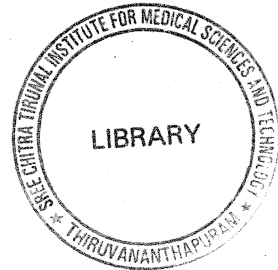


FIELD PROJECT REPORTS



By
Parvathy
(MAE- FETP Scholar 2002-2003)

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

JANUARY 2004

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By

Parvathy

(MAE- FETP Scholar 2002-2003)

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.

JANUARY 2004

CERTIFICATION

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

Date: 29.1.04



DIRECTOR

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All the staff of Saidapet Health Unit District for their co-operation and my family for bearing with me in this endeavor of hard work with patience.

Date

S. Parvathy

SECTION.1

FIRST FIELD POSTING

Chapter 1. Health Situation Analysis , Saidapet Health Unit District

Description of the existing health facilities will be made under the following headings:

- Introduction
- Objectives
- Methodology
- Data sources
- Description – geographic profile
- Overview of Kancheepuram district
- Saidapet district at a glance
- Organisational structure
- Health infra structure, Existing health programmes
- Linked sectors
- Discussion, Recommendations

1. Introduction

I hold a M.B.B.S degree and a Diploma in Public health from the Tamilnadu Dr. M.G.R Medical University, Chennai. I have been working in the Tamilnadu Public Health and Preventive Medicine Department as Municipal Health Officer, Mannargudi since June 2001. My duties as Health Officer included:

- Conducting baseline surveys
- Organizing, conducting and monitoring various health camps
- Visiting local schools and carrying out health check-ups for the school children
- Administering Vitamin A drops, polio drops to under 5 children
- Implementing and monitoring all the National Health/ Disease Control Programmes
- Collection, collation and analysis of data
- Reporting to higher officials.
- Supervising the nutritional status of children attending the ICDS center in coordination with the ICDS staff

I joined the Field Epidemiology Training Programme leading to the Master of Applied Epidemiology degree course at the National Institute of Epidemiology [NIE], Chennai, as I am interested in pursuing a career in Public Health. From January 27th 2002, I attended contact sessions for three months at NIE, which ended on 27th of April 2002.

After the first contact session, I have been placed at Chennai under the supervision of Director of Public Health and Preventive Medicine, Tamilnadu. My local preceptor is Deputy Director [Research] in the Office of the Director of Public Health and Preventive Medicine, Chennai.

In consultation with the Director of Public Health and Preventive Medicine, Saidapet Health Unit District has been identified as my field placement area. All field projects assigned to me will be carried out in this Health Unit District.

2. Importance of a “Work Place Situation Report”

Health is a State subject. It is important to understand the work place first in order to find the healthy status or disease burden of the population in a given area. Therefore, this exercise was undertaken with the intention of identifying and describing the existing health facilities in the context of Surveillance and Epidemic Preparedness and Response.

3. Objectives:

The objectives were to:

1. Describe the existing health facilities in Saidapet Health Unit District in the context of Surveillance and Epidemic Preparedness and Response
2. Identify priority areas of concern so that it serves as a reference point for planning processes
3. Identify the existing gaps in terms of health needs, available health services and resources.
4. Recommend measures to bridge the identified gaps

4. Methodology

Study area - Saidapet Health Unit District

- Information regarding the existing health facilities was collected from the health officials by means of discussion with Deputy Director of Health services (DDHS), Public Health Nurse (DPHN), Community Health nurse (CHN), Sector Health Nurse (SHN), Village Health nurse (VHN) and District Entomologist (DMO).

- Data from the records and registers maintained by the health staff of the Primary Health Centre (PHC) , Sub centre (HSC) and DDHS office were collected.
- I visited one primary health centre, one sub centre ,one Government hospital and teaching institution to see the existing health facilities in the respective levels.
- I visited one major private hospital in the area and had discussion with the Managing Director to find out the linkages they have with the Government sector.

4. 1. Data sources

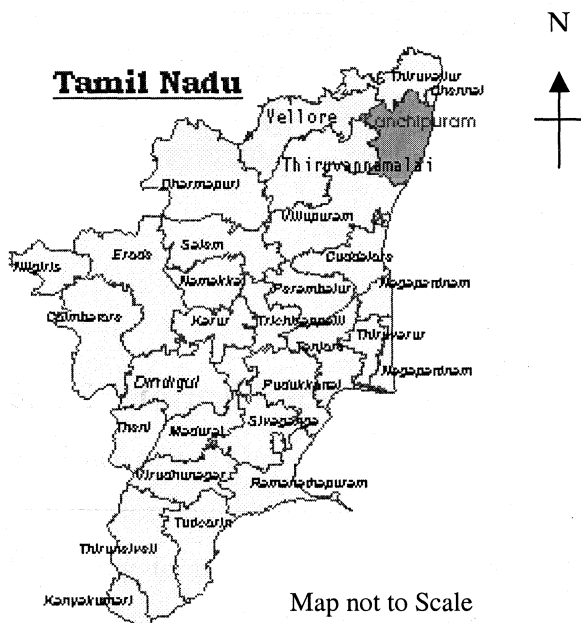
- Directorate of Public Health and Preventive Medicine
- Office of the Deputy Director of Health Services,Saidapet
- Primary Health Centres ,Sub centers
- Government Hospitals [Taluk, Block, District, Teaching Institutions]
- King Institute, Guindy
- Madavaram Laboratory
- Infectious Disease Hospital, Tondiarpet
- Social Welfare Department

4. 2. Types of data

- Primary data obtained from the health officials through discussions
- Secondary data from records and registers

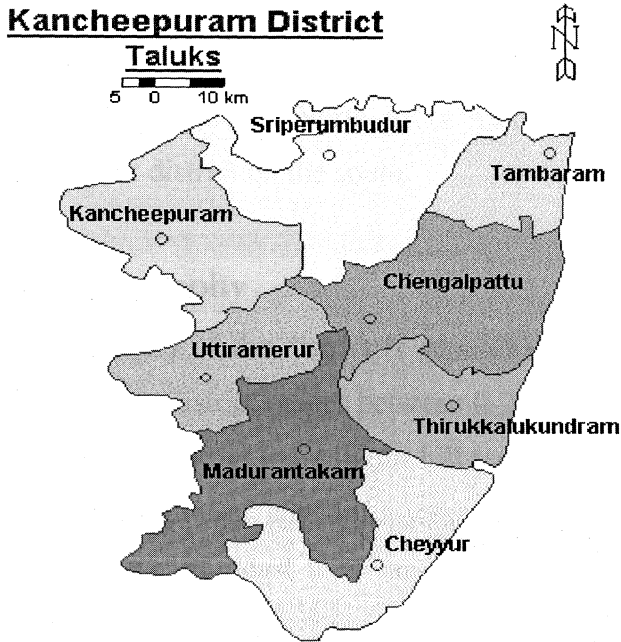
5. Description of work place

5.1. Background Information



The Tamilnadu State is situated in the south – east part of the country. Its boundaries are Kerala State in the East, the State Karnataka in the North-east, Andhra Pradesh in the North, Bay of Bengal in the East and Indian Ocean in the South. Tamilnadu has got thirty districts and Kancheepuram Revenue District is one of them. This Revenue District is divided into two health units for the purpose of administrative and revenue reasons. The

health units are Kancheepuram Health Unit District and Saidapet Health Unit District (my operational field area)



5. 2. Historical Background

Evidence of early human settlements in this region dates back to some 100,000 years ago, as witnessed by the presence of palaeolithic stone age tools near Atrampakkam , a town belonging to this district. Thondaimandalam was an ancient division of the country comprising roughly the present districts of Kancheepuram, Chennai, Tiruvallur, Vellore and Tiruvannamalai and the capital of Thondaimandalam was Kancheepuram.

As per the district administration, in 1900's the District Collector was having his head quarters at Saidapet and was assisted by a Sub Collector and two General Deputy Collectors, six Tahsildars for six Taluks. Later in 1911, the Sriperumbudur Sub Taluk was upgraded and thus the Taluk of Kancheepuram was formed. In the year 1977, the Chengleput-MGR district was splitted into two as Kancheepuram and Tiruvallur Revenue districts. The newly formed district now has 8 Taluks, 13 Blocks, 6 Municipalities, 19 Town Panchayats and 9 Rural Panchayats.

5. 3. Geographical Location

The Kancheepuram district lies between 12° 11' and 13° 35' N latitudes and 73° 34' and 80° 2' E longitudes. It is in the north-eastern portion of the state. It is bounded by the Bay of Bengal and the district of Madras on the east, Chittoor district of Andhra Pradesh state on the north, district of North Arcot Ambedkar on the west and Villupuram Ramasamy Padayatchiar district on the south.

5. 4. Topography

The topography of the district is generally flat and sloping towards the Bay of Bengal. Altitude in the district ranges between 0-200 metres above mean sea level. In the northern portion of the district the Allikuli hill ranges occur. There are many scattered hillocks in the south, south-east and north-west. The soil type found in the district is generally clayey. Along the coast it is sandy. Laterite soil occurs in the taluks of Ponneri and Tiruvallore.

5. 5. General Information

As per the 2001 census, the District has population of 30.38 lakhs , which is about 6.76% of the total State population.. The population growth per annum is 2.48 % and the population density is 592 persons per Sq.Km. The urban population is 53.48%

The total forest area in the district is 23,586 hectares. The district depends mainly on the seasonal rains. The Northeast and the Southwest monsoons contribute 54 and 36 percent of the annual rainfall. The average annual rainfall for total forest area in the district is 23,586 hectares.

Five rivers run across this district from west to east and drain into the Bay of Bengal: the Adayar, Araniyar, Cooum, Korattaliyar, and Palar (with its tributaries Cheyyar, Killiar and Vegavathi). There are a large number of irrigation tanks in the district, estimated to be between 3,644 and 4,324. Some of the larger tanks found in the district are Chembarambakkam, Cholavaram, Kulavai, Madurantakam, Red Hills, Thenneri, and

Uthiramerur. One artificial reservoir constructed in the district is the Poondi reservoir. Several estuaries with backwaters are present along the coast near Pulicat, Ennore, Kovalam and Sathurangapatnam. These backwaters are connected by the Buckingham canal.

Agriculture is the main occupation of the people with about 47% of the population engaged in it. Paddy is the major agricultural crop cultivated in about 2.92 lakh ha. Groundnut, cholam, ragi, cumbu, pulses are the other major crops grown. Fruits, vegetables and flowers are also cultivated to a modest extent. The next lead occupation of the city Kancheepuram and in and around areas of the city is silk weaving. Dairy development, sheep rearing, poultry farming are the major allied agricultural activities carried out in the district. Since the district is having a very long coast line fishing is another major occupation. The important fishing centres are Pulicat, Arambakkam, Chinnapakkam, Mamallapuram and Kovalam.

5. 6. Communications

The district has a good network of motorable roads and rail. Power and communication links are also well developed. All villages in the district are connected by motorable roads.

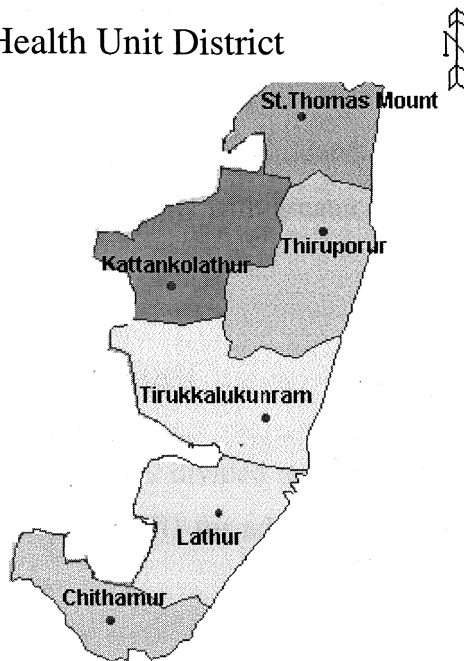
The Kancheepuram Revenue district is divided into two for administrative reasons. They are : Kancheepuram Health Unit District and Saidapet Health Unit District.

I will be describing Kancheepuram district briefly and Saidapet Health Unit district (operational field area) will be explained in detail with reference to the “Existing Health Facilities”

5. 7. Saidapet Health Unit District

Blocks of Saidapet Health Unit District

20 20 km



Saidapet Health Unit district is bounded by the Bay of Bengal and the district of Madras on the east, Chittoor district of Andhra Pradesh state on the north, revenue district of Kancheepuram on the west and Villupuram Ramasamy Padayatchiar district on the south.

Saidapet Health Unit District is roughly 60 kms in and around the Chennai city. As per the enumerated population, 2001, 30% of the total population are urban residents. But, in most of the places belonging to this area, there is no clear geographical separation of the urban and rural area.

The district has 4 Taluks, 6 Blocks, 21 Town Panchayats, 277 Village Panchayats and 5 Municipalities. It has got twenty three Primary Health Centres and one hundred and sixty eight Health Sub Centres. It has a population of 17 Lakhs. Seventy percent of the population live in Rural area and thirty percent live in the Urban area. There are five

Government Hospitals and one Medical College Hospital which serves as the Tertiary Referral Centre for the district.

The Kancheepuram Revenue district is divided into two for administrative reasons. They are : Kancheepuram Health Unit District and Saidapet Health Unit District.

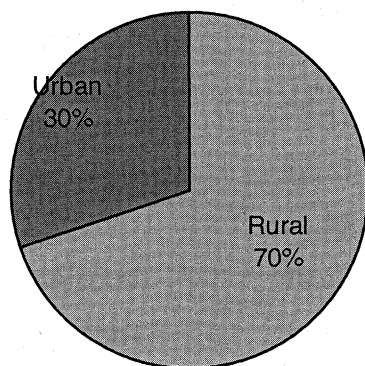
I will be describing Kancheepuram district with greater emphasis on Saidapet Health Unit district which is my operational place of work.

5. 8. Demographic Characteristics

The Revenue District Kancheepuram is divided into two Health Unit Districts (HUD) i.e Kancheepuram HUD and Saidapet HUD for administrative reasons. The Saidapet HUD has both Urban and Rural areas.

The HUD is broadly divided into Rural and Urban areas. In the rural area, there are 5 Taluks, six blocks, twenty one Town Panchayats, two hundred and seventy seven Village Panchayats and eight hundred and twenty two Villages. In the Urban area there are five Municipalities and hundred and sixty three wards.

Figure 1. Distribution of population, Saidapet district,2002



The total population of the HUD is around 17 lakhs. The Urban population constitute 30% of the total population.

Table 1. Demographic Characteristics, State, Kancheepuram Revenue district & Saidapet Health Unit District, 2002

Characteristics	State (Tamilnadu)	Revenue District (Kancheepuram)	Saidapet HUD
Population:			
Urban	27,241,553(43.86%)	15,34,731(53.8%)	5,41,795(30%)
Rural	34,869,286	13,35,189	12,39,773
Total	62,110,839	28,69,920	17,81,568
Sex ratio (per 1000 males)	939	972	NA
Life expectancy at birth:		NA	NA
Male	64.85		
Female	65.20		
Official spoken language	Tamil	Tamil	Tamil
Birth rate	19.2	16.4	18.9
Death rate	7.9	6.2	NA

Source : Census of India ,2001

Table 2. Socio - Economic Characteristics of State & Revenue District, 2001

Characteristics	State (Tamilnadu)	Revenue District (Kancheepuram)
Literacy Rate - Males	73.47	77.07
Females	82.33	85.0
Aggregate	64.55	70.0
Scheduled Caste (% of total population)	19.18	6.0
Scheduled tribe (% of total population)	1.08	5.03
Main workers to total population(%)	40.8	58.2
Total forest area in hectares	17078000	23586
Area under food grains (rice) in "000" hectares	2204	160

Source : Department of Economics and Statistics,2001

The major occupation of the people is agriculture. The Kancheepuram District is famous for “Silk Sarees” that are woven here as a small scale industry. The main workers constitute 58% of the total population. The major religion is Hinduism (>80%). There are many castes in Hinduism and a wide variety of sub sects in each caste. The cultural characteristics of each sect vary. The Scheduled caste and Scheduled tribe constitute a minor proportion of the total population i.e. 6 and 5% respectively.

5. 9. Cultural Characteristics of Revenue and Health Unit District

Ancient Kancheepuram, the city of thousand temples, is one of the seven most sacred pilgrim centres Ayodya, Madura, Maya, Kasi, Kanchi, Avanthi, Duvaragai for the Hindus. The Revenue District Kanchipuram owns 108 temples dedicated to Lord Siva and 18 to Lord Vishnu besides scores of other temples, mosques and churches. The famous Adi Shankara Mutt is also in the city of Kancheepuram . Mahabalipuram, a tourist place is known for its great edifices and magnificent temples of exquisite architectural beauty. Temple car (ratha) festivals are held in January, April and May. There are other days when the idols in the temples are taken out in procession on their respective vahanas or vehicles.

5. 10. Health seeking behaviour :

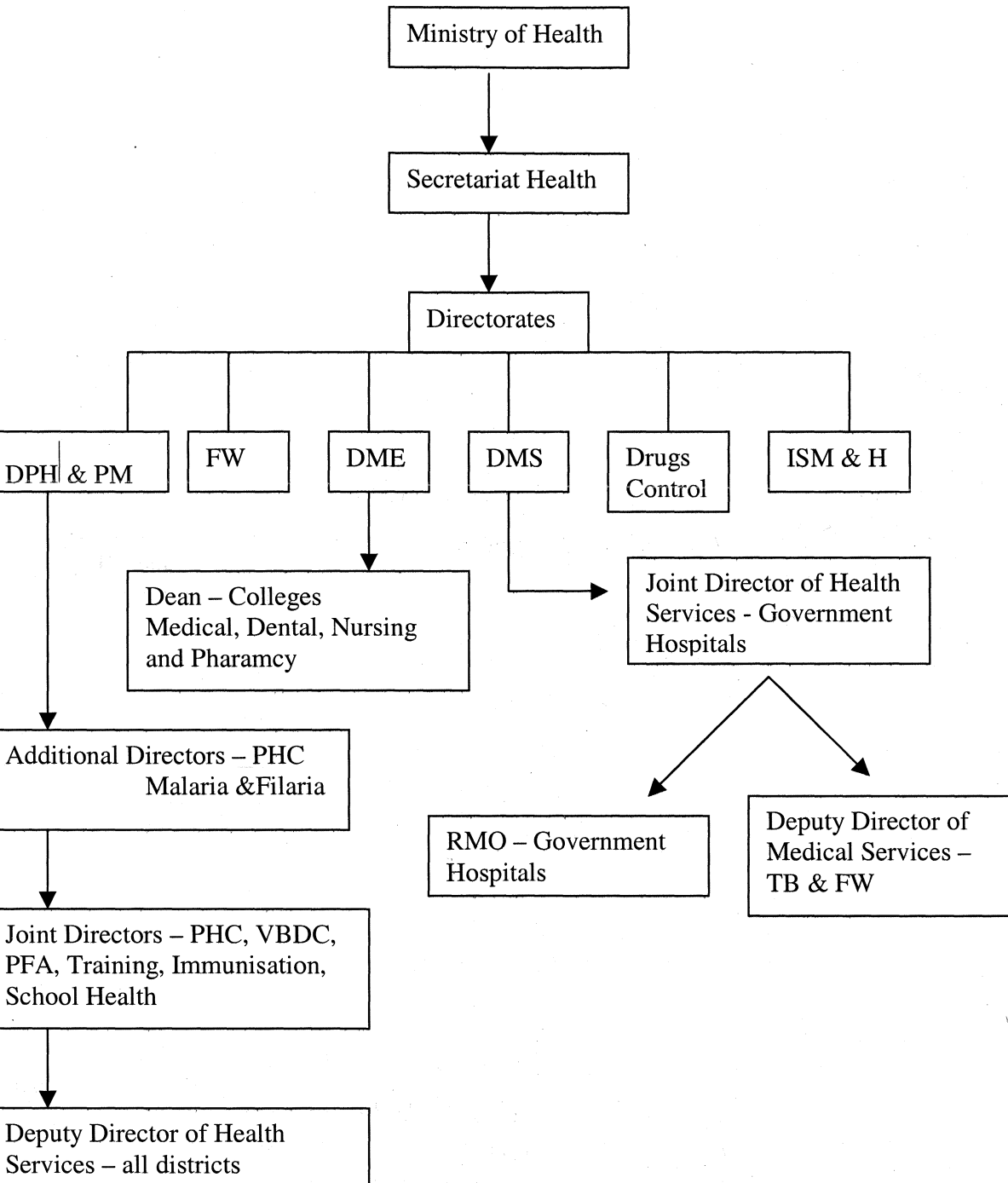
As previously mentioned, there is no clear demarcation of the urban and rural area. Due to the proximity of the district to the Capital City, Chennai, many people residing in my operational field area commute to the city for work reasons on a daily basis. The health seeking behaviour is also influenced by the same factor. It is often found that people residing in rural areas (officially) seek health care from the Secondary or Tertiary Care Centres rather than the Primary Health Centres due to better access to such institutions.

5. 11. Practices related to food :

It is customary for people in the State to add spices to food. More than seventy percent of the residents cook with gas stoves and steel vessels. Due to rapid urbanisation, the habit of eating fast foods is fast growing.

