETA
Reducing Child Malnutrition in Selected Asian Countries
National Strategy to Reduce Child Malnutrition In India
Co-ordinated by Department of Women & Child Development Ministry of HRD, Government of India
Administative Staff College of India Bella Vista, Hyderabad – 500 082 December 1997

21. Zambian National Strategy and Plan of Action for the Prevention and Control of Vit-A deficiency and Anemia. Developed by National food and Nutrition Commission with key partner agencies and Technical Assistance from MOST / USAID.

22. Stoltzfus RJ, Dreyfuss ML, Chwaya HM, Albonico M. Hookworm Control as a strategy to prevent iron deficiency anemia. Nutrition Reviews. 1997; 55: 6: 223-232.

23. Primary Investigator: Dr. Chitra Stephens
Collaborating Agency: Department of Community Health, St. John's Medical College
Project Period: January 1997 – August 1998

24. Shah, U. et al. *Using Community Health Workers to Screeen for Anemia.* World Health Forum, 1984. 5: 35-36.

25. Vinod Kumar CS, Anand Kumar H, Sunita V, Kapur I. Prevalence of anemia and worm infestation among school going girls at Gulbarga Karnataka. Indian Pediatr. 2002; 40: 70-72.

26. Narasinga Rao BS. Studies on iron deficiency anemia. Ind J Med Res. 1978 Oct; 68: 58-69.

27. Trevisanto S, Kim Y. Nutr Rev.2000; 58:1-10.

28. ACC/SCN/IFPRI. Fourth Report on World Nutrition Situation.WHO: Geneva ; 2000.

29. ACC/SCN. Controlling iron deficiency. A report based on an ACC/SCN Workshop. S Gillespie, J Kevany and J. Mason. ACC/SCN State of Art Series. Nutrition Policy Discussion Paper No 9. ACC/SCN C/O WHO, Geneva: 1991.

30. Indian pediatrics 1999, 36: 727-728 Child and Maternal Health in rural areas in Chandigarh.

31. Centers for Disease Control and Prevention. Recommendations to prevent and Control Iron Deficiency in the United States. MMWR 1998; 47(No. RR-3): p13.

32. Source CDC MMWR (1989) 38: 400-404.

33.Viteri FE et al. Fortification of sugar with iron sodium ethylenediaminotetraacetate (FeNaEDTA) improves iron status in semi rural Guatemalan populations.
American Journal of Clinical Nutrition 1915, 61: 1153-1163.

34.Rao BSN. Fortification of salts and Iron and Iodine to control anemia and goiter, Development of a new formula with good stability and bio availability of iron and iodine Food and Nutrition Bulletin, 1994, 15: 32-39.