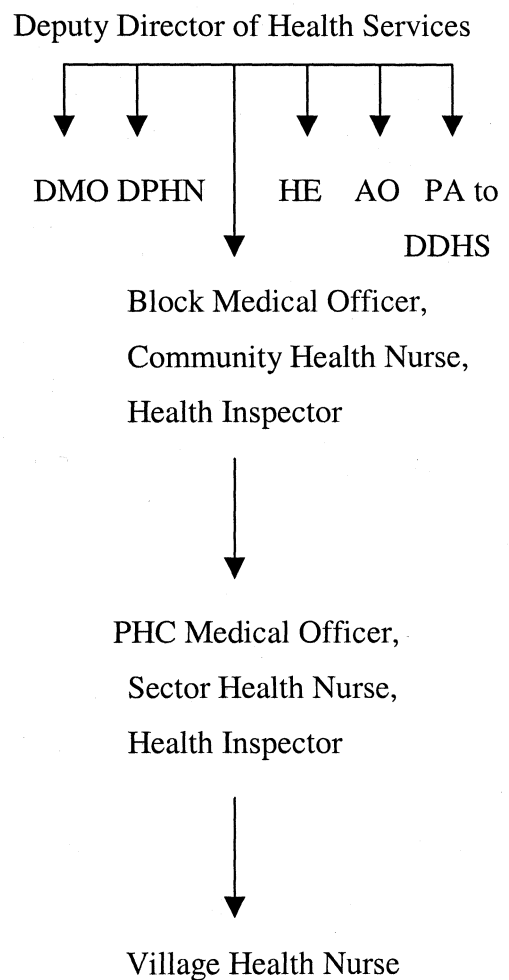
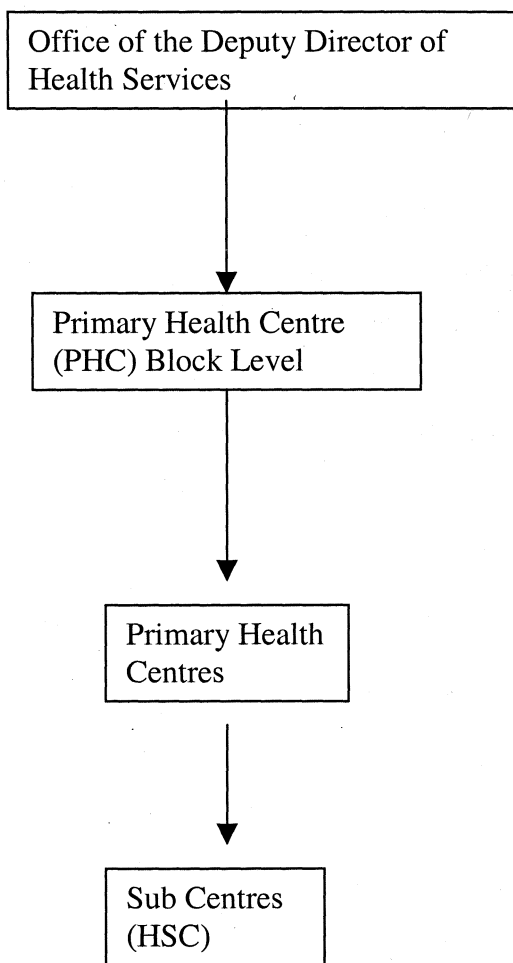
6. Work Situation Description

6.1. Organisational structure and Manpower Profile of the Health System in State



- DPH & PM – Director of Public Health & Preventive Medicine
- DMS - Director of Medical and Rural Health Services
- DME - Director of Medical Education
- FW - Family Welfare
- ISM&H - Indian System of Medicine and Homeopathy
- RMO - Resident Medical Officer

6. 2. Organisational Structure of Health System & Man power Profile in Saidapet Health Unit District



- DMO - District Malaria Officer
- DPHN - District Public Health Nurse
- PA to DDHS - Personal Assistant to Deputy director of Health Services
- HE - Health Educator
- AO - Administrative Officer

6. 3. Responsibilities at each level

Levels	Responsibilities
Ministry of Health	Policy framing
Secretary of Health	Enacting the policy framed
Directorate of PH &PM(State Level)	Primary health care Prevention of food adulteration Disease Surveillance and Prevention & control of Epidemics Implement & monitor health programmes, Training & Supervision
Deputy Director of Health Services(District Level)	Primary health care Implement health programmes Training & Supervision Collection & compilation of data
Primary Health Centre (Block level)	Primary health care Implement health programmes Training & Supervision Collection & compilation of data
Primary Health Centre	Primary health care, Implement health programmes, Collection & compilation of data
Health Sub Centre	Primary health care Implement health programmes Collection of data

6. 4. Staffing pattern

Each Block Level PHC is manned by one Senior Civil Surgeon, two to three Assistant Civil Surgeons (depending upon the population), one Community Health Nurse, five to six Health Inspectors, one to two Auxillary Nurse Mid wife (ANM), one Block Extension Educator , one to two drivers (depending upon the number of vehicles available) and Class IV workers.

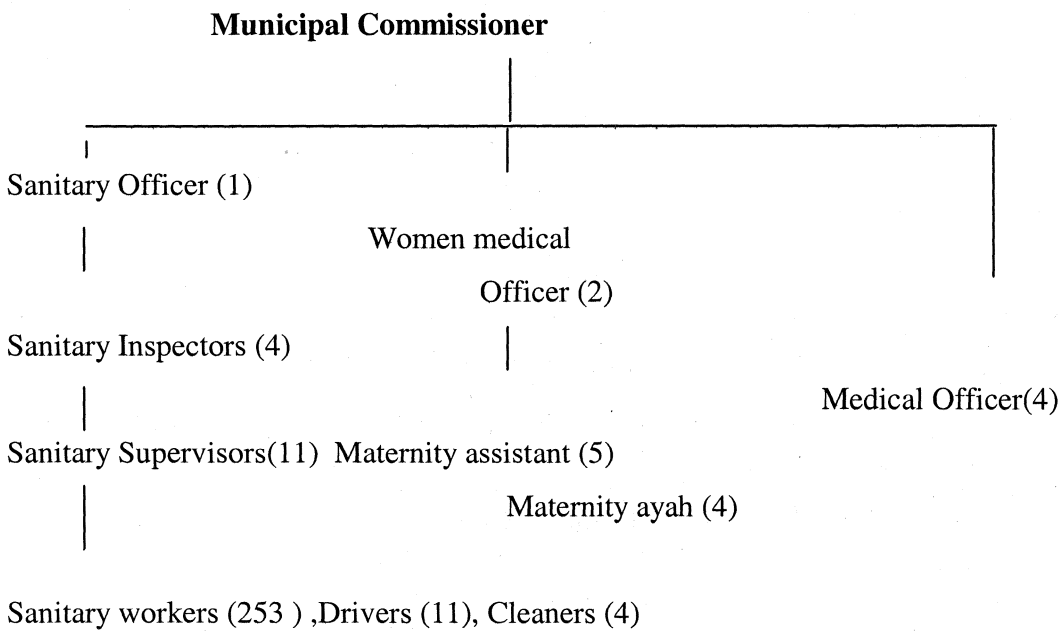
Each primary health centre is staffed with one Medical officer, one Pharmacist, one Lab Assistant , one Health Nurse, one Block Extension Educator , one ANM, two to three Health Inspectors and Class IV workers.

In each sub center, a resident village health nurse is present.

In Municipality, the Public Health Department is manned by Sanitary Officer (SO) [Health Officer Post is not sanctioned in my district] ,Sanitary Inspectors, Sanitary Supervisors and Sanitary Workers as per the population served norms of the Municipal Administration.

For example,Alandur municipality has the following organizational structure:

Alandur municipality has the following organizational structure:



6. 4. 1. Existing health facilities at Alandur Municipality

2 Maternity homes, 4 Health posts, 1 Allopathic dispensary, 1 Siddha dispensary and 2 Operation theatres are present. No laboratory facilities are present even to do the basic investigations.

6. 4. 2. Solid waste management

Door to door daily collection of garbage is made by means of one plastic bag system and two-bucket system. Collected garbage is transported by means of municipal lorries (6), tractors (4), tricycles and autos to the compost yard located at pallikaranai village. Compost manufacture process work has been handed over to Healing Medicates (P) Ltd.,

7. Health Infrastructure pattern of the HUD

Rural - There are twenty three Primary Health Centres and one hundred and sixty eight sub centers.

Urban – There are five municipalities with seven maternity centers in total

Table 3. Health Institutions by Type, Saidapet HUD,2002

Type of Institutions	Rural	Urban	Type of service	Average Bed Strength/ unit
Allopathic Hospitals				
Medical College	Nil	1	IP & OP	500
District Head Quarters	Nil	Nil	NA	NA
Non Taluk & Taluk	Nil	4	IP & OP	50
Block level PHC	6	Nil	IP & OP	20
PHC	23	Nil	OP & IP	6
HSC	168	Nil	OP	NA
ESI Dispensaries	Nil	2	OP	NA
TB Sanatorium	Nil	1	IP & OP	100
Indian System of Medicine Hospitals				
Ayurvedic	Nil	Nil	NA	NA
Unani	Nil	Nil	NA	NA
Homeopathy	Nil	2	OP	NA
Siddha	2	4	OP	NA
Local Body Hospitals				
Maternity Homes	Nil	3	OP	NA
Maternity Centres	Nil	4	OP	NA
Other Public Sector Hospital				
Defense Hospital	Nil	1	OP	NA

OP - Out Patient IP - In Patient NA - Not Applicable

The District Hospital is at the City Kancheepuram of the Revenue District Kancheepuram only. There is no separate district hospital for the Saidapet HUD.

Figure 2 shows that there is disparity in the distribution of government hospitals with one block having three and three blocks having none. Figure 3 shows that the distribution of PHCs and HSCs. Except for three smaller blocks all other blocks have about 30 HSCs .

Figure 2. Distribution of Government hospitals, Saidapet Health Unit District, Tamilnadu, 2002

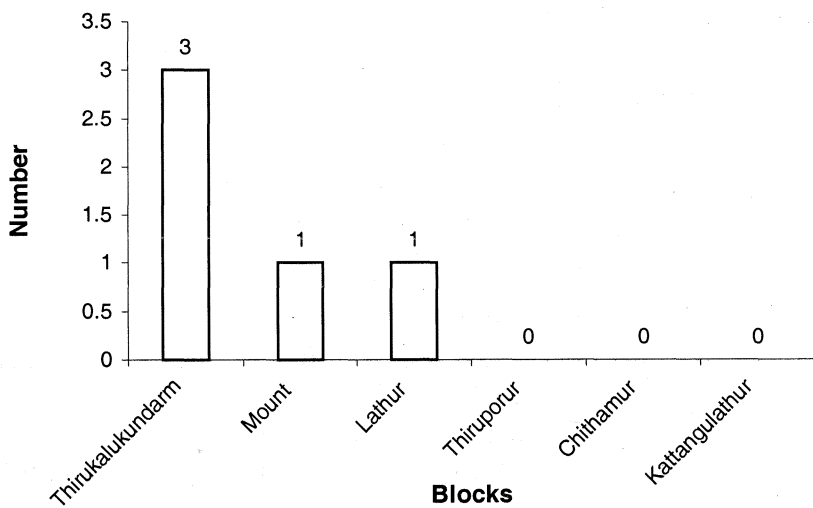
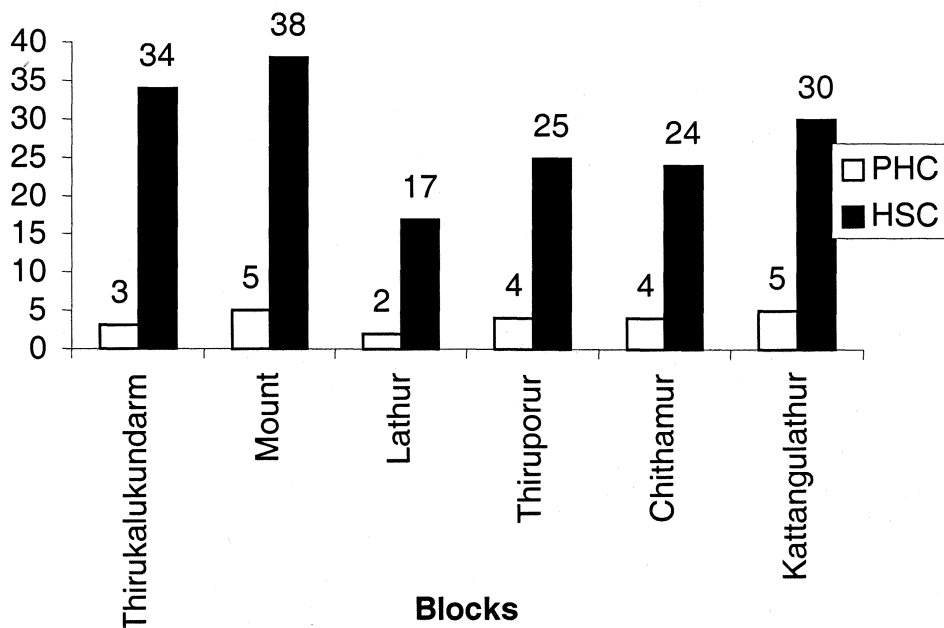


Figure 3. Distribution of PHC and HSC Blockwise, Saidapet district, Tamilnadu,2002



7. 2. Private hospitals

Table 4. Private Sector Hospitals in Saidapet HUD,2002

Accredited Speciality Hospitals	2
Hospitals with scan and basic laboratory facilities	20
Hospitals with Accredited Blood Banks	1

The number of bed strengths, man power availability and the services available are variable for each of the Private hospital (Annexure III)

Hindu mission hospital , Tambaram

This hospital is a 100 bedded one and this was the hospital I visited to describe the health facilities available.

Available Health Facilities

- Out patient services for general medicine, surgery, ENT, Ophthalmology, Dental, Orthopedic, Paediatric and Obstetric and gynecology.

- Special clinics like neurology and infertility clinics are being conducted by Specialists once a week.
- Laboratory facilities for basic blood investigations like hemoglobin ,total count, differential count, erythrocyte sedimentation rate, smear examination for malaria, urine examination for albumin, sugar, bile salts, bile pigments,blood sugar, urea are available.
- Special investigations like – Widal , VDRL, Liver function test, Thyroid function test, Semen examination are done here.
- Other facilities like X-ray and Sonogram are available

8. Health Statistics

Table 5. Vital Statistics of State, Kancheepuram Revenue district and Saidapet HUD, 2000

Indicators	Tamilnadu	Kancheepuram District	Saidapet HUD
Birth rate	18.3	17.6	19.46
Death rate	6.0	5.4	NA
Infant mortality rate	36.0	29.0	14.6
Maternal mortality rate	1.4	1.5	0.84
Still birth rate	15.7	11.6	7.95

Source : Survey conducted by D&E cell, DFW, 2000

9. Disease Burden , Saidapet Health Unit District, 2002

10. National Health Programmes in Saidapet HUD

Some of the functioning programmes in my operational field area are:

1. Revised National Tuberculosis Control Programme (RNTCP)
2. National Anti Malaria Control Programme (NMCP)
3. Reproductive and Child Health (RCH)
4. National Filaria Control Programme
5. National Leprosy Eradication Programme
6. National Programme for Control of Blindness
7. National AIDS Control Programme
8. National Nutritional Anemia Prophylaxis programme
9. National Iodine Deficiency Control Programme

11. Linkages Between Sectors

- a. Within the health sector
- b. Other sectors.

1. Linkage between DD – TB, DD – Medical, DD - Leprosy
2. Institute of child Health, Egmore
AFP ,Dengue surveillance
3. King Institute, Guindy
AFP,Dengue surveillance
food, water analysis
stool examination
strain identification
4. All head quarters hospitals

Figure 4. Distribution of Disease burden, Saidapet Health unit District, 2002

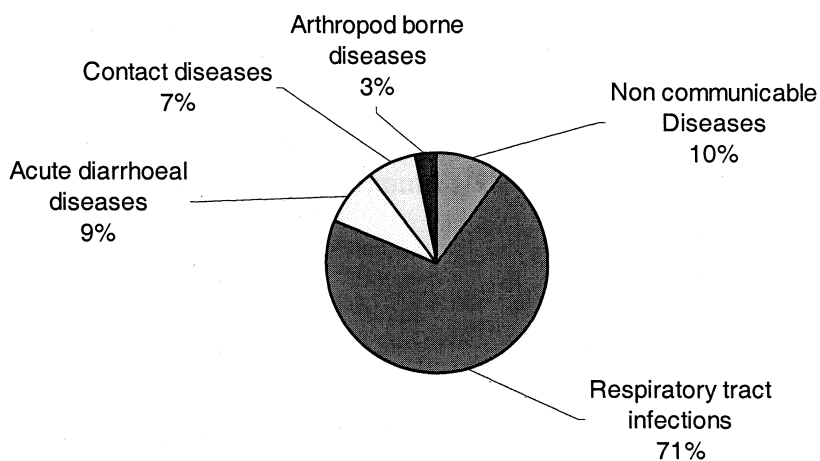


Figure 4 shows that Communicable Diseases continue to constitute 90% of the disease burden while Non Communicable Diseases contribute to only 10% of it. Among the Communicable Diseases, the major prevailing problem in the Saidapet HUD is the Respiratory tract infections which constitute 71% of the total disease burden. Respiratory tract infections are followed by Acute Diarrhoeal Diseases (9%), Contact Diseases (7%) and Arthropod Borne Diseases (3%)

This scenario could very well be due to the in-migration, rapid urbanisation and the life style changes of the people. It is rare to find a house without a vehicle in these modern days and hence, the whole atmosphere is polluted with a wide variety of pollutants. Inadequate and at times lack of supply of potable drinking water and poor sanitary facilities present in most of the rural areas could be the reason for the 9% contribution of the ADDs to the total disease burden .

The constant tension which is part and parcel of residing in a peri-urban area and working in the city which is the case in most of the population of this district, could very well lead to Hypertension and Accidents and Injuries. Life style changes attributed to urbanisation is an added factor that lead to NCDs. Smoking and fast food consumption are on the rise in peri-urban communities. The detailed morbidity profile is provided in Annexure IV.

10. National Health Programmes in Saidapet HUD

Some of the functioning programmes in my operational field area are:

1. Revised National Tuberculosis Control Programme (RNTCP)
2. National Anti Malaria Control Programme (NMCP)
3. Reproductive and Child Health (RCH)
4. National Filaria Control Programme
5. National Leprosy Eradication Programme
6. National Programme for Control of Blindness
7. National AIDS Control Programme
8. National Nutritional Anemia Prophylaxis programme
9. National Iodine Deficiency Control Programme

11. Linkages Between Sectors

- a. Within the health sector
- b. Other sectors.
 1. Linkage between DD – TB, DD – Medical, DD - Leprosy
 2. Institute of child Health, Egmore
AFP ,Dengue surveillance
 3. King Institute, Guindy
AFP,Dengue surveillance
food, water analysis
stool examination
strain identification
 4. All head quarters hospitals

Reporting of cases

Sample collection, confirmation of diagnosis and treatment **OR**

Sample collection and transportation to the referral centers

7. Infectious disease hospital, Tondiarpet

Confirmation of diagnosis of cholera and treatment

Treatment of all diarrhea diseases

8. Madavaram Laboratory.

Confirmation of leptospirosis

7. Private Hospitals

Nambi Hospital

Renga Hospital, Chengleput for leptospirosis reporting

8. Non -governmental organization

REWSEC, ASSEFA - Volunteers stay at Nerumbur PHC during night hours and assist in conducting deliveries.

- Help in transportation

- depute drivers especially during night at Pounjur PHC in case of emergencies.

11.1. Other Linked Sources:

10. 1. 1. Integrated Child Development Scheme (ICDS)

The general objectives of ICDS is to:

1. Improve the nutritional and health status of children below the age of 6 years
2. Lay the foundation for proper physical, psychological and social development of the child
3. Reduce the incidence of mortality, morbidity, malnutrition and school drop outs
4. Achieve co ordination of policy and implementation among various departments to promote child development
5. Enhance the capability of mother to look after the normal health and nutritional needs of the child through proper health and nutrition education

11. 1. 2. Public Health engineering

Though five rivers are flowing through the district, water availability is a major issue, ranging from 5 lpcd to 47 lpcd by piped water distribution system. The average service level remains at around 20 lpcd, which needs to be improved.

Service Level (LPCD)	No of habitations
0	0
1-10	97
11-20	1029
21-30	666
31-39	447
40-55	741
56 & ABOVE	433
Total	3413

Water Quality

Water Quality is periodically assessed for various parameters and thus quality assurance is maintained. Over the last several years, water quality in villages adjoining urban and industrial areas has deteriorated owing to sewage and effluent inflow into water bodies. This is evident in some pockets surrounding Kanchipuram, Pallavaram and Tambaram municipalities as well industrial areas in Thiruporur, Kelambakkam, etc. This trend needs to be arrested.

There is no water purification plant in the district.

11. 1. 3. Local Administration

Waste disposal is being carried out by sanitary workers in the municipality area. Recently from the year 2001, waste and garbage disposal is being done on a door to door collection basis. Though this system is not functioning fully, in the areas where it is being implemented, it is reported to be successful in creating and motivating the people to dispose waste in a proper sanitary manner. Otherwise also, the waste is collected by the municipal administration on a daily basis by means of vehicles and dumped in a yard marked for disposal by the health authorities. Sewage Treatment Plant is not present in my operational field area.

11. 1. 4. Educational Institutions

There are 638 Government schools (445 primary, 100 middle, 50 high and 43 higher secondary schools) in the district. One private dental college is present. One Government Medical college (Chengleput Medical College) is present. The school enrollment and drop out rate is not available.

12. Priority areas of concern

- The health needs of the urban population, which constitutes one third of the Saidapet district total population is not met by the Government sector.
- Access to the existing health facilities remain a major problem.
- The existing rural health infrastructure is not adequate for epidemic preparedness and early detection and response.

Thirty four of the one hundred and sixty eight health Inspector posts are vacant. Sadras – a main PHC does not have a phone facility. Pounjur & Chunambad – main PHCs do not have ambulance.

- Laboratory facilities at the primary health centers are not sufficient.
- Logistics problems are present.

13. Discussion

13.1. Unmet urban health needs

Thirty percent of the total district population is urban. There are only thirteen health posts present when compared to that of the twenty three primary health centers and one hundred and sixty eight sub centres.

Nearly seventy percent of the urban population seek health care from the private hospitals.

In the existing Government health facilities also adequate facilities like operation theatre and laboratory are not available. On the whole, the urban health care system is merely functioning as a curative structure only. Early detection of diseases is not possible with this facility.

13.2. Accessibility to existing health facilities

There is disparity in the availability of health facilities within the block itself. The block (St.Thomas Mount) which is having 39% of the total district population has only one FRU whereas the block (Thirukalukundram) having 13% of the total population has three FRUs.

Even with the existing rural health facilities, there lies the problem of distance and accessibility. For example, there are some primary health centers like Reddipalayam and Othivakkam where there are no direct transportation facilities. The only means of reach is by walk.

Another area of problem is the distance people have to travel when they are referred for speciality services. For example, people of the Chunambedu primary health center prefer to go to Jawaharlal Nehru Institute of Post Graduate medicine and Research Hospital (JIPMER) rather than going to the Chengelpet medical College hospital (CMC) which is the referral center for the district, Saidapet as Jipmer Is only 30 kms away while CMC is much farther away.

13.3. Inequality in the division of the Primary health centers

There is inequality in the division of the primary health centers with respect to the population served. For example, St.Thomas Mount block has a population of 4,66,469 and Kattankulathur block has a population of 2,33,708 whereas the Governmental norms suggested for a Block PHC is only 1,00,000. Block like Lathur do not even have a population of one lakh (population – 83,221).

This disparity should be looked upon at the earliest. Sooner or later the blocks with higher population are sure to wear down as we do not have the needed infra structure to support the additional load.

14. Recommendations

- Existing health infrastructure to be strengthened.
- Access to the available health facility to be augmented.
- The disparity in the distribution of primary health centers with respect to the population served to be addressed.
- Periodic training to the health personnel is to be made.
- Unmet needs of the urban population to be addressed.

Annexure I

Enumerated Population, Census 2001

Name Of The Block	Name Of The PHC	No. of HSC	Population	Block Total
Rural				
St.Thomas Mount	Medavakkam	5	77630	530538
	Pozhichalur	12	125345*	
	Peerkankaranai	7	92542	
	O.Thoraipakkam	7	147083	
	Moovarasampet	7	87938	
Kattangulathur	Nandivaram	6	87470	247229
	Othivakkam	6	33936	
	Reddipalayam	6	29338	
	Maraimalainagar	6	60176	
	Kunnavakkam	6	36309	
Thiruporur	Kelambakkam	6	45317	136882
	Thiruporur	7	41994	
	Sembakkam	6	25799	
	Sirukundram	6	23772	
	Thirukazhukundram	12	69916	
Chitamur	Nerumbur	12	47329	155043
	Vallipuram	10	37798	
	Cunampet	6	33214*	
	Polambakkam	6	29804*	
Lathur	Idaikalainadu	6	24975	109559
	Per.kayapakkam	6	31566	
	Pavunjur	11	50382	
	Koovathur	6	32240	
Urban				
Alandur				159600
St.Thomas Mount				40450
Pallavaram				131400
Tambaram				127900
Chengleput				59600

Annexure II

Staff vacancy position in rural area, Saidapet district

Personnel	No.of.Vacancy
Medical officers	4
Pharmacist	1
Statistical assistant	1
Health Inspector Grade I	29
Health Inspector Grade II	5
Lab assistant	4
Block health supervisor	1
Sector health nurse	6
Female nursing assistant	3
Hospital worker	5
Drivers	5
Mazdoors	4

Annexure III

List of Private Hospitals, Saidapet HUD

1. Accredited Specialty Hospitals in Saidapet District

1. Deepam Hospital, Chrompet
2. J.S.P Hospital, Chengleput

2. Hospitals with registered blood banks

1. Government Hospital for Thoracic Medicine
2. Government Hospital, Chrompet
3. Chengleput Medical College Hospital
4. Hindu Mission Hospital, Tambaram

3. Hospitals with ultrasonogram facilities

Tambaram

1. Hindu Mission Hospital
2. A.G Hospital
3. Philips Hospital
4. Christudas Hospital
5. Doctor's Cardiac Care Centre

Chrompet

1. Venkateswara Hospital
2. Akash Hospital
3. R.K Hospital

Chengleput

1. Nambi Nursing Home
2. Balaji Hospital
3. Renga Nursing Home
4. J.S.P Hospital

Pallavaram

1. Lakshmi Nursing Home
2. Shanthi Nursing Home

Hospitals with ultrasonogram facilities (contd.)

St.Thomas Mount

1. S.P Hospital
2. St. Thomas Mount Hospital
3. Sundar Health Care Centre,

Guduvanchery, Kattankolathur Block

Muthaiah Medical Centre

Annexure IV. Morbidity Profile of State and Saidapet HUD,2002

Diseases/ Related Problems	State Average*	Saidapet HUD*
Anemia	1.6	2
Vitamin A Deficiency	0.4	0.5
Vitamin B Deficiency	1.1	1.4
Kwashiorkar/Marasmus	0.03	0.12
Non Communicable Diseases		
Heart Diseases		
Congenital	0.01	0.17
Rheumatic	0.06	0.07
Ischemic	0.01	0.01
Hypertension	0.3	0.34
Diabetes Mellitus	0.22	0.2
Cancer	0.004	0.01
Accidents &Injuries	0.89	1.1
Contact Diseases		
Leprosy	0.04	0.04
STI	0.31	0.42
Respiratory Tract Infections		
Chicken pox	0.002	0
Measles	0.002	0.0004
Whooping Cough	0.02	0.04
Diphtheria		0.0004
Tuberculosis	0.07	0.04
Bronchial Asthma	1.3	1.02
Pneumonia	0.2	0.2
Other Respiratory Infections	5.1	6.53
Arthropod Borne Diseases		
Malaria	0.01	0.02
Filaria	0.02	0.1
Dengue fever		0.001
Viral Fever	1.23	1.02
Other fevers	31.1	3.6
JapaneseEncephalitis	0.02	0.1

* per 1000 population

Annexure V

Infra structure Support

Name of the Block	Name of the PHC	MO VHN				Infra Structure			
		S	IP	S	IP	Land	Building	Phone	Vehicle
St.Thomas Mount	Medavakkam	3	3	5	5+	+	+	+	+
	Pozhichalur	2	2	12	11+	+	-	-	-
	Peerkankaranai	2	2	7	7+	+	-	-	-
	O.Thoraiyakkam	2	2	7	7-	-	-	-	-
	Moovarasampet	2	2	7	7+	+	-	-	-
Kattangulathur	Nandivaram	3	2	6	6+	+	+	+	+
	Othivakkam	2	2	6	6+	+	-	+	-
	Reddipalayam	2	1	6	6+	+	-	-	-
	MaraimalaiNagar	2	1	6	6-	-	-	-	-
	Kunnavakkam	2	2	6	6+	+	-	-	-
Thiruporur	Kelambakkam	3	3	6	6+	+	+	+	+
	Thiruporur	1	1	7	7+	+	-	+	-
	Sembakkam	2	1	6	6+	+	-	+	-
	Sirukundram	2	1	6	6+	+	-	-	-
Thirukalukundra m	Sadras	3	3	12	12+	+	-	+	+
	Nerumbur	2	2	12	12+	+	-	-	-
	Vallipuram	1	1	10	10+	+	-	+	-
Chithambur	Cunampet	2	2	6	6+	+	+	+	-
	Idaikalainadu	2	2	6	6+	+	-	-	-
	Polambakkam	2	1	6	6+	+	-	+	-
	Periyakayapakkam	2	2	6	6+	+	-	-	-
Lathur	Pavunjur	2	2	11	11+	+	-	+	-
	Koovathur	2	2	6	6+	+	-	+	-

S – Sanctioned

IP – In position

Chapter 2. Laboratory Facilities In Saidapet Health Unit District,

Tamilnadu

1. Introduction:

Availability of adequate laboratory support in terms of existence and adequacy is a pre requisite for successful implementation of any national programme in any given area. It also serves as an integral part of the surveillance system .For example, the laboratories are very much involved in the diagnosis of a disease and tracing the source of infection. It plays a vital role in the early detection of an outbreak. The other services include detection of new disease agents, quality control of biologicals and to find out natural foci of infection like Plague and Leptospirosis

Tamilnadu is a better performing State in health front ranked next to Kerala (Family Welfare Year Book 2000). The most common outbreak in Tamilnadu is acute diarrhoeal diseases spread all over the State. There has been “Zero reporting” of Polio cases for the past three years.

In Saidapet district in the past five years there have been outbreaks of acute diarrhoeal diseases and cholera every year. There has been an outbreak of dengue fever in this district for the past three years. Given this background, this exercise was undertaken to identify and describe the existing laboratory facilities in Saidapet Health Unit District in the context of Surveillance and Epidemic preparedness and Response.

2. Objectives:

The objectives of this exercise are to:

1. Identify the existing laboratory facilities in Saidapet Health Unit District
2. Describe the prevailing laboratory facilities
3. Identify the lacunae (if any)
4. Suggest recommendations to bridge the identified gaps

3. Methodology:

- Study area - Saidapet Health Unit District
- Study period - 18.8.2002 – 25.8.2002
- Type of data - Primary & Secondary
- Sources of data - Interview of Health Personnel of different categories
Questionnaire administration to laboratory staff

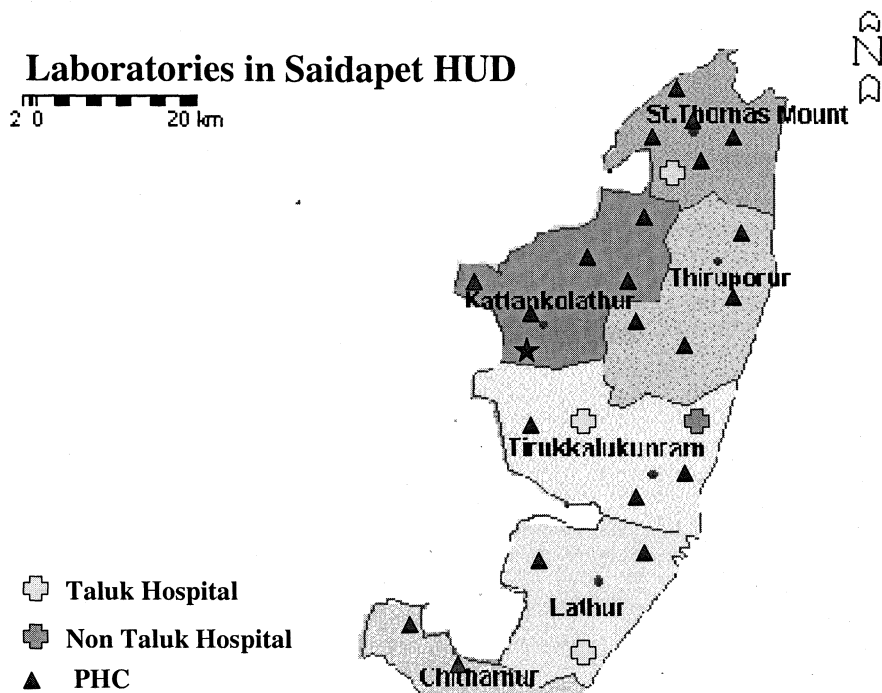
(Annexure VI)

Records and registers from laboratories at various levels

Background:

Saidapet Health Unit District covers the in and around area of Chennai, the capital city of Tamilnadu. The total population of this district is about seventeen lakhs (2001 Census). Rural : There are six blocks which in turn has a total of twenty three primary health centres and one hundred and sixty eight subcentres. There are five government hospitals which includes one district level hospital at Kancheepuram, three taluk hospitals at Cheyyar, Pallavaram and Thirukazhukundram and one non taluk hospital at Mammallapuram.

The referral hospital is the Chengleput Medical College Hospital which is about sixty kilometres from the heart of the Chennai city. Urban : There are five municipalities in this district.



3. 2. Data Collection:

I selected one each of the subcentre, primary health centre, block level primary health centre and Government hospital on a convenient sampling method. I visited the referral hospital i.e. Chengleput Medical College Hospital.

I had informal meetings with the Deputy Director of Health Services, Saidapet Health Unit District, Dean of the Medical College and the hospital Superintendent and explained the purpose of the exercise and got their official permission .

I visited the selected units and had discussions with the Civil Surgeon , Assistant Surgeon in the block level primary health centre and primary health centre respectively. I met the Assistant Professors of Microbiology, Biochemistry Departments.

I administered the questionnaire to the laboratory assistants and collected the data accordingly.

My discussions with the Deputy Director of Health Services revealed that the facilities in the primary health centre, block level primary health centre,

Government hospital (excluding District level Hospital) remain the same throughout the district. This was further supported by the district level and State level reports. There was not any discrepancy between the information I had collected and these reports. Hence, I will be describing the existing laboratory facilities as per the available reports.

4. Description of the existing laboratory facilities

4. 1. Diseases of outbreak potential:

Acute diarrhoeal diseases and Cholera

Dengue fever

Malaria

Leptospirosis

Typhoid, Polio

Food and water borne diseases

Table 6. Existing Scenario with respect to Laboratory facilities

Type	Total Units	No of Units with Laboratory	Manpower
Government Institutions			
Medical College Hospital	1	1	6
District hospital	1	1	2
Taluk & Nontaluk hospital	5	5	8
Block PHC*	6	6	7
Primary health Centre	23	23	21
Health Sub Centre	168	Nil	Nil
Urban Local Body Institutions			
Municipality	5	Nil	Nil
Private Institutions			
Hindu Mission Hospital	1	1	4
Major Private Hospitals**	4	4	10
Defense Hospital	1	1	2

*Primary Health Centre

**Hospitals with more than 50 beds

The exact number of private microbiological laboratories could not be estimated as there are many in the area. I visited two of them to see the facilities available. I found that mostly they are conducting baseline hematological investigations only.

4.2. Existing laboratory facilities with respect to diseases of outbreak potential

Type	Equipments available*	Type of tests	Average Load per day
Government Institutions			
Medical College Hospital	Simple, compound, dark ground microscopes, Centrifuge, Colorimeter, Glucometer, Test tubes, reagent solutions, incinerator, hot air oven, spectrophotometer	Peripheral Smear Culture-blood, urine, stool, sputum, pus, throat swab, vomitus Tests –Biochemical, Microbiological, hematological, serological tests	30 2-10 50 5-10 100 20
District hospital	Simple microscope, Test tubes, reagent solutions, Colorimeter, autoclave, incubator	Peripheral Smear Culture-blood, urine, stool, sputum, pus, water, throat swab, vomitus Tests –Biochemical, Microbiological, hematological, serological tests	20 2-5 5 5 50 10

**Existing laboratory facilities with respect to diseases of outbreak potential
(contd.)**

Taluk & Nontaluk hospital	Simple microscope, Colorimeter, Test tubes, reagent solutions	Peripheral Smear	20
		Tests –Biochemical,	20
		Microbiological,	10
		hematological,	100
		serological tests	20
Block PHC	Simple microscope, Test tubes, reagent solutions	Peripheral Smear	15-20
		Tests –Biochemical,	5-10
		hematological,	15-20
		serological tests	2-5
Primary health Centre	Simple microscope, Test tubes, reagent solutions	Peripheral Smear	10-15
		Tests –Biochemical,	2-5
		hematological,	5-10
		serological tests	Variable

4. 3. Existing private laboratory facilities with respect to diseases of outbreak potential

Hindu Mission Hospital	Simple, compound, dark ground microscopes, Centrifuge, Colorimeter, Glucometer, Test tubes, reagent solutions,	Peripheral Smear Tests –Biochemical, hematological, serological tests Culture-blood, urine, stool, sputum, pus, water, throat swab, vomitus	10-20 30-50 100-150 20-40 Variable
Major Private Hospitals**	Simple, compound, dark ground microscopes, Centrifuge, Colorimeter, Glucometer, Test tubes, reagent solutions	Peripheral Smear Tests –Biochemical, hematological, serological tests	5-10 5-10 10-20 Variable
Defense Hospital	Simple, compound, dark ground microscopes, Centrifuge, Colorimeter, Glucometer, Test tubes, reagent solutions	hematological, serological tests	2-5 Variable

*Equipments which are needed for detecting diseases of outbreak potential

**Hospitals with more than 50 beds

4.4. Existing laboratory facilities with respect to the diseases of outbreak potential and level(s) at which they are available

Diseases	Type of test	Level(s)/ Institutions at which available
Acute diarrhoeal diseases	Stool Culture	District Hospital Medical College Hospital Hindu Mission Hospital
Cholera	Hanging drop	District Hospital Medical College Hospital
Malaria	Peripheral Smear	All levels Private Institutions
Leptospirosis	Serological Test	Medical College Hospital Private Institutions
Dengue	Serological test	Not available
Typhoid	Widal	District Hospital Block level PHC
	Blood culture	District & Medical College Hospital
Food and water diseases	Chemical, bacteriological tests	Not available
Poliomyelitis	Stool Culture	Not available

4.5. Existing Referral laboratories

1. King Institute of Preventive Medicine, Guindy, Chennai
2. Infectious Disease Hospital, Tondiarpet
3. Institute of Child Health, Egmore, Chennai
4. Madhavaram Laboratory, Chennai
5. Laboratory at the Directorate of Public Health and Preventive Medicine, Chennai
6. Central Malaria Laboratory, DMS Complex, Chennai

5. Networking of laboratories in Saidapet Health Unit District:

Saidapet Health Unit District is situated very close to the city of Chennai and hence a good networking of the governmental laboratories is present on a routine basis. The networking of these laboratories with the primary health care set up are as follows:

5.1. King Institute, Guindy

Stool samples are sent routinely from the primary health centres as and when an outbreak of acute diarrhoeal diseases occurs for detection of *Vibrio cholerae*. Confirmation of polio myelitis cases is done here. It serves as the Government reference laboratory for water analysis. The other services of this Institute is described in detail in the following paragraph.

The various departments which are functioning and closely linked with that of the surveillance system are:

1. The Department of Biological Control
2. Diagnostic Department
3. Department of Virology
4. Blood Bank and
5. Media Section are few of them which are closely linked with that of the surveillance system.

5. 1. 1. Diagnostic Department :

The Department comprises of three sections namely :

1. Clinical Microbiological Section
2. Serology Section
3. Therapeutic Vaccine Section

The diagnostic services available are :

- Microbiological analysis of clinical specimens and food samples and serological tests at nominal charges.

- Stool samples are being received from Primary Health Centres throughout TamilNadu, for detection of Vibrio Cholerae.
- In the event o an epidemic like Typhoid, Cholera etc., stool, blood and other suitable clinical samples are collected and analysed, enabling the Public Health authorities to control the epidemic.
- Besides, samples of food served to Very important persons visiting Chennai are also analysed.

5. 1. 2. Department of Virology :

This, established in 1969, has an excellent tissue culture lab, facilitated its designation as National Polio Laboratory in 1993 and the subsequent accreditation by WHO in 1995, as one of the laboratories in Global Network.

Role of National Polio Laboratory :

1. Confirmation of Polio cases
2. Isolation and identification of the virus
3. Monitors potency of oral polio vaccine
4. Imparts training to medical personnel

Arbo viral centre has started functioning where investigations for Japanese encephalitis and Dengue are being carried out. Viral investigations are also carried out for

Coxsackie –B, Herpes, and Measles infections.

5. 1. 3. Media Section :

40 different types of media are prepared and supplied to all Departments for use in vaccine manufacture, diagnostic and research activities. The alkaline buffer salt transport media is prepared and supplied free of cost to Primary Health Centres and all Health Units functioning under the Government of TamilNadu, to enable them to send stool samples for isolation of vibrio cholerae.

5. 1. 4. Water analysis Laboratory :

This is in function ever since 1924 and is under the control of the Directorate of Public Health since 1959.the lab has the following wings :

1. Water Biology
2. Medical Biology
3. Rural water supply wing

The Chief Water Analyst Laboratory serves as the Government Reference Laboratory.

Activities :

1. Regular water quality monitoring
2. Analysis of water, waste water, sewage water, treatment chemicals like bleaching powder, alum , chlorine tablets etc., received from private parties, industries, consultants, Government organizations on requisition and payment of analytical fees fixed by the Government
3. Co-ordinates with the Directorate of Public Health and undertakes field investigations in an epidemic.
4. Spot monitoring done by the staff during fairs and festivals, conferences.,

5. 2. Infectious Disease Hospital, Tondiarpet

This hospital serves as the nodal hospital for the area in and around Chennai city whenever an outbreak of acute diarrhoeal diseases occur. Patients are referred and admitted here for treatment . Detection of *Vibrio Cholerae* is done here and the same is notified to the concerned authorities regularly.

Other than this as a cross verification method, the Health Inspectors from the Saidapet Health Unit District visit this Institute on a weekly basis to collect data regarding any admission from their area. During these visits, they make enquiries regarding the *Vibrio cholerae* detected cases and ensure that they do not belong to their area. If found that there is/are case(s) belonging to their area, they immediately notify the Deputy Director Of Health Services and undertake an outbreak investigation for containment of further spread.

5. 3. Institute of Child Health, Egmore

Pediatric aged children from this district are routinely referred to this hospital for Acute Respiratory Infections, Meningitis etc., as this hospital has better facilities than the identified tertiary hospital of the district i.e Chengleput Medical College Hospital. Moreover, since most of the area of this particular district is a peri urban area, people find it much more convenient to attend this institution than the medical college hospital in terms of access and availability of better services.

5. 4. Madhavaram Laboratory

This laboratory serves as a reference centre for confirmation of Leptospirosis cases by Macroscopic Slide Agglutination Test (MSAT) and Microscopic Slide Agglutination Test (MAT).

5. 5. Laboratory at the Directorate of Public Health and Preventive Medicine, Chennai

This laboratory is situated in the Directorate of Public Health and Preventive Medicine Complex and this serves as a Public Health Laboratory.

5. 6. Central Malaria Laboratory , Chennai

This is situated in the Directorate of Public Health and Preventive Medicine Complex and this serves as a laboratory which monitors the quality control of the slides for the vector borne diseases like malaria. The trend of the diseases is being analysed here on a routine basis and early alert is being issued whenever they suspect an impending outbreak of malaria.

Quality control

The quality of the slides are maintained by external cross checking of the slides. Ten percent of the slides from the district are sent for cross verification on a monthly basis. Five percent of the slides are sent to the Zonal Entomological Team, Vellore, two point five percent each to the Family Welfare Office, "Rajaji Bhavan", Chennai and Institute of Vector Borne Diseases, Hosur. Feedback from these institutes constitutes an effective ongoing surveillance of the malaria.

6. Discussion

As previously mentioned this district is very closely situated to the Chennai city which has got very many facilities than the tertiary referral centre of Chengleput Medical College Hospital. Hence, it can be seen that the health personnel themselves routinely refer patients to the already described referral centres as when it is warranted. This practice helps people in avoiding unnecessary delays and these centres are situated in such locations so that people can very easily access them also.

It is very much evident that the existing facilities in the primary health centres and the taluk level hospitals are adequate to have the very basic hematological investigations like hemoglobin estimation, urine sugar and albumin and identification of the malarial parasite in the peripheral smear only. Though facilities like stool culture and cerebrospinal fluid culture are present in the Medical College Hospital, it is often found that since the Polio Referral Centre (King Institute) , the Infectious Disease Hospital and the Institute of Child Health is very near, the health personnel are referring to these centres. This practice though ensures the availability of the best of the care for the patients without any delay, on the other hand might sometimes cause over burden of the referral centres which should viewed with some caution.

It is also very clear that the urban local body institutions do not have even the minimum basic facilities which at present the primary health centres have.

On the whole, it appears that the existing facilities in the primary health care set up do not seem adequate in terms of surveillance and outbreak response to diseases having outbreak potential. But, with the prevailing system of a well coordinated network with other referral laboratories, this is not a major problem in this district as has been evident in the past outbreak managements. The present network is in fact geared to increase its potentiality in terms of man power, equipments and other necessary facilities.

7. Identified lacunae

One major lacunae is the lack of full fledged inter- sectoral coordination with the private sector. I say “lack of full fledged” because there is in fact networking with the private hospitals in this district but only for one disease Leptospirosis. Only two private nursing homes Renga and Nambi Nursing homes, Chengleput serve as a sentinel centre for this disease.

8. Recommendations

Inter-sectoral coordination with private institutions to be strengthened. There are many r private institutions which serve a larger population and have the potential to serve as a referral center for select diseases. They could very well be motivated for the same.

9. Conclusion

The present study has made me understand the existing laboratory facilities in Saidapet Health Unit District. Though I could see some of the constraints experienced by the Government sector, I could also see the efforts already made to rectify them by having a good network with the referral laboratories.

Keeping in view of all the above factors , I should say that the existing facilities are indeed adequate to deal with an outbreak.

Annexure VI

Questionnaire for Laboratory personnel

Name

Designation

Name of the District

Name of the Block

Name of the PHC

Name of the HSC

1. Is there a laboratory?
2. What is the space available for laboratory?
3. What are the tests done on a routine basis?
4. Are there any special tests done ?
5. If Yes, give details
6. How many staff are available for doing the tests?
7. What is the average no. of tests done per day?
8. Is the staff in position adequate to deal with this work load?
9. What are the equipments available?
10. Are the equipments in good condition?
11. Do you think that any more facilities are needed?
12. Is there enough water supply?
13. Is there electricity facility?
14. Recommendation

Signature of the respondent _____

Date _____

Annexure VII

List of functionaries who have been interviewed

Primary Health Care set up:

Deputy Director of Health Services, Saidapet Health Unit District

Dean, Chengleput Medical College

Medical Officer, Chengleput Medical College Hospital

Professor of Microbiology, Chengleput Medical College Hospital

Professor of Biochemistry, Chengleput Medical College Hospital

Professor of Social and Preventive Medicine, Chengleput Medical College Hospital

Senior Civil Surgeon, Block level Primary Health Centre

Assistant Civil Surgeons, Primary Health Centre

Additional Director, Malaria and Filariasis

Joint Director, Central Malaria Laboratory

Senior Entomologist, Central Malaria Laboratory

District Malaria Officer

District level Malaria Inspector

Laboratory technician, Block Primary Health Centre

Laboratory Assistants, Primary Health Centres

Referral Centres

Director, King Institute, Guindy

Deputy Director (Diagnostics), King Institute

Director, Institute of Child Health, Egmore

Director, Infectious Disease Hospital, Tondiarpet

Assistant Surgeons, Infectious Disease Hospital, Tondiarpet

Laboratory Technician, Infectious Disease Hospital, Tondiarpet

Laboratory Technician, Madhavaram Laboratory

Chapter 3. Description of existing Surveillance system, Saidapet health unit district, Tamilnadu

The description of the existing surveillance system will be made under the following headings:

- Introduction
- Objectives
- Methodology
- Data sources
- Description – geographic profile
- Overview of Kancheepuram district, Saidapet district at a glance
- Organisational structure
- Health infra structure
- Description of the surveillance system Types Functions Logistics
- Data flow chart
- Diseases under surveillance
- Discussion
- Recommendations

1. Introduction

A surveillance system is “the on going, systematic collection, analysis, interpretation of data in the process of describing and monitoring a health event” with the objective of supporting the planning, implementation and evaluation of public health interventions and programme.

Disease surveillance is a critical component of any health system. It provides baseline data for all existing diseases in a given area and helps the decision makers in identifying the high risk populations and areas requiring special attentions. It helps in trend analysis of the diseases and to assess the burden of any disease at any given time. It plays a vital role in detecting sudden changes in disease occurrence (out breaks). Other than these, the most important role is to identify the priority diseases based on morbidity and mortality data generated by the surveillance system and to decide upon the resource mobilization and allocation for the identified disease control programmes.

To state briefly, Surveillance system for diseases is mandatory for each State as it provides the needed data for information and action for optimal health care delivery and effective health strategies.

1. 1. Disease Surveillance System In Tamilnadu State

There is no formal Disease Surveillance System in Tamilnadu except for the districts of Madurai and Theni where the National Surveillance Program for Communicable Diseases is ongoing. There is a Surveillance system for all National Vertical Disease Control Programmes . There is Sentinel Surveillance system for HIV- AIDS in the State.

Disease Surveillance System in Saidapet health Unit District

As mentioned earlier, there is no formal Disease Surveillance System in the district. There is a Vertical Disease Control Programme Surveillance and there is a Sentinel Surveillance for HIV – AIDS.

2. Objectives

The objectives of the exercise are to:

1. Describe the existing surveillance system in Saidapet district
2. Identify the strengths and constraints of the existing system.
3. Make appropriate recommendations to the stake holders to bridge the identified lacunae.

3. Methodology

Study area	- Saidapet Health Unit District
Study Period	- 16.6.2002 to 30.6.2002
Data Source	- Records, registers, morbidity, mortality and epidemic reports from various levels Morbidity, mortality and epidemic reports Interviews and discussions with health care providers
Types of data	- Primary and Secondary data

Data Collection

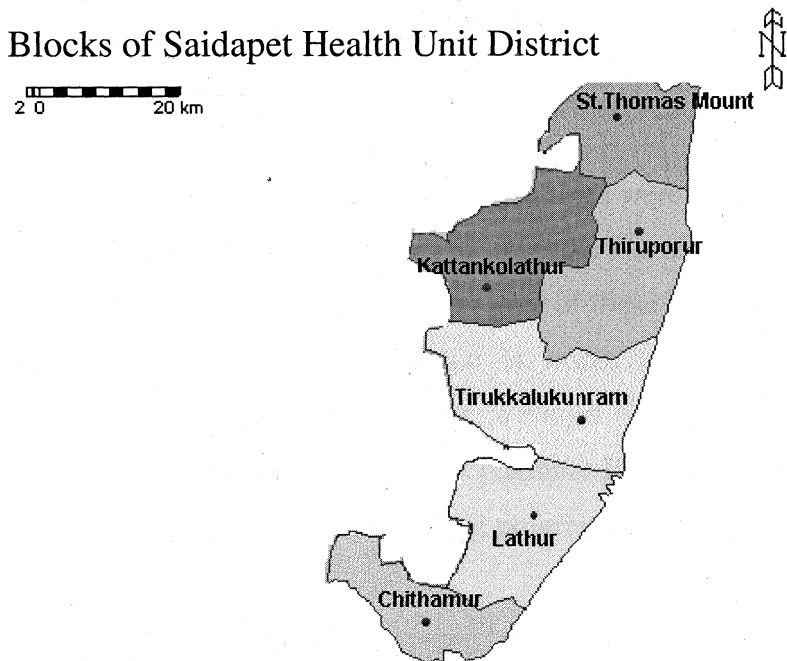
I visited the Office of the Deputy Health Services, Saidapet Health Unit District and got his permission to review the records and registers and also to conduct interviews with the Government Health personnel for the purpose of the project .

At the District level, I had discussions with Deputy Director of Health services (DDHS), Public Health Nurse (DPHN), Community Health nurse (CHN) and District Entomologist (DMO). Annual reports for select diseases like malaria were available and this was reviewed by me.

I visited one Block level Primary Health Centre, one Primary Health Centre and one Health Sub Centre to gather information regarding the data collection, compilation and analysis at various levels of the health sector. I had informal discussions with the Block level Medical officer, Assistant Surgeons, Sector Health Nurse (SHN) and Village Health Nurse (VHN). Data from the records and registers maintained by the health staff of the Primary Health Centre (PHC) , Sub centre (HSC) were collected.

I went to one Taluk level Hospital and the tertiary level hospital i.e. Chengleput Medical College Hospital to obtain regarding the Sentinel Surveillance System for HIV/ AIDS. I also visited one major private hospital in the urban area and had discussion with the Managing Director to find out the linkages they have with the Government sector with particular reference to the notification of notifiable diseases and disease surveillance system.

4. Saidapet Health Unit District



Saidapet Health Unit district basically has a peri urban set up. It is bounded by the Bay of Bengal and the district of Madras on the east, Chittoor district of Andhra Pradesh state on the north, revenue district of Kancheepuram on the west and Villupuram Ramasamy Padayatchiar district on the south.

The district has 4 Taluks, 6 Blocks, 21 Town Panchayats, 277 Village Panchayats and 5 Municipalities. It has got twenty three Primary Health Centres and one hundred and sixty eight Health Sub Centres. It has a population of 17 Lakhs. Seventy percent of the population live in Rural area and thirty percent live in the Urban area. There are five Government Hospitals and one Medical College Hospital which serves as the Tertiary Referral Centre for the district.

4. 1. Description of the Existing Disease Surveillance System:

Though a formal Disease Surveillance System does not exist, the existing informal Surveillance System will be discussed along the following lines:

1. Vertical Disease Surveillance System
2. Sentinel Surveillance System

4. 1. 1. Vertical Disease Control Programmes

In India, the various Disease Control Programmes were launched in different time periods in the post – independent era for diseases like malaria, filaria, tuberculosis etc., Prevention of diseases is the major goal of these Public Health Programmes. These were launched with the vision of improving the health status of the community. To know the health status, we must have the baseline statistics and the launch and implementation of the National Health Programmes helps us in getting this data. Some of the functioning programmes in my operational field area are:

1. Revised National Tuberculosis Control Programme (RNTCP)

2. National Anti Malaria Control Programme (NMCP)
3. Reproductive and Child Health (RCH)
4. National Filaria Control Programme
5. National Leprosy Eradication Programme
6. National Programme for Control of Blindness
7. National AIDS Control Programme
8. National Nutritional Anemia Prophylaxis programme
9. National Iodine Deficiency Disorders Control Programme

4. 1. 2. Organisational Structure

The head of the health care system in the District is the Deputy Director of health Services. He is in charge of six Blocks with twenty three Primary Health Centres (PHC). On an average each block has four to five PHCs except for two blocks where they have two and three PHCs only. Each PHC has one to two Assistant Surgeons, four to five Health Inspectors and the Block level PHC has a Senior Civil Surgeon, one Sector Health Nurse, in addition to general staffing pattern of the PHC. Each HSC is manned by the Village Health Nurse who plays a vital role of being the back bone of the whole system.

4. 1. 3. Flow of information

4. 1. 3. 1. Regular

The relevant data of each of the National Programmes are collected by the grass root level workers i.e. Village Health Nurses(VHN) of the respective Health Sub Centres. Each VHN enters the data in the specified forms manually and submits them to the Primary Health Centre by the end of every month. The data from all the sub centres are then compiled at the Primary Health Centre and submitted both to the Block level PHC and Office of the DDHS by 5th of the successive

month. All the Block level information is then consolidated at the DDHS office and submitted to the State by 10th of the next month.

4. 1. 3. 2. Weekly

Apart from the regular flow of information, weekly reports are sent from the periphery and they in turn are consolidated and submitted by the DDHS office to the State for diseases like Acute Diarrhoeal Diseases and Poliomyelitis.

4. 1. 3. 3. Daily

Apart from the above mentioned, daily reports are sent from the periphery to the State through District at times of outbreak.

4. 1. 4. Functions of surveillance at Different Levels

Functions	HSC	PHC	Block PHC	District	State	Central	International
Detection of cases	Yes	Yes	Yes	No	No	No	No
Notification of cases	Yes	Yes	Yes	Yes	Yes	Yes	No
Collection of data	Yes	Yes	Yes	No	No	No	No
Consolidation of data	No	Yes	Yes	Yes	Yes	Yes	No
Reporting of data	Yes	Yes	Yes	Yes	Yes	Yes	No
Analysis of data	No	No	Yes	Yes	Yes	Yes	No
Feedback	No	Yes	Yes	Yes	Yes	Yes	Yes
Feed forward	Yes	Yes	Yes	Yes	Yes	Yes	No

4. 1. 5. Types of surveillance in the Vertical Disease Control Programmes

The various types of surveillance that are being adopted in the district by way of implementation of the Health Programmes are as follows:

1. Active surveillance
2. Passive surveillance
3. Sentinel surveillance
4. Reporting of Notified Diseases
5. Laboratory Surveillance

4. 1. 5. 1. Active surveillance

Active surveillance is done for diseases like Malaria , Filaria and Leprosy. In the case of Malaria, the Health Inspectors go in active search of fever cases and make peripheral blood smears. For Filariasis, blood smears are made at night times on a house to house basis method. On Saturdays of every week, a house to house visit is done for identification of suspected leprosy cases. In the event of increased number of fever cases in a given area, active fever surveillance is being undertaken ever since the outbreak of Dengue fever in Chennai city in the year 2001. As Saidapet Health Unit District is situated in and around Chennai, this precautionary method is being followed for the past two years.

4.1.5. 2. Passive surveillance

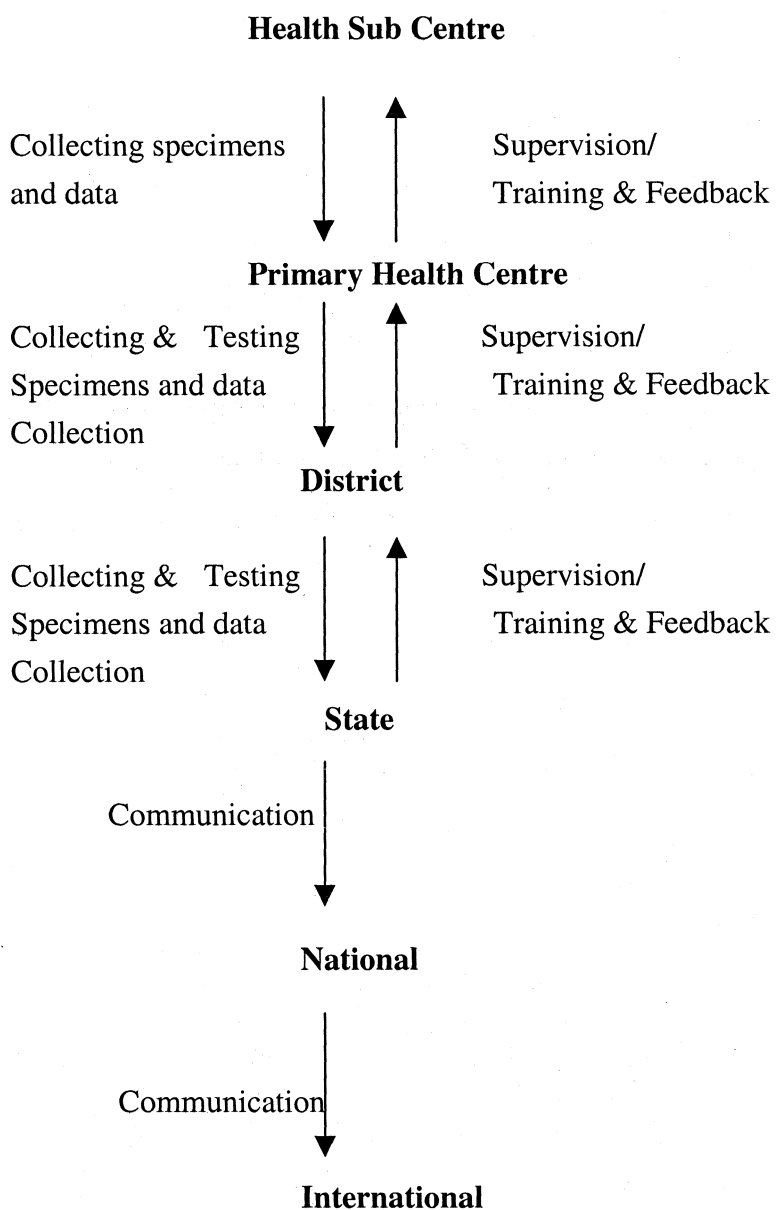
Passive surveillance is being done for malaria wherein the self reported fever cases in the out patient department of the Primary Health Centres are screened for malaria by making peripheral blood smears in them. This type of surveillance is being adopted as a routine procedure for diseases like Acute Diarrhoeal Diseases, Non Communicable Diseases, Other Communicable diseases, Zoonoses and Contact diseases. The monthly morbidity report is being made at the PHC level

by consolidating data from the daily outpatient register and sent to the DDHS office in the “Monthly PHC Morbidity Form” .

Family Health Awareness Campaign is being conducted for 15 days for the past three years in which concentration is being focussed on Reproductive tract Infections and Sexually Transmitted Infections.

4. 1. 5. 3. Laboratory surveillance

Flow of Laboratory Data and Specimen in Surveillance System



Apart from the routine services of the Government Laboratories in the Primary Health Centres and the Hospitals, Laboratory Surveillance is undertaken for diseases like Acute Diarrhoeal Diseases and Cholera by various other Government Institutions. Data from these institutions are routinely collected by the Health Inspectors at the District Level.

4. 1. 5. 4. Laboratories coordinating

- a. King Institute, Guindy for identification of vector borne diseases, polio cases by stool examination
- b. Communicable Disease Hospital, Tondiarpet - identification of cholera cases by stool examination

Water Quality assurance is maintained by constant monitoring of water samples sent from the periphery to the State level i.e. Office of the Chennai Corporation Public analyst and Kilpauk water works at Chennai

4. 1. 5. 5. Reporting of Notified diseases (Annexure VII)

All the twenty one diseases in the list are to be reported by the health officials to the next higher authorities as and when the cases occur.

4. 1. 6. Malaria Surveillance System in Saidapet Health unit District

I will now take up Malaria to explain in detail about the vertical disease control programme surveillance system.

4. 1. 6. 1. Introduction

Malaria is one of the diseases of Public Health Importance. In India, approximately 1.1 million positive cases are reported annually. Plasmodium vivax is the commonest species followed by falciparum. Nearly fifty percent of Malaria Mortality is due to the species falciparum which causes malignant malaria.

4. 1. 6. 2. History of National Anti- Malaria Programme

In April 1953, Government of India launched the National Malaria Control Programme with the following objectives:

1. To bring down malaria transmission to a level at which it would cease to be a major public health problem and
2. Thereafter an achievement was to be maintained by each state to hold down the malaria transmission at low level indefinitely.

With effective reduction in malaria cases and mortality due to malaria, it was recommended in the 8th World Health Assembly to change the concept from control to eradication of malaria. Thus, the National Malaria eradication Programme (NMEP) was launched in 1958 with the objective to eradicate malaria in 7-9 years.

The NMEP suffered set backs due to various constraints like financial, logistic, technical and administrative. This resulted in resurgence of malaria during the 70's. As it was realized that urban areas did not receive their due attention and this could have resulted in the resurgence, the Urban Malaria Scheme was launched in 1971. In spite of this, a high number of cases were reported every year. This necessitated the adoption of Modified Plan of Operation (MPO) in 1977.

4. 1. 6. 3. Objectives of Modified Plan of Operation:

1. Elimination of malarial deaths
2. Reduction of malaria morbidity
3. Maintenance of the gains achieved so far by reducing transmission of malaria

This modified plan was able to control the malaria deaths at lower level for the subsequent years. But, in 1994 resurgence of malaria was observed in some states. An expert committee was constituted to review the situation. Based on their

recommendations, guidelines for the malaria control known as “Malaria Action Programme” were formulated. The principal aim was to identify “high risk” malaria areas.

4. 1. 6. 4. Objectives of the Malaria Action Programme

1. Early case detection and treatment
2. To reduce the morbidity and mortality due to malaria
3. To monitor changes in the trend of the disease
4. To detect epidemics, if any

To achieve the above said objectives, the strategies applicable to the operational field area are:

1. Active case detection and presumptive treatment
2. Passive case detection and presumptive treatment
3. Blood smear collection and examination
4. Radical treatment with priority to Plasmodium falciparum cases within 48 hours

4. 1. 6. 5. Case Definitions

4. 1. 6. 5. 1. Suspected Malaria

All fever cases unless and otherwise proved.

4. 1. 6. 5. 2. Probable Malaria

Fever cases without the following associated symptoms and not subjective to microscopic examination. These will be diagnosed by the Medical officers and reported by them separately as Clinical Malaria.

Associated symptoms:

1. Cough- Acute respiratory infections
2. Cold with running nose
3. Skin rash suggestive of eruptive illness
4. Burning micturition

5. Skin infections like boils, abscess and infected wounds
6. Painful swelling of joints
7. Ear discharge

4. 1. 6. 5. 3. Seriously Sick Malaria

Those malaria cases who present with following signs and symptoms:

1. Cerebral malaria - Case of unrousable malaria not attributable to any other cause in a patient with *P.falciparum* infection
2. Other cases with hyperpyrexia, convulsions, severe anemia, pregnancy with fever, pulmonary edema in *P.falciparum* infection, hyper parasitemia and malaria causing hemoglobinuria

4. 1. 6. 5. 4. Deaths due to malaria

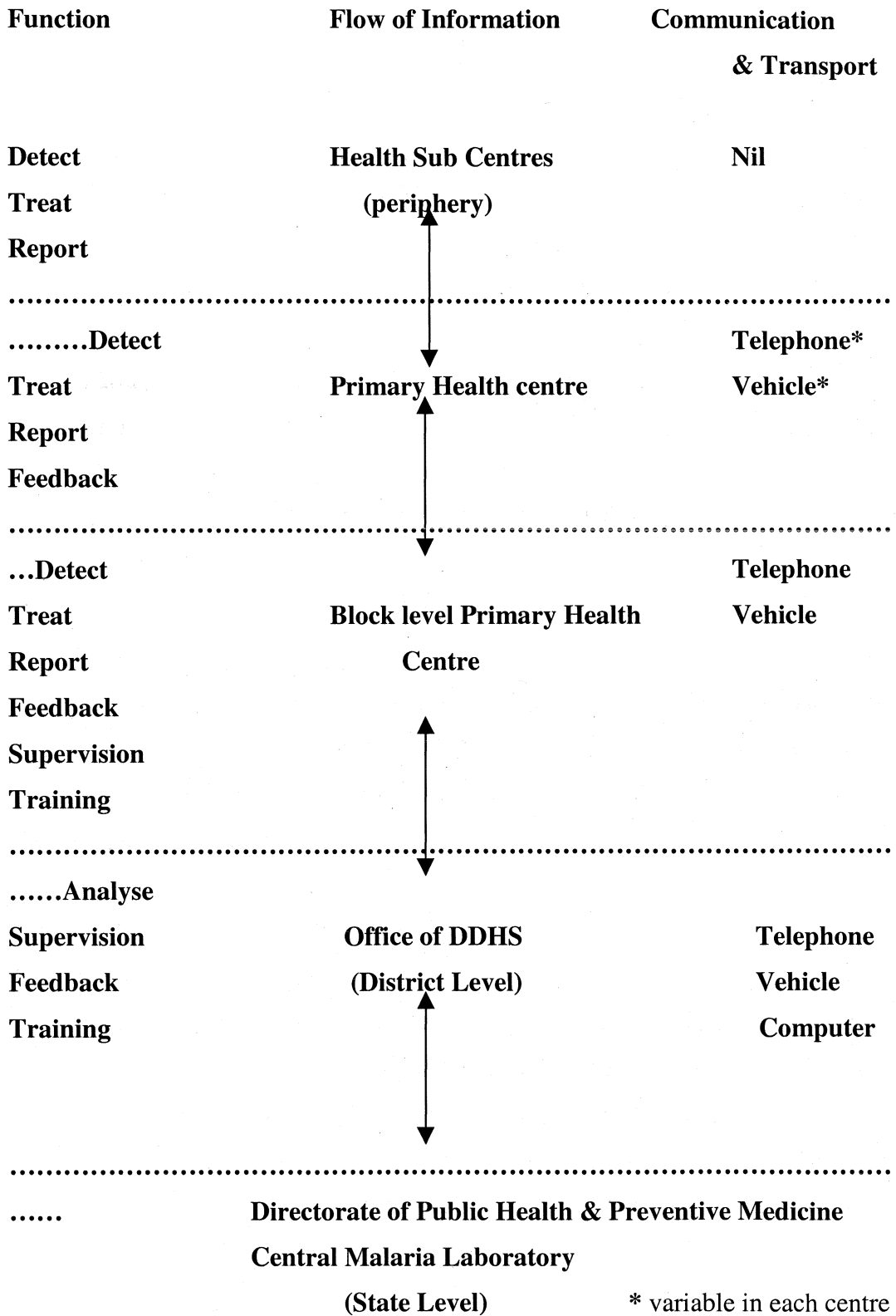
Deaths due to *P.falciparum* infection

In the event of any fever case having signs and symptoms cited above dies without microscopic confirmation, the death can be attributed to malaria.

4. 1. 6. 5. 5. Confirmed Malaria death

Death of microscopically confirmed *P.falciparum* infected patient due to any of the complications mentioned above.

4. 1. 6. 6. Flow of Information, Task Orientation & communication



* variable in each centre

4. 1. 6. 7. Description of the flow of information

4. 1. 6. 7. 1. Case Detection, Confirmation and reporting

Active surveillance for fever cases is being undertaken by the Health Inspectors (Sub Centre level) on a daily basis. Blood smears are made for those cases and administered presumptive treatment. The details of the blood smear are recorded in MF 2 Form. Passive surveillance is made at the Primary Health Centre (PHC) level. Blood smears are made for all reported fever cases at the out patient department. These blood smears are examined by the Laboratory technicians at the PHC. The details of passive blood smear are recorded in MF 2 Register.

In a malaria positive case, the following responses are initiated:

1. Immediate response

Administration of radical treatment to the positive case

Reporting to the Block Level PHC and the DDHS office in the MF 4 Form.

2. Blood smear collection for all contacts in the house hold of the positive case

3. A fever mass blood survey is conducted in the neighboring 20 houses and presumptive treatment is given. If in the survey , a +ve case is detected ,then 200 houses or the entire village is screened.

The treatment details are maintained in the MF 5 Register.

4. 1. 6. 7. 2. Periodicity of Data flow

The collected data is sent from the periphery (HSC) to the PHC on a daily basis. This data is reviewed at the PHC in the weekly meetings every tuesday. Unless a malaria positive case occurs, the dta collected from the respective sub centres is consolidated and sent to the Block level PHC and DDHS office by 30th or 31st (as the case may be) of every month. The information from all the PHCs are consolidated, analysed and forwarded to the State level by 5th of the subsequent month.

4. 1. 6. 7. 3. Feed back

Feedback is given to the Village Health Nurses , Laboratory Assistants and Health Inspectors in the weekly review meetings (every Tuesday)conducted by the PHC Medical Officer. Monthly review meetings (3rd of every month) are held for the Laboratory assistants and technicians by the District entomologist.

Feedback is usually in the form of oral and very occasionally in the form of written reports.

4. 1. 6. 7. 4. Feed forward

Monthly written reports are sent to the Directorate of Public Health and Preventive Medicine and Central Malaria laboratory, Chennai

4. 1. 6. 7. 5. Monitoring and Supervision

Supervision is being carried out at different levels.

At the PHC and Block Level PHC

The making of blood smear and treatment given is being monitored by the PHC Medical Officer. Confirmation of blood smear positives (if any) is also being done by them.

At the District Level

The DDHS and the District Malaria Officer visits the PHCs as per the advanced tour programme and supervises the blood smear examination, registers and stock position.

Zonal Level

The Zonal Entomological team visits the district on a quarterly basis and monitoring is done by means of carrying out entomological surveillance.

4. 1. 6. 8. Quality control of blood slides

All positive blood smears are sent to the Zonal Laboratory, Vellore for cross checking. A sample of 10% of the negative slides are sent to three different places by 10th of the successive month. The places where the samples are sent are – 5% to the Zonal Laboratory, Vellore, 2.5% to the Regional Office of Health and Family Welfare, Chennai and 2.5% to the Institute of Vector Control and Zoonoses, Hosur. Based on the feedback from these centres, the quality of the blood smear examination is maintained.

Table 7. Malaria Situation in Saidapet Health Unit District, 1999 to 2002

Year	Population	Blood smear collected				Positive		
		Active	Passive	Mass& Contact	Total	PV	PF	Total
1999	1701407	125891	58248	8562	192701	141	2	143
2000	1734097	130776	55983	6128	192887	96	1	97
2001	1759161	122026	67522	4123	193671	39	1	40
2002	1781568	110059	66704	5826	182589	51	3	54

Table 8. Malaria Indicators, Saidapet Health Unit District, 1999 to 2002

Year	ABER [%]	SPR [%]	API[/ 1000 population]	PF Cases[% of total cases]
1999	11.33	0.08	0.08	1.40
2000	11.12	0.05	0.06	1.03
2001	11.02	0.02	0.02	2.5
2002	10.2	0.03	0.03	5.56

4. 2. Sentinel surveillance

Sentinel surveillance is done for Acute flaccid paralysis, HIV/AIDS and Leptospirosis in my district. Identified Government Hospitals (within the district and also at Chennai), private nursing homes and laboratories serve as sentinel centers (Annexure VII). Reports are sent from these centres on a monthly basis to the DDHS office except for HIV/AIDS in which case reports are sent directly from the Chengleput Medical College to Tamilnadu State AIDS Control Society located at Chennai.

4. 2. 1. HIV Sentinel Survey in Tamilnadu

HIV Sentinel Survey is aimed to collect epidemiologic information regarding the distribution and spread of HIV infection. This data is very much needed for relevant planning, implementation and monitoring of HIV/AIDS prevention and control activities. The Tamilnadu State AIDS Control Society (TNSACS) was formed in 1994, with the main objective to initiate suitable action to prevent and to contain HIV/AIDS in the community. It is financially supported by National AIDS Control organisation (NACO), Government of India and State Government.

4. 2. 2. Objectives of Sentinel surveillance for HIV –AIDS

The objectives of this surveillance is to:

1. Monitor HIV sero prevalence of any sentinel population over the years
2. Observe the trend of HIV infection
3. Assessing the impact of ongoing AIDS control programme

4. 2. 3. Strategies adopted by TNSACS

Targeted interventions for population at high risk

Creating awareness and facilitating behavioural change amongst general population

Strengthening of infrastructure

Inter-Sectoral Collaboration

Low cost care for People Living with HIV/AIDS

4. 2. 4. Case definitions

Case definitions used at the STD clinic is as those who are coming with complaint of any one of the following four syndromes:

1. Genital Ulcer male or female.
2. Cervical discharge or Cervicitis.
3. Urethral discharge.
4. Genital Wart.

4. 2. 5. Concept:

HIV testing at the sentinel sites is done by means of “Unlinked Anonymous Testing”.

Sentinel Sites

Total Sites	- 25
High Risk Group	- STD Clinics (11 sites)
Low risk Group	- ANC Clinics (11 sites)
New Sentinel Sites (from the year 2000)	
IVDU	- 1
MSM	- 2

Sample size for:

STD Clinics is 250 and for ANC Clinics is 400.

4. 2. 6. HIV/AIDS Sentinel Surveillance System in Saidapet HUD:

In Saidapet HUD, the Sentinel Surveillance for HIV/AIDS was started only in the year 2002. The Chengleput Medical College Hospital serves as the STD sentinel site. Out of the 250 samples tested, six were positive for HIV with a positive percentage of 2.4 which constitutes 17.5% of the Total State percentage i.e. 13.68% .

5. Discussion

Strengths of the Existing Surveillance System

1. Availability of adequate trained manpower
2. Presence of standard case definitions and guidelines for early case detection and case management like malaria, sexually transmitted diseases, leprosy, filariasis etc.,
3. Availability of standardised reporting formats for select diseases like malaria, sexually transmitted diseases
4. Established and effective flow of information from periphery to the State
5. Quality control of blood smears made and examined

Constraints of the System

1. Lack of standard case definitions for all the diseases under surveillance system
2. Lack of standardised reporting formats for all diseases under the system
3. Lack of well organised "Rapid Response Team"
4. Supervision is not adequate at all levels
5. Private sector is not involved
6. Lack of regular reporting of the Urban Local bodies to the DDHS office
7. Notified diseases are not being notified even by the Government Institutions at times
8. The information from the Government hospitals is being sent only to the Directorate of Health Services and not to the Directorate of Public Health and Preventive Medicine
9. Focus is on the Communicable diseases only

6. Recommendations

1. Strengthening of the existing surveillance system by means of forming standardised case definitions and guidelines for management of cases for all diseases under surveillance system

2. Improving the monitoring and supervision at all levels
3. Establishment of an active “Rapid Response Team” fully trained in “Surveillance, Epidemic Preparedness and Response”
4. Inter sectoral co ordination to be established
5. Strengthening of Urban Surveillance System
6. Legislative powers to be exercised for non-notification of notified diseases
7. Report sharing is to be done between the different wings of the health care system on a regular basis
8. Non Communicable diseases to be included in the Surveillance system

Annexure VIII

List of Notified Diseases :

1. Cholera
2. Leptospiral fever
3. Chicken pox
4. Diphtheria
5. Influenza
6. Hemorrhagic fever
7. HIV/Aids
8. Infectious hepatitis
9. Leprosy
10. Malaria
11. Measles
12. Poliomyelitis
13. Plague
14. Rabies
15. Scarlet fever
16. Small pox
17. Typhoid fever
18. Tuberculosis
19. Tetanus
20. Viral encephalitis
21. Whooping cough

Annexure IX

Sentinel Centres for select diseases

I. Acute Flaccid Paralysis

- a. Government Hospital, Chrompet
- b. Rasi Nursing Home, Chrompet
- c. B.M Hospital, Alandur
- d. A.G.Hospital, Tambaram
- e. Hindu Mission Hospital, Tambaram
- f. Chenglepet Medical College Hospital
- g. I.S.P Nursing Home, Chengleput
- h. Thirukalukundram Government Hospital
- i. Cheyyar Government Hospital

II. Leptospirosis

- a. Nambi Nursing Home, Chengleput
- b. Renga Nursing Home, Chengleput
- c. Madavaram Laboratory

III. Acute Diarrhoeal Diseases

- a. Institute of Child Health, Egmore
- b. Infectious disease Hospital, Tondiarpet
- c. King Institute of Preventive Medicine, Guindy

IV. HIV/AIDS

Chengleput Medical College Hospital

Annexure X

Infra structure Support

Name of the Block	Name of the PHC	MO VHN				Infra Structure			
		S	IP	S	IP	Land	Building	Phone	Vehicle
St.Thomas Mount	Medavakkam	3	3	5	5+	+	+	+	+
	Pozhichalur	2	2	12	11+	+	-	-	-
	Peerkankaranai	2	2	7	7+	+	-	-	-
	O.Thoraipakkam	2	2	7	7-	-	-	-	-
	Moovarasampet	2	2	7	7+	+	-	-	-
Kattangulathur	Nandivaram	3	2	6	6+	+	+	+	+
	Othivakkam	2	2	6	6+	+	-	+	-
	Reddipalayam	2	1	6	6+	+	-	-	-
	MaraimalaiNagar	2	1	6	6-	-	-	-	-
	Kunnavakkam	2	2	6	6+	+	-	-	-
Thiruporur	Kelambakkam	3	3	6	6+	+	+	+	+
	Thiruporur	1	1	7	7+	+	-	+	-
	Sembakkam	2	1	6	6+	+	-	+	-
	Sirukundram	2	1	6	6+	+	-	-	-
Thirukalukundram	Sadras	3	3	12	12+	+	=	+	+
	Nerumbur	2	2	12	12+	+	-	-	-
	Vallipuram	1	1	10	10+	+	-	+	-
Chithambur	Cunampet	2	2	6	6+	+	+	+	-
	Idaikalainadu	2	2	6	6+	+	-	-	-
	Polambakkam	2	1	6	6+	+	-	+	-
	Periyakayapakkam	2	2	6	6+	+	-	-	-
Lathur	Pavunjur	2	2	11	11+	+	-	+	-
	Koovathur	2	2	6	6+	+	-	+	-

Chapter 4. Secondary Data Analysis

1. Introduction:

Secondary data analysis is the analysis of the existing data from various sources. The purpose of the analysis is to identify the existing problem diseases, prioritise them, analyse the trend over the years and to assess the disease burden in a given area. This is needed time and again as we know that any data not transcribed into action is a waste. To avoid that waste happening, it is mandate that such exercises are undertaken so that apart from identification and prioritisation of the problem diseases, some action be taken for the lacunae identified if any.

2. Objectives:

1. To describe and to study diseases over a period of time
2. To identify diseases of epidemic potential
3. To identify diseases that need to be included in the existing surveillance system
4. To develop action plan for strengthening existing health infrastructure and to reduce disease burden

3. Methodology

Study area	- Saidapet Health Unit District
Study Period	- 1.9.2002 – 15.9.2002
Data Sources	- Morbidity Records and Reports from the Office of the Deputy Director Of Health Services, Saidapet Health Unit District
	- Form 9 from the State Bureau of Health Intelligence , Directorate of Public Health and Preventive Medicine, Chennai
Data Type	- Secondary data

Data Collection

I visited the Office of the Deputy Director Of Health Services (DDHS), Saidapet Health Unit District to collect data from the morbidity records and reports. After briefing the Deputy Director of Health Services regarding the purpose of the exercise and getting his verbal permission , I proceeded with the data collection.

The “Monthly PHC Morbidity Form” has been in use only for the past three years. All the twenty three Primary Health Centres of the Health Unit District compile the daily data from the Out Patient Registers and send the morbidity data report to the Office of the DDHS on a monthly basis. Since I thought that this would serve as an excellent data source, I went through the monthly Primary Health Centre Morbidity Reports and came to know of the fact that there was incompleteness in the filling up of the forms for the first year (2000). A complete data set was available for two years only i.e. April 2001 to March 2002 and April 2002 to March 2003 but there did not exist a compiled annual report. The office of the DDHS, sends the monthly report to the NIC NET Centre located at the campus of the Directorate of Public Health and Preventive Medicine and the data is entered in the computer over there. So I visited this Centre and obtained information from them.

Mean while, I also collected data from the Form 9 report which is being sent by the Office of the DDHS to the State Bureau of Health Intelligence Cell to address the issue of non availability of morbidity report for the previous years. I was successful in getting information for three years i.e. April 1999 to March 2002. But, I could see that the morbidity data provided in this Form was very minimal and with respect to diseases like acute diarrhoeal diseases, acute respiratory infection and reproductive tract / sexually transmitted diseases only. This form also had mortality data.

Hence, I have used both the sources i.e. data from the DDHS Office and the State Bureau of Health Intelligence for the purpose of my analysis. In fact I have used

the data from the State Bureau of Health Intelligence (April 2000 to March 2002) as the standard for evaluating the data from the district in terms of qualities like correctness.

Comparison of the State average with that of the Saidapet Health Unit District for the Year 2001-2002

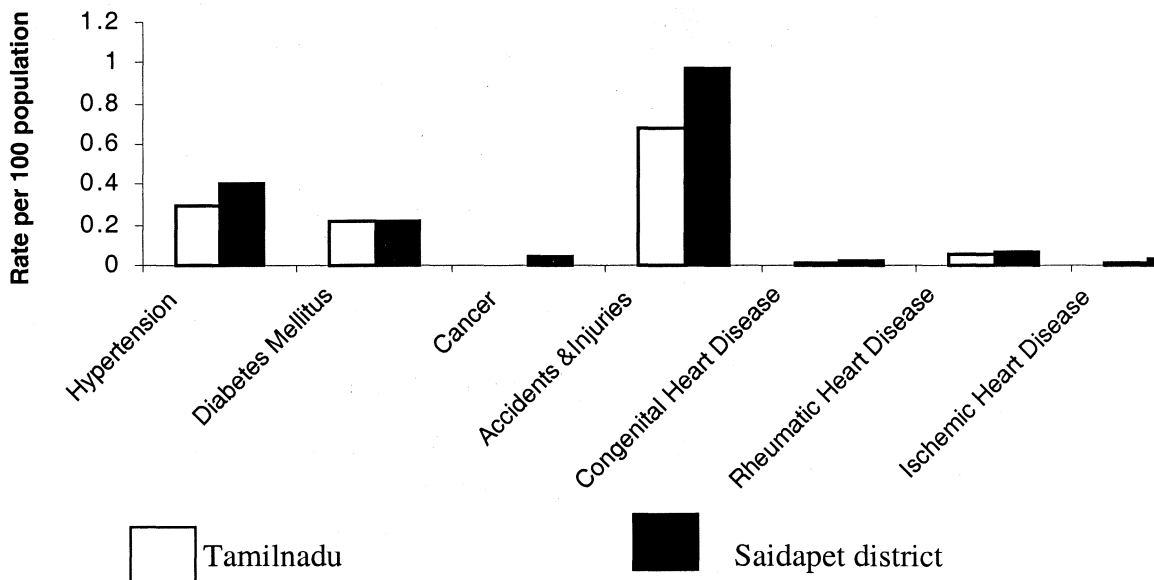
The secondary data will be presented as follows:

1. General analysis of the data
2. Data quality assessment
3. Malaria trend analysis

4. Scenario in Saidapet Health Unit District

4.1. General analysis of the data

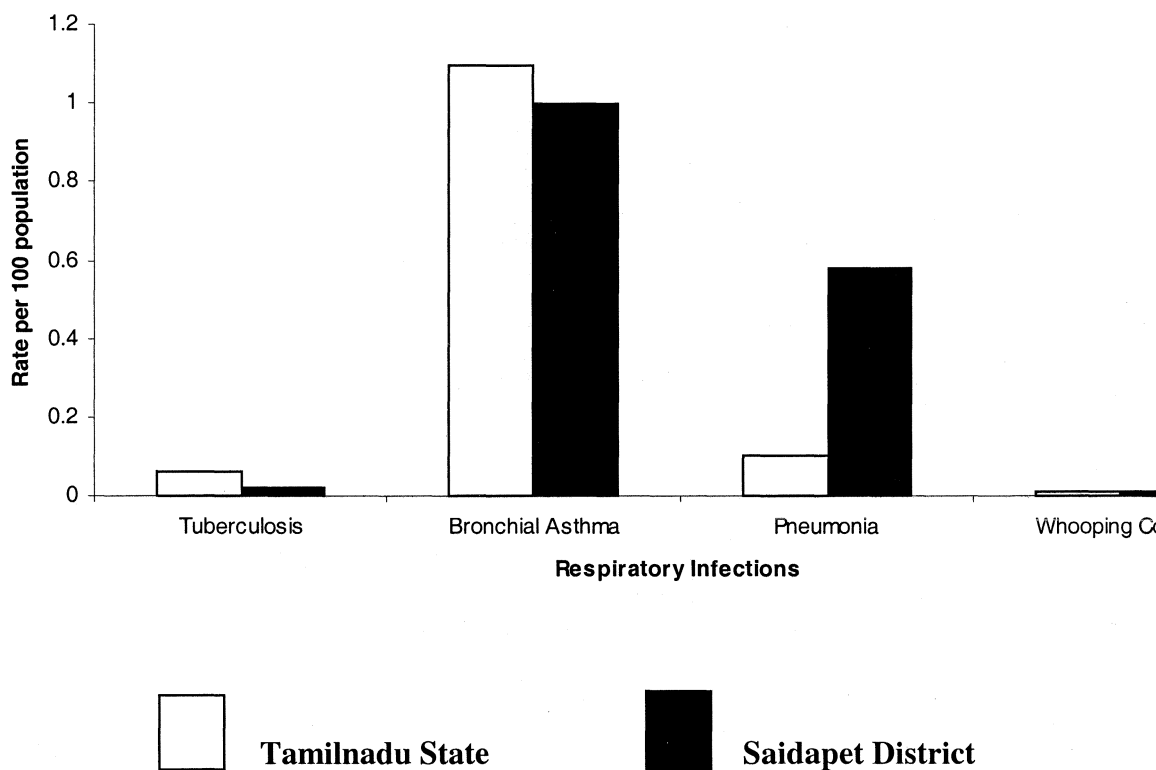
Figure 5. Prevalence of Non Communicable Diseases, Tamilnadu State & Saidapet Health Unit District, 2001-2002



This figure shows that there is an increase in the rate of the Non communicable diseases like Hypertension and Accidents & Injuries in the district when compared to that of the State average. These could be attributed to the rapid urbanisation

and life style changes of the people in Saidapet district as most of the area belong to the peri-urban set up.

Figure 6. Respiratory Tract Infections, Tamilnadu State & Saidapet Health Unit District, 2001-2002

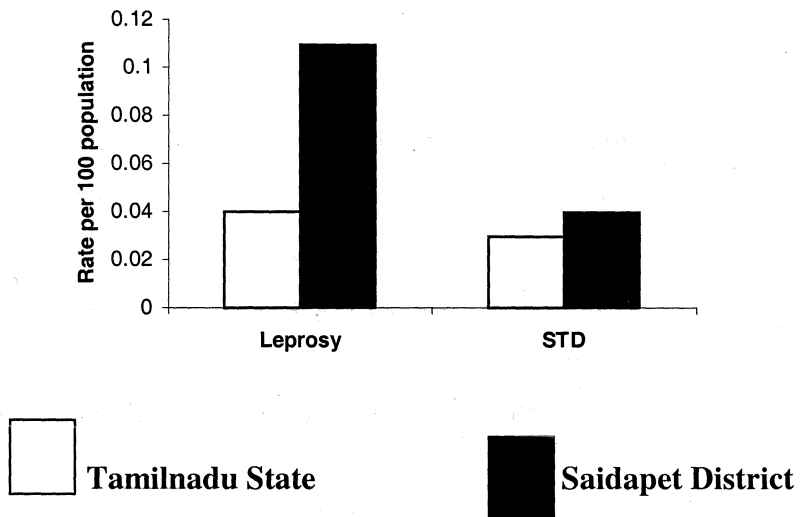


This figure shows that pneumonia incidence is higher than the State average in the district. Also the rate for the disease Bronchial asthma is also high though not as high as the State average. Though not depicted in the graph, it was found from the reports that there is “Zero reporting” of Chickenpox.

Six cases of Diphtheria and five cases of Measles have been reported. Rates are not mentioned because of the very small numbers. cough and 5 cases of measles have been reported. Though, Tuberculosis is seen to be a lower prevalent disease, the role of Tuberculosis in constituting the disease burden could not be forgotten

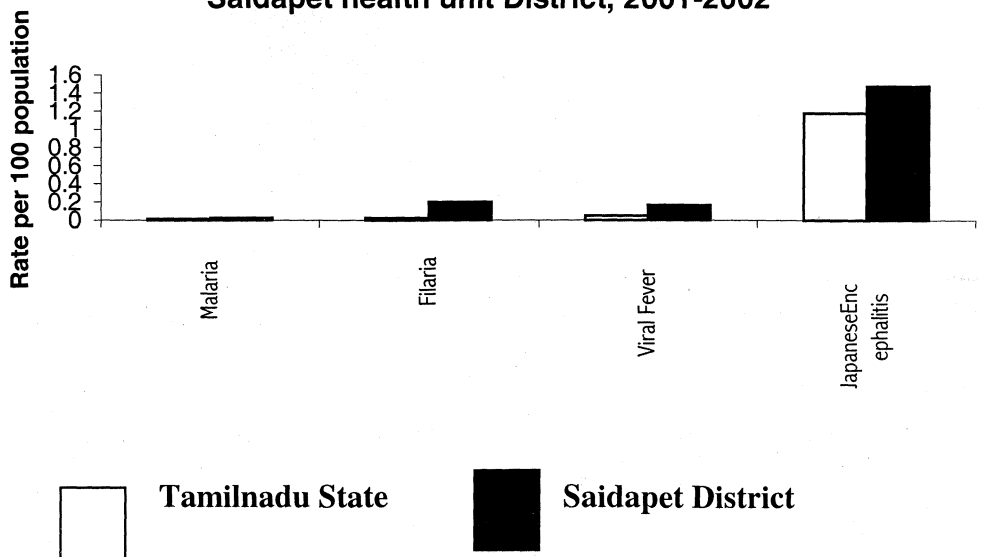
with the invent of HIV/AIDS and also the ever increasing problem of multi drug resistance.

Figure 7. Contact Diseases, Tamilnadu State & Saidapet Health Unit District, 2001- 2002



This figure shows that the prevalence of Leprosy and Sexually transmitted diseases in the district is higher than the State average.

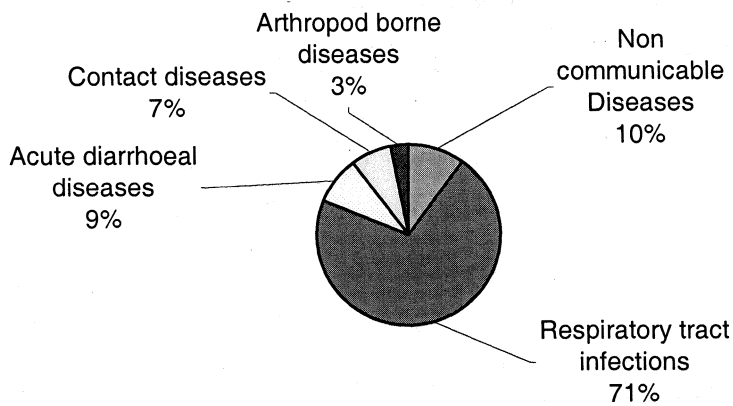
Figure 8. Arthropod borne diseases, Tamilnadu State & Saidapet health unit District, 2001-2002



It is evident from the above figure that Japanese Encephalitis , Filariasis and Fevers categorised as others are all having a higher rate than that of the State average.

The picture presented in the Figures 1 to 4 shows that many of the diseases like Japanese encephalitis, Viral fevers and Fevers categorised as others are having a higher incidence and diseases like Hypertension, Leprosy, Sexually transmitted Diseases, Filariasis have a higher prevalence in the district when compared to that of the State average. This could be explained in two ways. One reason being that the prevalence is truly higher than that of the State average and the other being that the surveillance and reporting is good in this district when compared to all other districts which compiled together form the State average. Hence, these graphs should be viewed with caution in terms of interpretation.

Figure 9. Disease burden, Saidapet Health unit District, 2002-2003



This figure shows that the major prevailing problem in the district is that of the Respiratory tract infections which constitute seventy one percent of the disease

burden. The next priority diseases are the Non communicable diseases and Acute Diarrhoeal Diseases which share ten and nine percent of the burden respectively. The picture represented here could very well be due to the in –migration, rapid urbanisation and the life style changes adopted by people. It is rare to find a house without a vehicle in these modern days and hence, the whole atmosphere is polluted with lots of pollutants causing hole in the Ozone layer and resulting in the “Green House” effect. Added to this is the constant tension which is part and parcel of residing in a peri – urban area and working in the city which is the case in most of the population of this district. This could very well lead to increase in the rate of Non communicable diseases. The major contribution of the Acute Diarrhoeal diseases is due to the inadequate and at times lack of supply of potable drinking water and poor sanitary facilities persisting in most of the areas.

Table 9. Outpatient (OP) and Inpatient (IP) Load , Primary Health Centres, Saidapet Health Unit District, April 2000 to March 2002

Year	Outpatient				Total Outpatients	In patients	Total OP & IP	Total OP & IP* in %
	New Number	%	Old Number	%				
2000-2001	545159	68	258868	32	804027	1543	805570	67
2001-2002	555385	64	314115	36	869500	1696	871196	71

* Expressed in percent per total population of the district in the corresponding years

Source : State Bureau of Health Intelligence

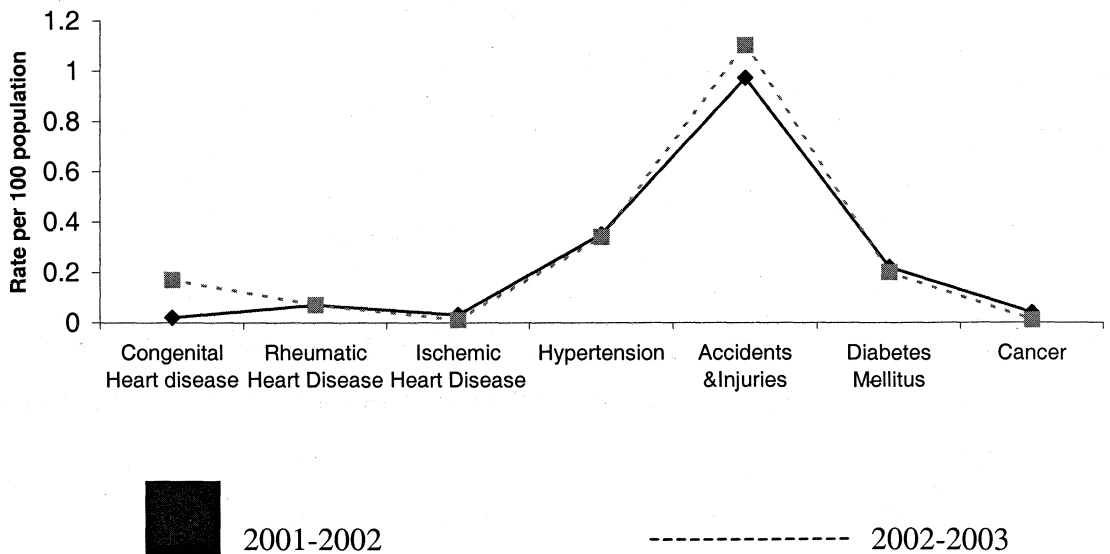
This table shows the annual patient load in the Saidapet Health unit District. Sixty seven percent of the general population sought medical care in the year 2000-2001 whereas Seventy one percent have sought medical care in the year 2001-

2002. There is a four percent increase in the annual patient load of the Primary Health Centres of the District.

The population represents only those who had treatment at the Primary Health Centres of the district. This does not include all the urban population as there is an overlap between the urban and rural area and often people from the urban area and rural area tend to seek medical care in the primary health centre nearby or in the city. Moreover, this does not include those who had treatment at the Tertiary Care Centre i.e. Chengleput Medical College Hospital.

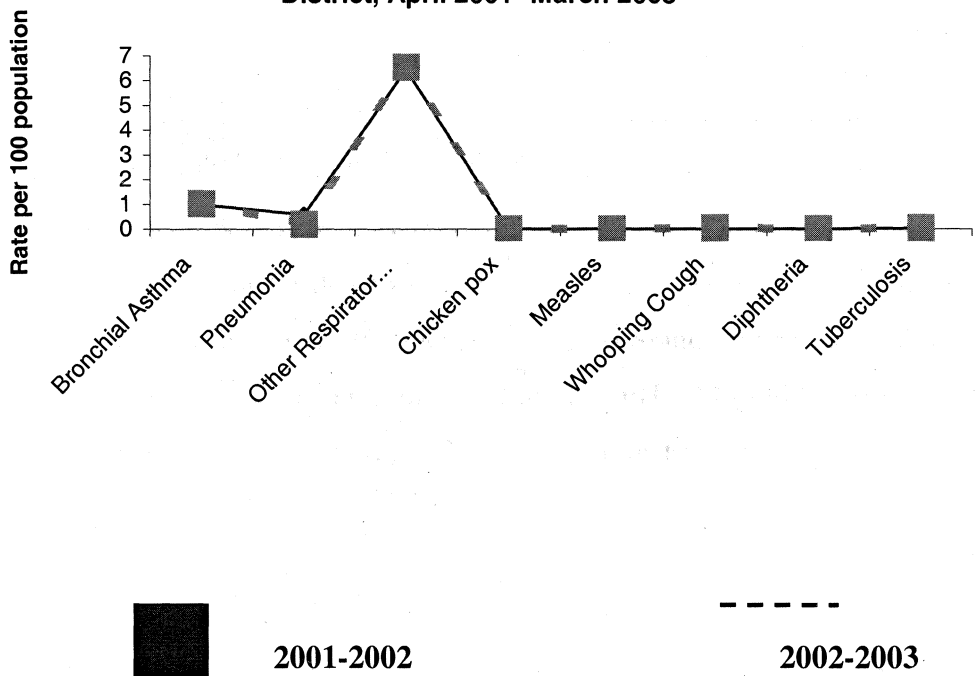
Given this background, we can see that there is a definite problem of health as there is more and more input of patients who seek medical care. On the other hand, this could be due to the fact that the general awareness of people is on the increase and hence they seek care at an earlier stage itself.

Figure 10. Trend of Non Communicable Diseases, Saidapet Health Unit District, April 2001 to March 2003



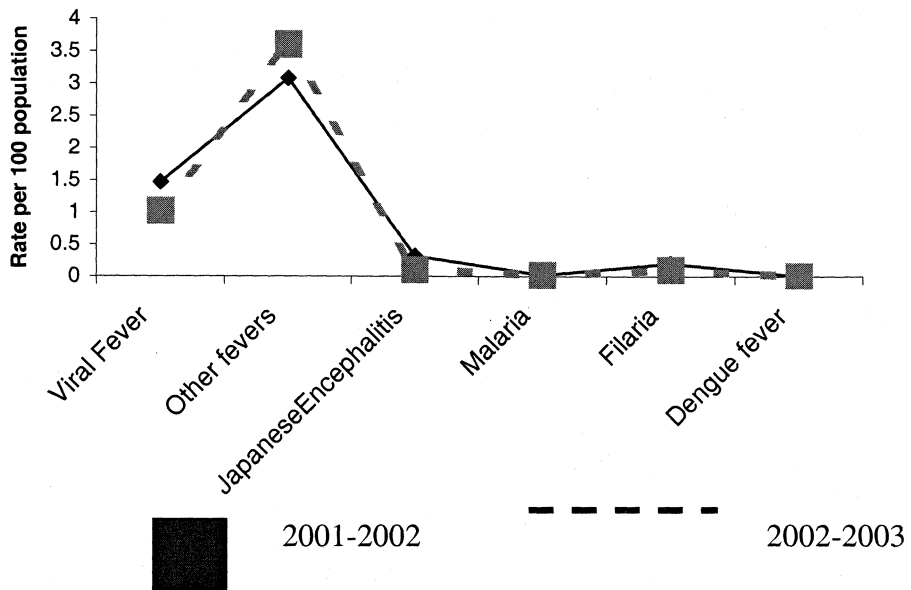
This figure shows that Congenital Heart Disease and Accidents & Injuries are on the rise in the district. This could be due to the fact of urbanisation and change in the life style of the people. Constant job and family tension might lead to cumulative psychological tension in an individual thus resulting in accidents and injuries. Increase in the Congenital Heart Diseases could be attributed to the increase in the maternal age due to late marriages. Increased maternal age is a known risk factor for Congenital Heart Diseases.

Figure 11. Trend of Respiratory Tract Infections, Saidapet Health Unit District, April 2001- March 2003



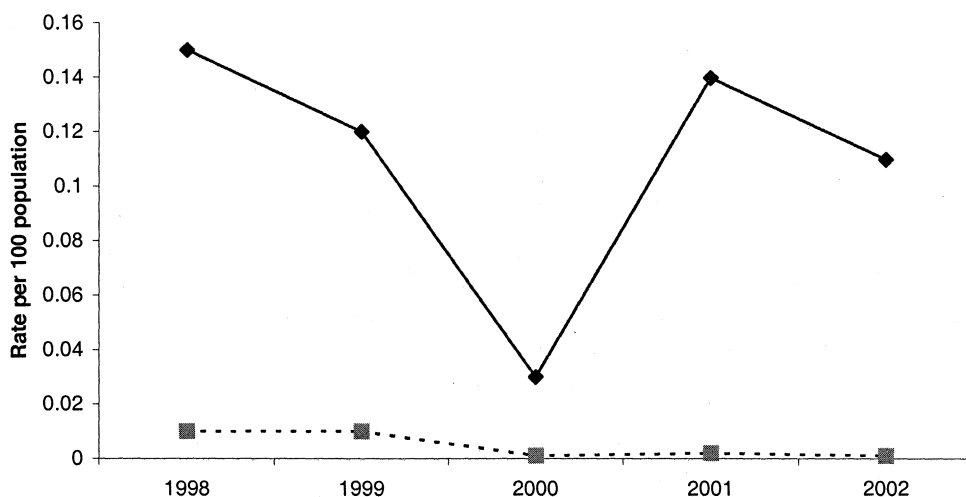
This figure shows that except for the disease categorised as Other respiratory infections whose rate is remaining static, all other respiratory tract infections are on the decreasing trend in the past two years. Though I am aware that to say there is an increasing or decreasing trend there has to be at least five year data, since this is the best I could get, I am making this statement with these two year data. Six cases of Diphtheria and five cases of Measles have been reported in the year 2002 to 2003.

Figure 12. Trend of Arthropod Borne Diseases, Saidapet Health unit District, April 2001 to March 2003



This graph shows that there is increased rate of the Category Other fevers than the previous year. This might be due to the increase in the Vector density causing such fevers or it could be due to the fact there are no Standard Case Definitions for most of diseases that are entered in the “Monthly PHC Morbidity Form” and hence there is no uniformity in the reporting from various reporting units.

Figure 13. Trend of Acute Diarrhoeal Diseases & Cholera, Saidapet Health Unit District, 1998 to 2002



Source : ADD Cell, Directorate of Public Health and Preventive Medicine, Chennai

■ Acute Diarrhoeal Diseases - - - Cholera

This shows that there was a sharp decrease in the number of cases in the year 2000 followed by a gradual increase in the subsequent years. The reason for the sharp decrease in the year 2000 could not be made out from my discussions with the State ADD Cell Officer. As per the information obtained, underreporting by the District Officials is a possibility as this data is compiled on a weekly basis from the year 2001 only.

Table 11. Deaths due to Acute Diarrhoeal Diseases & Cholera, Saidapet Health Unit District, 1998 to 2002

Diseases	Year				
	1998	1999	2000	2001	2002
Acute Diarrhoeal Diseases	7	2	1	2	2
Cholera	0	0	0	0	0

Source : ADD Cell, Directorate of Public Health and Preventive Medicine, Chennai

There were no deaths due to cholera but there were fourteen deaths altogether due to Acute Diarrhoeal diseases in the past five years

4. 1. 2. Discussion:

The figures 6 to 8 show that diseases like Congenital Heart Diseases, Other Fevers, Other Respiratory tract infections are on the increasing trend. This could be due to either one or more than one of the following reasons:

1. There are no Standard Case Definitions for most of the diseases that are entered in the "Monthly PHC Morbidity Form" and hence there is no uniformity in the reporting from various reporting units.
2. Increase in the Congenital Heart Diseases could be attributed to the increase in the maternal age due to late marriages. Increased maternal age is a known risk factor for Congenital Heart Diseases.
3. Rapid Urbanisation and changes in the life style of the people could be the reason for the upcoming Non Communicable Diseases
4. Respiratory Tract Infections could be due to air pollution and increases population per square kilometer area
5. Acute Diarrhoeal Diseases are a result of poor sanitary facilities and inadequate or lack of potable drinking water.

Diseases like Dengue fever, Measles, Diphtheria which were not reported the previous year have been reported in the successive year. “Zero Reporting” of poliomyelitis and Neo natal Tetanus has been present in the last two years.

There is evidence from the “Monthly PHC Morbidity Form” to suggest that there has not been an increase in the incidence and prevalence of diseases like Pneumonia, Viral fever, Japanese Encephalitis and Hypertension, Cancer and Diabetes Mellitus respectively. But, it should be viewed with caution while making interpretation for the following reasons:

1. The available data is not representative of the whole general population of the district as it is obtained only from the Primary Health Centres.
2. Morbidity pattern of the Urban areas is not available.
3. The available data quality is to assessed before making any interpretation pertaining to the rural areas of the district at least.

4. 2. Data Quality Assessment:

Given this background, I proceeded with my analysis of assessment of data quality with reference to the non existence of the discrepancy between the two reports i.e. “Monthly PHC Morbidity Form” and the Form 9. Though these are two different forms, they are sent from the single source of the Office of the Deputy Director of Health services, Saidapet Health Unit District and so I had my hypothesis of

“ there is not much difference between the two reports”.

I analysed data for two diseases i.e. Acute diarrhoeal diseases and Acute Respiratory Infections from these two reports.

Table 12. Data for two diseases from two different reports, Saidapet Health Unit District, 2000 to 2001 and 2001- 2002

Diseases	No.of Cases		Discrepancy (%)	No.of Cases		Discrepancy (%)
	2000 -2001			2001 –2002		
	Form 9	PHC Form	Form 9	PHC Form		
ADD*	53570	8865	+ 16	53918	10404	+19
ARI**	34877	84847	- 41	36259	82292	- 44

* Acute Diarrhoeal diseases

**Acute Respiratory Tract Infections

On further analysis of the Form 9 and “Monthly PHC Morbidity Form” with that of the State ADD Cell report showed that neither matched with the State report. So, I could conclude that there was not data consistency and so any interpretation based on any of these sources could not be representative of the true picture of the district.

4. 2. 1. Identification of Diseases of Epidemic potential

Already identified diseases - Acute diarrhoeal diseases and Cholera, Dengue fever, Malaria, Leptospirosis, Measles, Typhoid, Poliomyelitis and Food and water borne diseases.

In addition to these, Japanese encephalitis and Non communicable (NCD)diseases are also coming up. The issue of NCD is being addressed in the Integrated Disease Surveillance Programme (IDSP) to be launched in Tamilnadu soon.

4. 2. 2. Limitations of the study:

The available data is from the Primary health centres only which represent only the rural area. The details of the morbidity pattern of the urban area is not

available. As Saidapet is mostly situated in the peri urban set up, people of this area often seek health care from the urban health facilities. When I say Urban facilities, I mean Private Sector as the Government Health facility in the Urban area is virtually non existent. Since there is not much inter- sectoral co-ordination with the Private sector, we do not get any information regarding the notifiable diseases even. Hence whatever I described in the earlier sections is representative only of the rural population of the Saidapet Health Unit District.

Moreover, since there are no Standard Case Definitions available for most of the diseases that are entered in the “Monthly PHC Morbidity Form” and this non existence of the uniformity rules out the

Inter – district comparison (though I have made an attempt of comparing the district with that of the State average since the whole exercise was about analysing the existing data)

4. 2. 3. Recommendations:

1. Inter – sectoral Co-ordination with private sector to be strengthened.
2. Standard Case Definitions to be framed for those diseases for which data is collected.
3. Collection of data for only those diseases which have public health importance in terms of morbidity and mortality might improve the quality of the data.

4. 3. Trend Analysis of Malaria

4. 3. 1. Objectives

1. To describe the malaria disease in Saidapet Health Unit District
2. To have a trend analysis of the disease malaria

4. 3. 2. Methodology

Data Source - Annual Malaria report from the Office of the Deputy Director Of Health

Services, Saidapet Health Unit District

Data Type - Secondary data

Period of Analysis - January 1999 to December 2002

Data Collection

I visited the Office of the Deputy Director of Health services, Saidapet Health Unit District and got his permission to make use of the data from his office. I collected the data pertaining to malaria for a period of five years. I came to know from the informal interviews with the District Malaria Officer and the Malaria Inspector at the DDHS office that the district was sub divided and re allocated with new Primary Health Centres replacing some of the old ones in the year 1998. So, the data from the year 1999 to 2002 was collected for the purpose of analysis.

Table 13. Overall Situation of Malaria in Saidapet Health Unit District

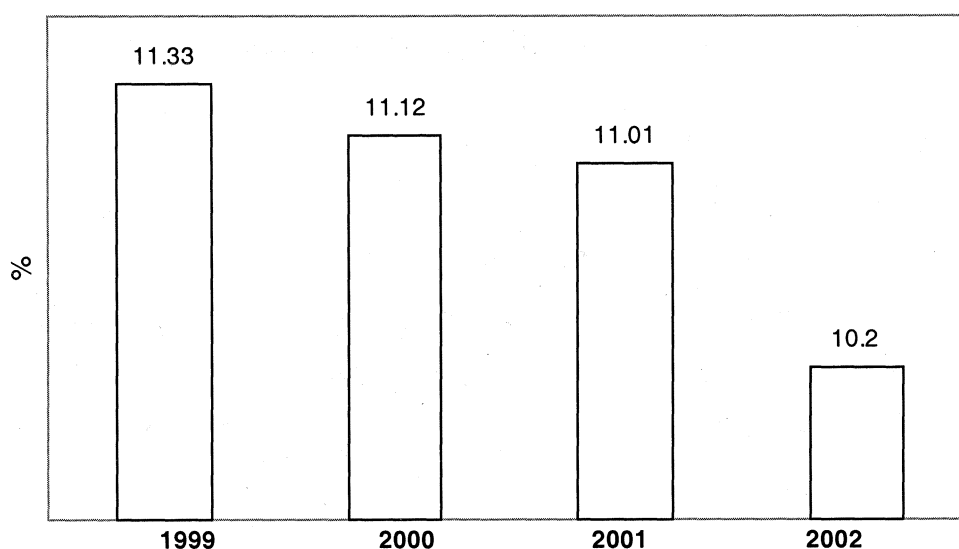
Year	Population	Blood smear collected				Slide Positive		
		Active	Passive	Mass & Contact	Total *	PV	PF	Total
1999	1701407	125891	58248	8562	192701	141	2	143
2000	1734097	130776	55983	6128	192887	96	1	97
2001	1759161	122026	67522	4123	193671	39	1	40
2002	1781568	110059	66704	5826	182589	51	3	54

* Total Blood smear Collected and examined

Table 14. Malaria indicators, Saidapet Health unit District, 1999, 2002

Year	ABER [%]	SPR [%]	API [/1000 population]	PF Cases [as % of total cases]
1999	11.33	0.08	0.08	1.4
2000	11.12	0.05	0.06	1.03
2001	11.01	0.02	0.02	2.5
2002	10.2	0.03	0.03	5.56

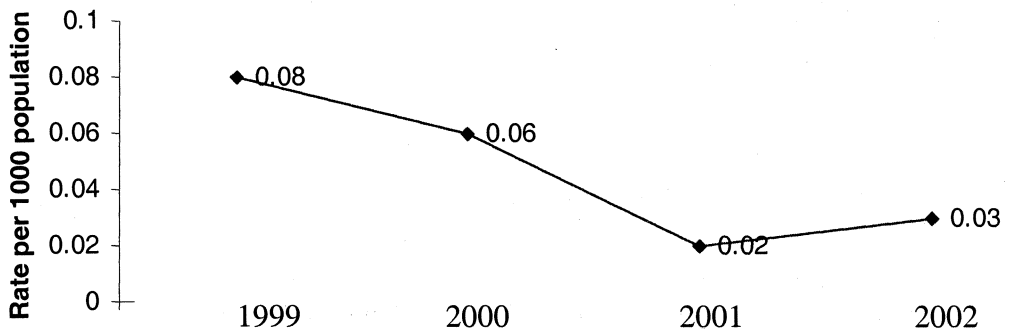
Figure 14. Trend of ABER, Saidapet Health Unit District, 1999 to 2002



The Annual Blood Examination Rate (ABER) is a tool of operational efficiency. There is a norm saying that at least 10 % of the population should be covered each month. From this figure, it is evident that for the past four years the average ABER has been more than the requisite 10%. Though this being the case, there is constant decrease in this indicator i.e. 11.33 % in the year 1999 to 10.2% in the

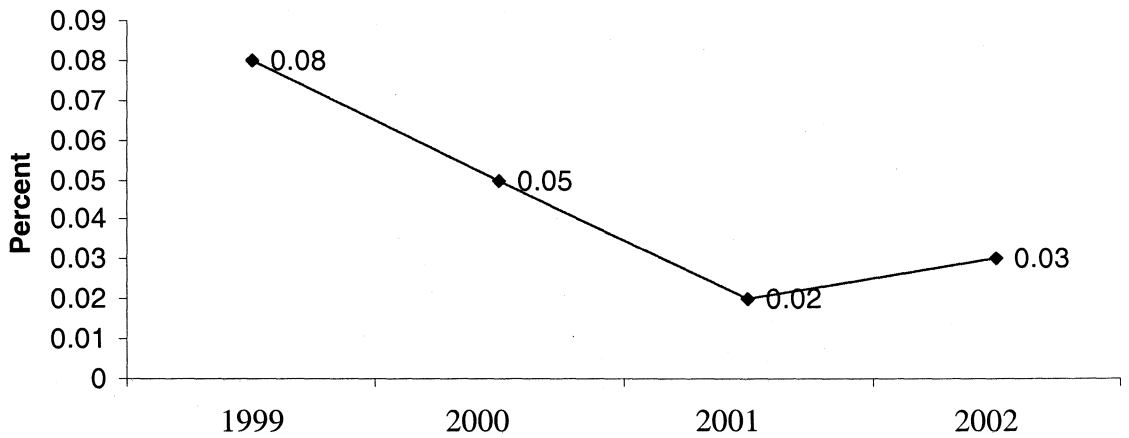
year 2002. This is a cause for concern as Malaria is a disease that has the potentiality for outbreak and if the surveillance is getting weak there is always a reason for outbreak to occur at any time.

Figure 2. Trend of Annual Parasite Incidence, Saidapet Health Unit District, 1999 to 2002



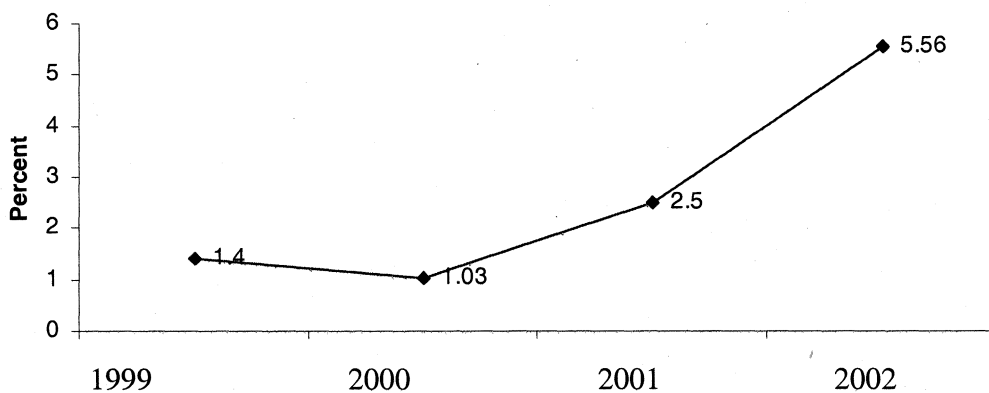
The Annual Parasite Incidence (API) is the most sensitive indicator of the Malaria Surveillance. This is the total number of cases per 1000 population in a given area. From this graph it is seen that though there was a decreasing trend for three years i.e. 1999 to 2001, there has been a slight increase in the rate in the last year.

Figure 16. Trend of Slide Positivity rate, Saidapet Health Unit District, 1999 to 2002



There is an increase in the slight positivity rate in the last year. This could be attributed to two reasons One is that there is a true increase in the positivity rate and the other is that there has been an increased efficiency in the detection of positivity by the Laboratory assistants.

Figure 17. Trend of Plasmodium Falciparum Cases, Saidapet Health Unit District, 1999 to 2002



This figure shows that the Plasmodium falciparum cases are on the increasing trend from the year 2001.

The Figures 13 to 17 give a picture of the Malaria situation and the Surveillance system indicators in Saidapet Health Unit District for the past four years. It is evident from these that (1) the malaria disease is on an increasing trend (2) more and more of Plasmodium falciparum cases are being detected and (3) the ABER is on a decreasing trend. Given this situation, there is always a possibility of an impending outbreak in this district.

Table 15. Malaria positive cases by Distribution, Age and Plasmodium species, Sidapet Health Unit District, 1999

Distribution	P.Vivax			Total	P.Falciparum			Total	Grand Total
	0-	5-15	>15		0-	5-15	>15		
	4				4				
Rural	5	18	115	138	0	0	1	1	139
Urban	0	0	3	3	0	0	1	1	4
Total	15	18	118	141	0	0	2	2	143

Table 16. Malaria positive cases by Distribution, Age and Plasmodium species, Saidapet Health Unit District, 2000

Distribution	P.Vivax			Total	P.Falciparum			Total	Grand Total
	0-	5-15	>15		0-	5-15	>15		
	4				4				
Rural	4	8	77	89	0	0	1	1	90
Urban	0	0	7	7	0	0	0	0	7
Total	4	8	84	96	0	0	1	1	97

Table 17. Malaria positive cases by Distribution, Age and Plasmodium species, Saidapet Health Unit District, 2001

Distribution	P.Vivax			Total	P.Falciparum			Total	Grand Total
	0-	5-15	>15		0-	5-15	>15		
	4				4				
Rural	0	4	35	39	0	0	0	0	39
Urban	0	0	0	0	0	0	1	1	1
Total	0	4	35	39	0	0	1	1	40

Table 18. Malaria positive cases by Distribution, Age and Plasmodium species,

Saidapet Health Unit District, 2002

Distribution	P.Vivax			Total	P.Falciparum			Total	Grand Total
	0-4	5-15	>15		0-4	5-15	>15		
Rural	1	6	43	50	0	0	3	3	53
Urba	0	0	1	1	0	0	0	0	0
Total	1	6	44	51	0	0	1	1	54

Tables 15 to 18 shows that the Plasmodium species particularly attack the more than 15 year age group. This picture is consistent over the years for both the species. Since the age wise split up details were not available for the corresponding years, the attack rate age, year and species wise could not be made.

Figure 18. Rural Malaria Cases by Sex, Saidapet Health Unit District, 1999 to 2002

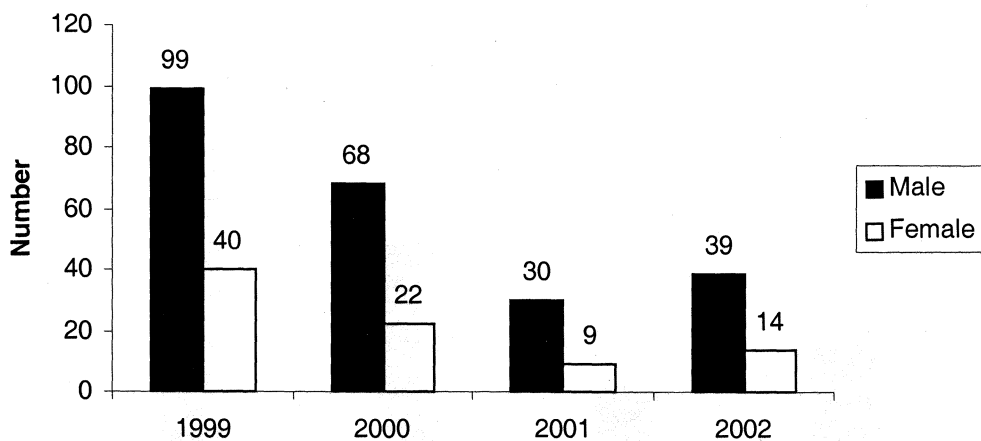
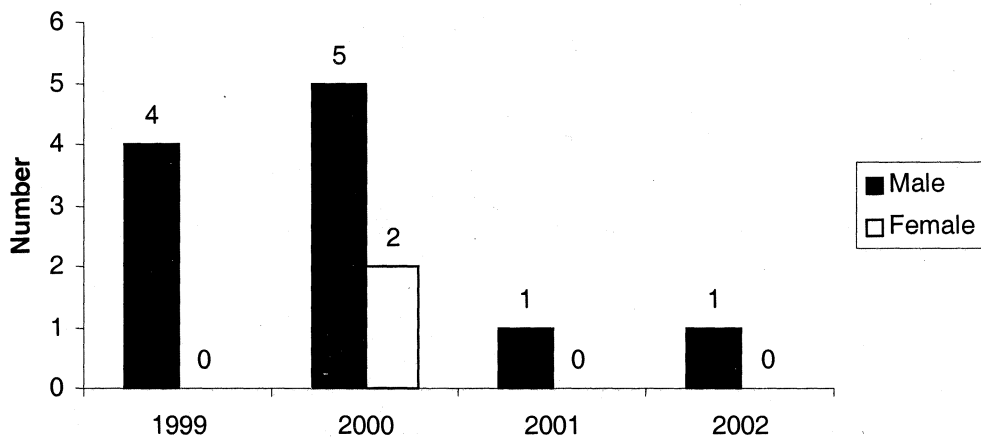
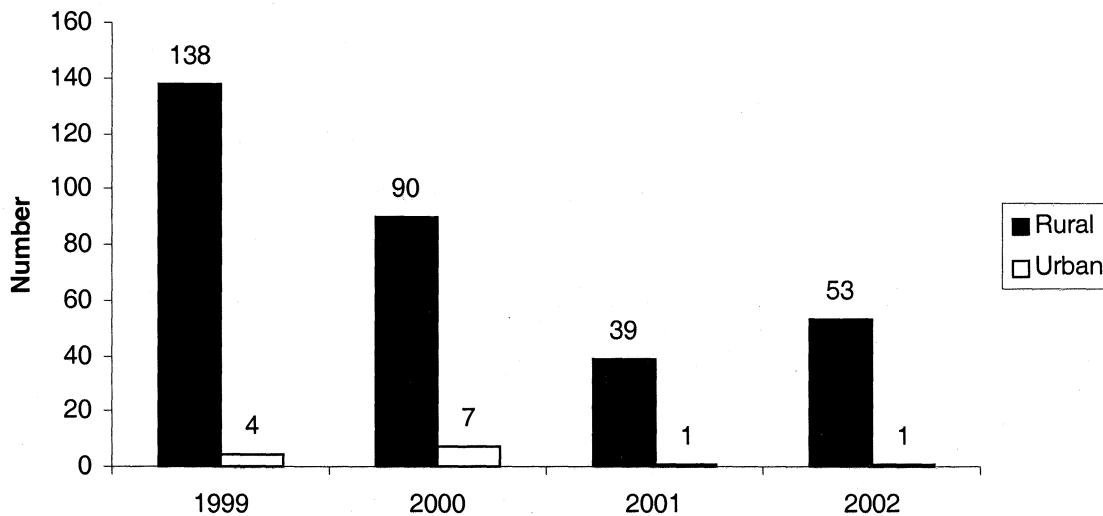


Figure 19. Urban Malaria Cases by Sex, Saidapet Health Unit District, 1999 to 2002



Figures 18 & 19 shows that the incidence of malaria is higher among males when compared to that of the females over the years.

Figure 20. Imported Malaria Cases, Saidapet Health Unit District, 1999 to 2002



Almost all the cases of Malaria are imported ones only. One case of indigenous malaria case was found in the year 1999 in rural area.

Discussion:

For the past four years the average ABER has been constantly in a decreasing trend

i.e. 11.33 % in the year 1999 to 10.2% in the year 2002. There was a decreasing trend in API for three years i.e. 1999 to 2001 but, there has been a slight increase in the rate in the last year and this warrants constant effective surveillance.

The decreasing trend might have been due to the following factors :

1. Local transmission has stopped.
2. Indigenous cases are no longer present.
3. Due to the decrease in rainfall, the mosquito density has decreased.
4. Parasitic load is considerably reduced due to early health interventions [radical therapy]

Added to these factors is the additional fact that the Plasmodium falciparum cases are on the increasing trend from the year 2001. These are all a cause for concern as Malaria is a disease that has the potentiality for outbreak and if the surveillance is getting weak there is always a reason for outbreak to occur at any time.

There has been an increase in the slide positivity rate in the last year. This could be attributed to two reasons One is that there is a true increase in the positivity rate and the other is that there has been an increased efficiency in the detection of positivity by the Laboratory assistants. In fact this could well be the truth as all the Laboratory Assistant post vacancy has been filled in the last year.

Saidapet District is mainly a peri – urban area and lots of ongoing works like construction, summer vocations like brick kilns and industries like Ford Car company are the main reasons for people to migrate from various parts of the State and bordeing States to this area. Very high possibility of import of Malaria cases is present.

To conclude, (1) the malaria disease is on an increasing trend (2) more and more of Plasmodium falciparum cases are being detected and (3) the ABER is on a decreasing trend. Given this situation and the district having history of imported malaria cases in the past years, there is always a possibility of an impending outbreak in this district.

Recommendations:

Malaria surveillanace to be strengthened as there is enough data that support the impending possibility of an outbreak in the near future.

Main concentration to be made in the construction sites where in – migration is a cause for concern for the imported Malaria cases.

Chapter 5. Maternal Mortality Analysis

1. Background

Maternal Mortality Rate (MMR) is a sensitive index of the health status of women in a society. The MMR in Tamilnadu has been fluctuating between 120/100,000 live births in 1996 and 140/100,000 in 1999 (DANIDA Survey, 1999). As per the Tamilnadu State Government Health Policy 2000, the goal is to reduce MMR to below 100/100,000 by the year 2005. Therefore a study was undertaken to : (1) Identify and describe the various factors influencing MMR in Tamilnadu and (2) Suggest measures to reduce the risks for MMR.

2. Methodology

Analysis of Maternal Deaths Reported from the Community through the Government Public Health System for the entire state of Tamilnadu during April 2001 to March 2002. Data Source : "Maternal Death – Case Investigation Sheet". Total number of maternal death case investigation sheets received and analysed were 1116, i.e. 68% of all maternal deaths reported.

3. Objectives

- To describe the Causes of Death of maternal deaths in Tamilnadu.
- To examine the variability in maternal mortality rate [MMR] of the districts with reference to demographic, social,obstetric factors and utilisation of health services

4. Results

The data was received only from 25 districts and these were analysed.

The tables are described first and then the results are discussed.

Table 19. TamilNadu deliveries and Maternal deaths [April 2001- March 2002]

Place of delivery	No.of deliveries	% of deliveries to total	Maternal deaths	% of deaths to total deaths
Govt.hospitals	436354	36.97	495	50.56
PHC&HSC	145043	12.29	19	1.94
Private hospitals	456003	38.63	214	21.86
Domiciliary	142770	12.09	251	25.64
Total	1180170		979	

Expected maternal deaths –1770 [with an average of 1.5/1000 live births]

Reported deaths - 1416 [as per form 9]

Received case sheets - 1245

Deaths analyzed - 1116

Table 20. Period of death

	Antenatal	Natal	Postnatal
Deaths	208	79	822
%	18.64	7.08	73.66

Nk -7 [0.65%]

Table 20 shows that 74% of the total maternal deaths occur in the post-natal period.

Table 21. Place of death

Place of death	No.of deaths	%[to total deaths]
Govt.Hospitals	479	42.92
Home	216	19.35
Private hospitals	214	19.18
Transit	182	16.31
PHC/HSC/CHC	14	1.25
Maternity Centre	4	0.36
Others	1	0.09

NK -6[0.54%]

Table 21 shows that 43% of the maternal deaths are occurring in Government hospitals. This could be due to the fact that complicated cases are often referred to the apex institutions or due to late referral followed by peripheral hospitals. Another 16% are in the transit which has to be carefully looked at as the serious cases are referred very late and the death occurs in the transit period.

Table 22. Cause of death

Causes	No.of deaths	%
PPH	278	24.91
PIH	129	11.56
Heart disease compli.. pregnancy	82	7.35
Anemia & malnutrition	81	7.26
Sepsis	60	5.38
APH	45	4.03
Post.op complications	39	3.49
Jaundice compli..preg	34	3.05
Rupture uterus	31	2.78
Thrombophlebitis	19	1.70
Puerperal psychosis	15	1.34
Prolonged/Obstructed labour	14	1.25
Others	289	25.90

Table 22 shows that the most common cause of maternal death is post partum hemorrhage. The category “others” includes antenatal, natal and post natal others where the cause of death is usually written as “Cerebro Vascular Accidents”

Table 23. Antenatal care

	Fully provided	Partially provided
Deaths	337	779
%	30.20	69.80

Early registration - 848 [75.99%]
 AN 5 Visits - 745 [66.76%]
 TT[II Doses] - 1079 [96.68%]
 IFA –Fully consumed –481 [43.10%]
 Partially “ -150 [13.44%]
 Not “ - 220 [19.71%]
 Not known 331 [29.66%]

Table 24. Outcome of pregnancy

	Delivered [live, still, multiple]	Not delivered	Abortion
Deaths	864	199	14
%	77.42	17.83	1.25

Not known –39[3.49%]

Table 25. Nature of delivery

	Normal	Assisted	Caesarean
Deaths	632	64	169
%	69.60	7.05	18.50

Not known –43[4.85%]

Antenatal deaths 208

Table 25 shows that 19% of the maternal deaths had occurred following caesarean section.

Table 26. Caesarean deaths

Place of delivery	Number of deaths	%
Govt.Hospitals	112	66.3
Private Hospitals	57	33.7

Table 26 shows that of all the cesarean deaths, 66% of them occurred in Government hospitals.

Table 27. Type of attention received at the time of death

	Doctors	Paramedical	Trained Dai	UTD/Relative
Deaths	514	152	101	100
%	56.61	16.74	11.12	11.01

NK -41[0.33%]

Table 27 shows that 11% of the maternal deaths were attended by untrained dais.

Table 28. Maternal deaths in relation to age[in years]

	<19	20-29	30-39	>39
Deaths	72	776	246	13
%	6.45	69.54	22.04	1.16

NK -9 [0.81%]

Table 28 shows that maternal deaths are occurring mostly in the 20 to 39 age group.

Table 29. Maternal deaths in relation to Gravida

	1	2	>2
Deaths	389	266	457
%	34.86	23.84	40.95

NK -4[0.365]

Table 29 shows that maternal deaths are more in the more than gravida 2.

Socio-economic analysis

Table 30. Maternal deaths in relation to Community

	SC	ST	MBC	Others
Deaths	423	42	298	353
%	37.90	3.76	26.70	31.63

Table 30 shows that maternal deaths are more in the Scheduled Caste community.

Table 31. Maternal deaths in relation to Religion

	Hindu	Christian	Muslim	Others/Unknown
Deaths	998	60	38	20
%	89.43	5.38	3.41	1.79

Table 32. Maternal deaths in relation to family income[Rs]

	<1000	1000-<2000	2000-<3000	3000-<5000	5000- <10000	10000& above
Deaths	896	149	38	19	11	3
%	80.29	13.35	3.41	1.70	0.99	0.27

Table 32 shows that maternal deaths are more in the lower socio economic status

4. Discussion

Among the maternal deaths that occurred, the following factors influencing MMR in Tamilnadu were identified:

Socio Demographic : maternal age below 19 years (7%) and above 30 years (34%); birth interval less than 3 years (62%) ; female literacy below primary school (68%); Family income below Rs.12, 000 / annum (80%) and Scheduled castes, tribes and most backward communities (68%).

Obstetric: Primi gravida (35%), women with parity > 2 (21%)

Health Care: Incomplete Antenatal care (70%), Domiciliary deliveries(22%), deliveries in private institutions (21%), Maternal Deaths after cesarean sections in private Institutions (27%).

5. Summary

1. 75.60% are institutional deliveries and 12.09% are domiciliary deliveries.
3. 25.64% of maternal deaths occurred at home and 21.86% occur in private hospitals.
4. Full antenatal care was provided for 30.20% of pregnant women by the government sector
5. Deaths due to higher order births is 18.90%
5. 33.73% of Caesarean deaths occur in Private Hospitals.

6. Limitations

Incomplete data from the reported districts

Non-reporting from the districts with higher MMR

7. Recommendations

- Complete final analysis is to be made after the receipt of all case sheets.
- In- depth case studies are needed to make final conclusions.
- Periodic training of health personnel is to be made.

SECTION.2

Epidemic Preparedness and Outbreak Response

Chapter 6. Thiruvannamalai Mahakumbabishekam - Epidemic preparedness and Response

1. Background

Thiruvannamalai is one of the 42 municipalities of Tamilnadu State. The total area is 13.64 km² with a population of 1,30,376. The famous “Arunachaleswarar temple” is located in this city. The common notified festivals that occur here are “Karthigai Deepam” and “Arunagirinath festival”. “Giri Valam” is a general happening on “Poornima” of every month. Pilgrims from all over the State visit this place to attend these festivals.

The last Kumbabishekam was done in the year 1974 and after 26 years, it is being carried out in June 2002. The expected number of devotees were roughly 15 lakhs. But in reality, only 3 lakhs attended the function.

2. Objectives

To learn the actions involved in the epidemic preparedness and response

3. Methodology

Study area - Thiruvannamalai Municipality

Study period - Pre, during and post Kumbabishekam period (20 & 21.6.2002, 27-29.6.2002 and 9&10.7.2002)

Sources of data - Records and registers, meeting minutes, IEC materials from the Municipal health Office and Deputy Director of health Services, Thiruvannamalai

Types of data - Primary and Secondary

Data collection

Discussion with the Municipal Health officer and the Officer in-charge for the festival was made regarding the arrangements made prior to the festival and the information was collected. Records and registers maintained were also gone through.

4. Findings

4. 1. Epidemic preparedness:

The epidemic preparedness was found to be adequate. The evidence for the following activities was found in the records at the Municipal Health Office:

1. Sensitisation meeting for Commissioner, local body Chairman and its counsellors and important local leaders
2. Orientation and sensitisation training for the Medical Officers and other health staff.
3. Identification of medical camp sites
4. Resource mobilisation and allocation
5. Logistic supply arrangements
6. Mass cleaning of the whole city
7. Anti fly measures since 15.6.2002. The initial fly index of 450/sq.km had reduced to 17/sq.km
8. Sensitisation meeting for the owners of lodges and hotels was done in which the importance of good sanitation maintenance was reinforced.
9. Periodical inspection of the lodges, hotels, cool drinks factories was made.
10. Water Sanitation was maintained : All the water sources and teh distribution points were chlorinated adequately on a daily basis.
11. Sanitary facilities – In addition to the existing four private lavatories, 10 temporary latrines have been constructed.
12. Anti mosquito measures like desilting of the channels and removal of the silt with tractors and fogging have been undertaken.

4. 2. During the festival

Routine public health activities like cleaning, provision of safe water, sanitary facilities and anti fly and anti mosquito measures were in force. Medical care was provided to those in need. 10 medical camp sites were functioning round the clock for the two festival days i.e. 26 & 27.6.2002. Adequate manpower was present. One Medical Officer, one female health worker and one helper were present in each site. Each medical site was provided with electricity

facilities and water supply. Minor ailments and first aid were attended to at these sites. Drug needed for treating these ailments and the first aid kit supply was found to be satisfactory. In the event of reporting of acute diarrhoeal diseases, complete identification details like name, age, sex and address of the patient was obtained so that follow up of these patients at a later date was made possible. Two mobile medical teams were also functioning for the two days.

Annadanam

Annadanam was provided by sponsors for 1 week including the two day festival period. Inspection of the food and water served and also the place of food serving was done by me along with the Joint director of Epidemics, Deputy director of Health Services, Municipal Health Officer and Officer in-charge of the festival. The inspection revealed that the food and water quality was maintained satisfactorily. The place where the food was served also was clean to the extent possible. The anti fly measures were being adhered to strictly and the chlorination of water was also being done regularly.

Strengthening of infrastructure

Infrastructure	Existing number	Deputed number
Staff		
Sanitary inspector	4	5
Sanitary Supervisor	9	10
Sanitary Worker	100	200
Drivers	1	4
Vehicle		
Lorry	9	2
JCP	Nil	1
Tipper Tractor	Nil	2
Tanker Lorry	Nil	4

4. 3. After the festival

Visit made after the end of the festival revealed that there were no reporting of any outbreaks.

5. Lessons learnt

Visit to an area where a notified festival is occurring has enabled me to understand the activities involved in the prevention of an outbreak.

Chapter 7. Investigation of a gastrointestinal outbreak at Kalyanapuram, Chennai, 2002

1. Background:

1. 1. First Information Report:

The first reporting of children affected by diarrhoea and vomiting in the kalyanapuram slum was made by “The Hindu” newspaper on May 17th 2002. As per the report, 17 children were affected and admitted to hospital. I could not get much information from the government offices regarding the general information about the area as the next two days happened to be Saturday and Sunday. However, I visited the area and made enquiries regarding the gastrointestinal illness and found out that 18 children had been affected. Out of these 18 children, 12 were admitted and treated at the Stanley medical college hospital and 6 were admitted and treated in the infectious disease hospital, Tondiarpet. As there was a sudden increased clustering of cases, I proceeded with the outbreak investigation and a matched case control study by age and sex.

1. 2. Geographical Information of the slum area:

Kalyanapuram is a slum very near to the Central Railway Station, Chennai. It has a population of three thousand five hundred and seven (3507). It is a densely populated area with people belonging to lower socio-economic area. The major occupation of most of the people here is agricultural labourer. With the exception of very few houses all of them are of the “kutchra” type and there is no separate

kitchen area. The residents use a common lavatory (Sulabh Souchalya) which is situated near the entrance to the slum. The source of water is a common hand pump which is near to the lavatory. Buying foods from vendors is a common practice here especially in the morning hours as most of the residents leave for the work place very early in the morning.

2. Objectives:

1. To investigate the gastro intestinal illness
2. To control the existing outbreak
3. To prevent the occurrence of such future outbreaks

3. Methods:

Study area : Kalyanapuram slum

Study design : Matched Case- Control Study

Study tool : Structured questionnaire (Annexure I)

A. Team formation:

A team was formed to carry out active case finding on a house to house basis which consisted of myself as the principal investigator and the health workers of the Trivelyn Basin Health Post of the Chennai Corporation and also the Anganwadi workers of the Kalyanapuram area. The team was apprised of the case definition and control definition.

B. Determining the existence of the outbreak

The corporation office was contacted to find out if any reporting of such similar illness has been made in the previous years and it was found that was not the case. The presence of gastrointestinal illness in seventeen individuals in the resident population of Kalyanapuram at any given point of time was not found in the the previous years. Hence, this episode of gastrointestinal illness was considered an “outbreak” and an investigation of the same was conducted.

C. Confirming the diagnosis:

Clinical :

The real presence of the outbreak was confirmed by me. I went to the affected area and reviewed the history and clinical findings of the cases. The cases that were admitted in the hospital were also contacted and the relevant data was collected. The case sheets of these cases were obtained for clinical details like fever at the time of admission.

Definitions:

Probable Case : Any person residing in the Kalyanapuram slum area and who had vomiting, diarrhoea with or without fever, abdominal pain, nausea since 10-19th of May 2002.

Confirmed Case : A probable case with laboratory confirmation with the criteria dependant on etiologic agent.

Control :Age and sex matched person residing in the Kalyanapuram area and who did not have gastrointestinal illness during the period 10-19th of May 2002

Epidemiological:

Laboratory:

Water Sampling:

Water Sample was collected from the source and three distribution points i.e.households and sent for water quality analysis at the Kilpauk water works.

Food Sampling:

Food samples could not be collected from the house holds as well as from the Vendors who supplied food as the remains were thrown away by the time I could reach the site.

Stool Samples:

The stool specimens of all the admitted cases were examined to rule out the differential diagnosis of cholera and none of the sample was positive for Vibrio cholera.

D. Environmental Investigation

The environmental investigation was undertaken before starting the study per se to find out the existing sanitary facilities in the affected area.

E. Active Case Finding:

This was done on a house to house basis in the whole slum area and an additional seven cases were found who fit our case definition. Line listing of cases was done.(Annexure II)

Prominent people in the slum area like self group members and youth association president were contacted for information about any factors or incidents like local festivals that might have triggered the outbreak. No such occurrence was found. The Anganwadi worker informed that six children who attended the centre on May 16th 2002 had vomiting and four others had vomiting and diarrhoea. She was very specific in saying that all ten children had these symptoms within half an hour of coming to the centre and that they had not consumed any food or water from the centre. This particular information was cross verified at the time of direct interviewing and was found to be true.

F. Case Management:

Eighteen out of the twenty four cases (75%) was admitted to the Government Hospital for treatment. Twelve were admitted at the Stanley Medical College Hospital and Six were admitted at the Infectious Disease Hospital, Tondiarpet, Chennai. Stool samples were collected from all the admitted patients and they were discharged in two days.

G. Action Taken to prevent such future outbreaks:

Health education was given to the residents of the slum regarding good sanitary measures like making their own foods, boiling water and avoidance of consumption of food from outside vendors. The structured questionnaire was administered to all identified households with the cases and age & sex matched

family / neighbour hood controls. The health workers and the anganwadi workers played a key role in identification of the households of cases and controls. The questionnaire was administered by myself and the respondents were mothers (n=42) , grandmothers (n=4) and aunt (n=2)

The outbreak – in brief:

One case had gastro intestinal symptoms on the 15th of May,2002. Twenty three out of the total twenty four cases had gastro intestinal illness on May 16th 2002. Sixty seven percent of the cases had idiyappam from an outside vendor who regularly supplies food to that area. The average incubation period was four hours. The illness per se lasted for only one day though the hospital admitted cases were discharged after two days for want of the results from the laboratory. No further cases were reported after 16th May, 2002 .

Preliminary hypothesis:

A point source gastro intestinal outbreak has occurred. Sixteen of the twenty four cases had consumed idiyappam from an outside vendor for breakfast and had fallen ill and this suggests that the possible contaminated food could be idiyappam purchased from the outside Vendor. However, the role of other food items and water could not be ruled out.The likely source of infection could either be food borne or water borne. The median incubation period was four hours and this suggests that we are dealing with a bacterial agent most likely *Staphylococcus aureus*.

4. Results:

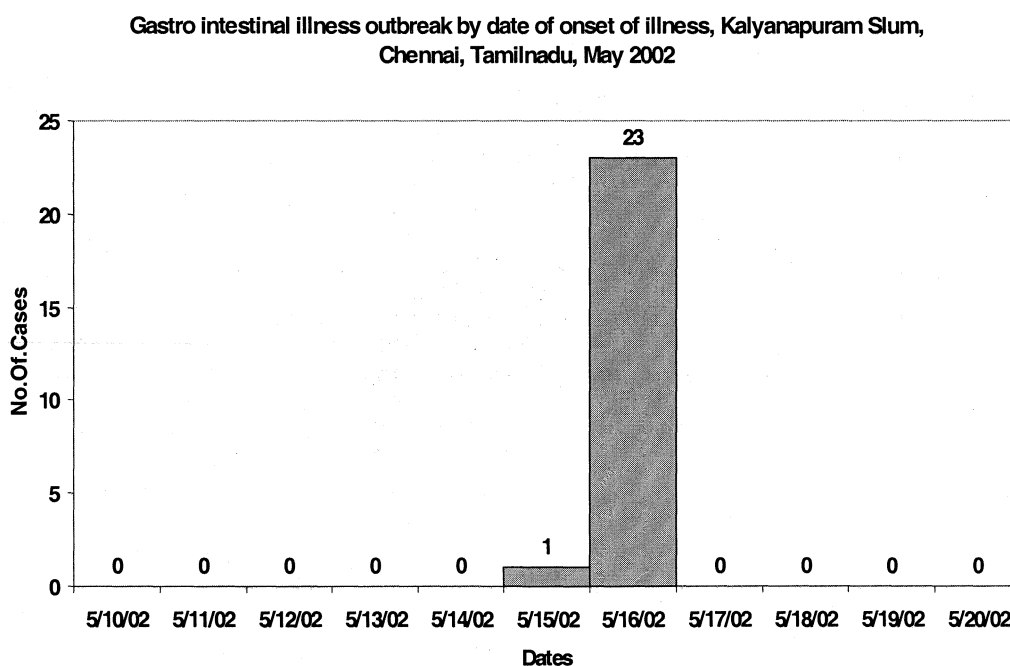
Environmental investigation

The environmental investigation revealed that this slum is a highly congested area with Five hundred and fifty households and with a population of three thousand five hundred and seven. More than ninety percent of the houses are of the “kutchra” type and there is no separate kitchen facility in any of these houses. They cook in front of their houses where an open drainage is running along.

Two street vendors were found to be selling foods like “idli, vadai and bajji”. On enquiry it was found that they are local residents who make and sell these items in front of their houses. Many local people were found to be purchasing foods from these people and eating even during the investigation period. There is no separate bathroom facility for the individual houses. There is a common lavatory “Sulabh Souchalya” which is within ten feet of the drinking water source. There is one hand pump which serves the whole slum area. People bathe, wash clothes and take drinking water from this particular source. On the whole the sanitary conditions of the slum area was very poor.

Descriptive Epidemiology:

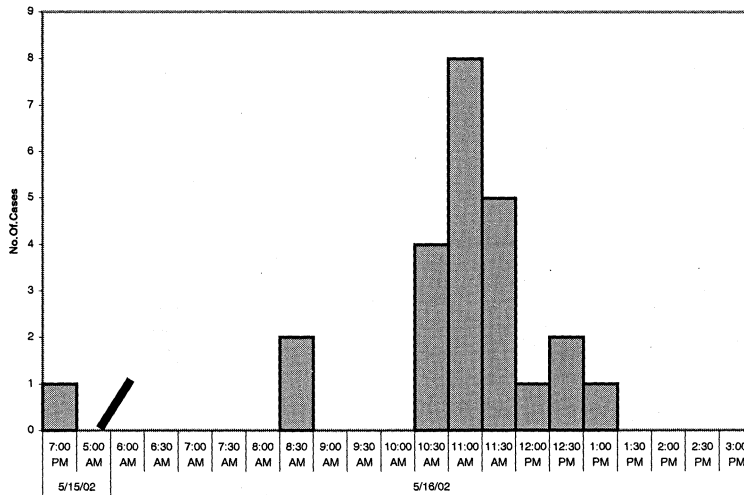
A. Time distribution



There is a sharp increase in the no.of cases on May 16th.No more cases were found till 20thMay 2002

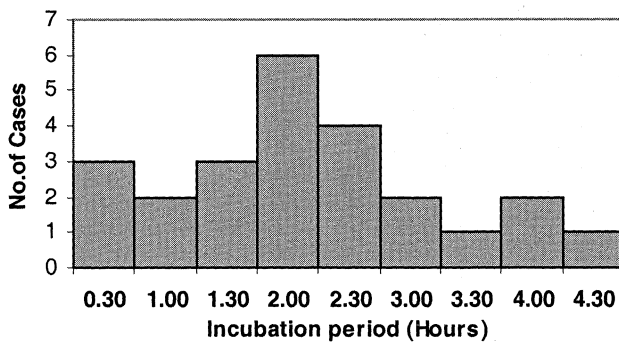
Epicurve of a gastro intestinal illness outbreak by time and date of onset, Kalyanapuram Slum, Chennai, Tamilnadu, May 2002 (n=24)

The epicurve shows that there was one case on May 15th 2002 and the rest of the



Cases occurred on May 16th 2002. The cases started occurring by 8.30 AM of 16th and the last case was by 1.00 PM of the same day. The median incubation period of the outbreak is 11.00 AM of May 16, 2002 as 50% of the cases has occurred by this time.

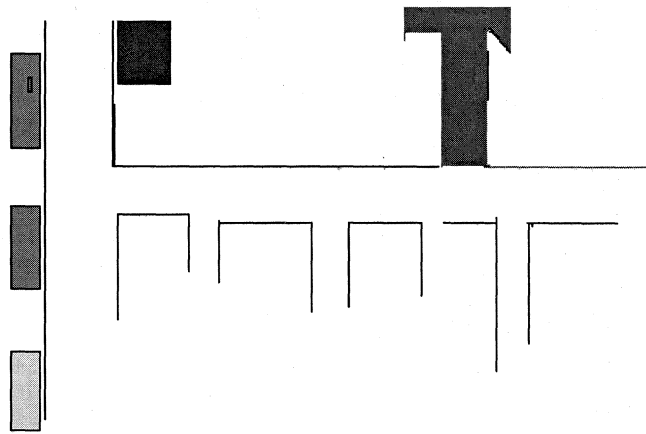
Distribution of cases by time of exposure and onset of illness, Gastrointestinal illness Outbreak, Kalyanapuram Slum, Chennai, May 2002 (n=24)





The minimum incubation period was 0.30 hours and the maximum incubation period was 4.30 hours

B. Place Distribution

Location of the Kalyanapuram Slum in Chennai City



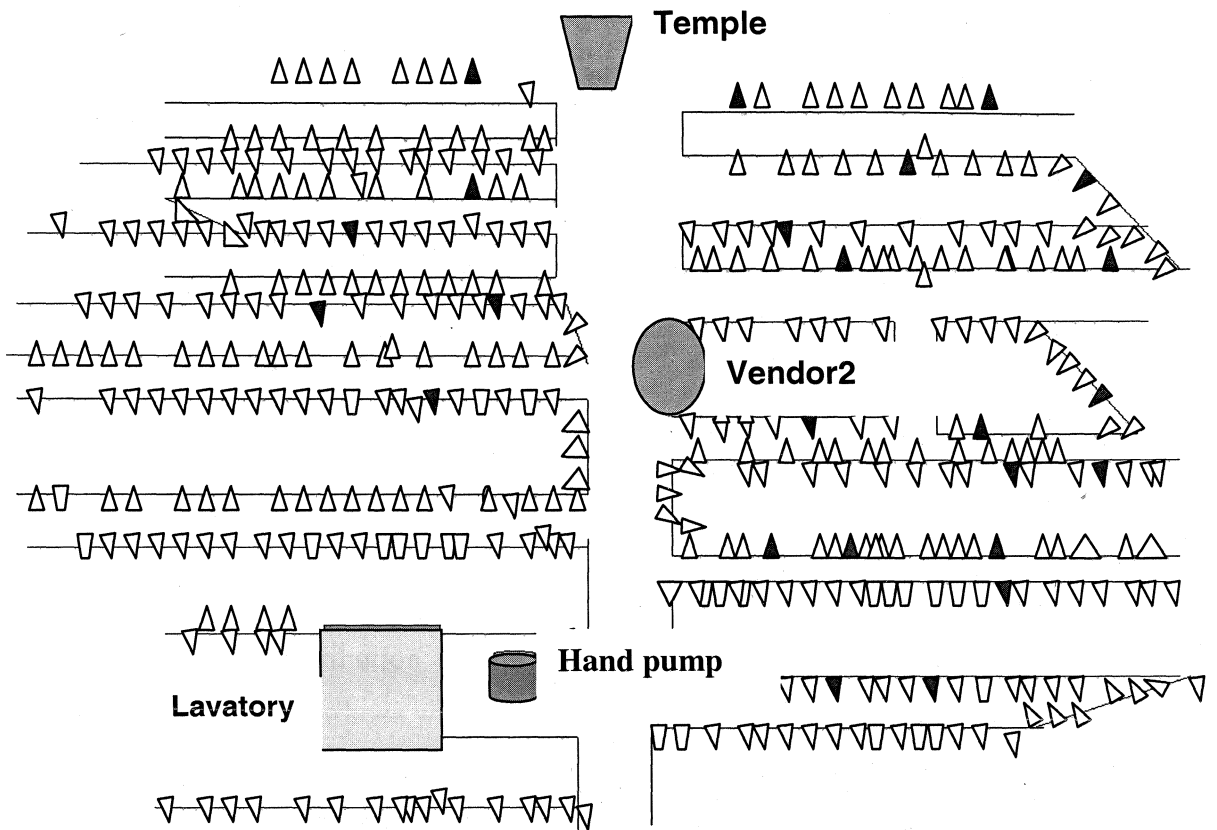
 Government Hospital

 Slum Area

 Madras Medical College

 Central Railway Station

Spot map of the Kalyanapuram Slum area



It is evident from this spot map that the houses in this slum are very closely located. Though it looks like the cases are scattered, in reality this is a very densely populated area and the occurrence of twenty four cases in one day is abnormal. Vendor 2 is a local resident who makes and sells food items at her home. Vendor 1 is an outside person who has been selling food items in the morning usually by 6 to 6.30 am for many years.

C. Person Distribution

Table 33. Frequency distribution of Symptoms, Gastrointestinal Illness Outbreak, Kalyanapuram, Chennai, May 2002 (n=24)

Symptom	No.Of.Cases	%
Vomiting	22	92
Diarrhoea	18	75
Diarrhoea + Vomiting	17	71
Fever	4	17
Diarrhoea+Vomiting+Fever	4	17

The frequency distribution of symptoms were as follows: vomiting 92%; diarrhoea 75%; diarrhoea with vomiting 71% ; fever 17%; and diarrhoea with vomiting and fever 17%.The percent distribution does not come to 100% as one case might be included in more than one category of symptom.

Table 34. Attack rates by age, Gastrointestinal Illness Outbreak, Kalyanapuram, Chennai, May 2002 (n=24)

Age Group (in years)	No.Of.Cases	Total Population	Attack rate per population	per 1000
1-3	9	146	62	
3-5	10	141	71	
5-6	-	71	-	
6-10	2	272	28	
10-14	-	251	-	
>14	3	2626	11	
Total	24	3507	6.8	

The overall attack rate by age is 6.8 per 1000 population (24 out of 3507). Attack rate by age shows that children aged 1 to 3 years were 62 per 1000 population, 3 to 5 were 71 per 1000 population, 6 to 10 were 28 per 1000 population and more

than 14 years were 11 per 1000 population. Children in the age group of 5 to 6 and 10 to 14 years and infants were not affected.

Table 35. Overall attack rate by sex, Gastrointestinal Outbreak, Kalyanapuram, Chennai, May 2002 (n=24)

Sex	No.Of.Cases	Total population	Attack rate per 1000 population
Male	8	1927	4
Female	16	1580	10

Overall attack rates by sex were 4 per 1000 males and 10 per 1000 females.

Attack rates per 1000 population by sex and age group showed that in males 22 were in the 1 to 3, 67 in the 3 to 5, 7 in the 6 to 10 year age group and in females 127 were in the 1 to 3, 76 in the 3 to 5, 8 in the 6 to 10 and 3 in the >14 year age group.

Table 36. Attack rates by sex and age group, Gastrointestinal Illness Outbreak, Kalyanapuram, Chennai, May 2002 (n=24)

Age Group (in years)	No.Of.Cases		Attack rate per 1000 male population	No.of cases		Attack rate per 1000 female population
	Male	Total population		Female	Total population	
1-3	2	91	22	7	55	127
3-5	5	75	67	5	66	76
5-6	-	32	-	-	39	-
6-10	1	141	7	1	131	8
10-14	-	121	-	-	130	-
>14	-	1467	-	3	1159	3
Total	8	1927	4	16	1580	10

The attack rates per 1000 population by sex and age group shows that amongst males it was 22, 67 and 7 in the 1 to 3, 3 to 5 and 6 to 10 year age group respectively and amongst females it was 127, 76, 8 and 3 in the 1 to 3, 3 to 5, 6 to 10 and >14 year age group respectively.

Table 37. Food specific attack rate, Gastrointestinal Illness Outbreak, Kalyanapuram, Chennai, May 2002 (n=24)

S.No	Food Item	No.Of.Cases	Attack rate (%)
1	Idiyappam only	15	63
2	Idli only	4	17
3	Pongal only	1	4
4	Rice only	2	8
5	Others+Idiyappam	2	8
	Total	24	100

Food specific attack rates (%) for idiyappam was 63, for idli 17, for pongal 4, for rice 8 and for other foods like puttu and rice ate along with idiyappam was 8.

Table 38. Food specific attack rate by age, Gastrointestinal Illness Outbreak, Kalyanapuram, Chennai, May 2002 (n=24)

Age Group (in years)	Food Item									
	Idiyappam		Idli		Pongal		Rice		Others+ Idiyappam	
	C	AR %	C	AR%	C	AR%	C	AR%	C	AR%
1-3	6	40	1	25	1	100	0	-	1	50
3-5	7	46	2	50	0	-	1	50	0	-
5-6	0	-	0	-	0	-	0	-	0	-
6-10	0	-	0	-	0	-	0	-	1	50
10-14	1	7	0	-	0	-	0	-	0	-
>14	1	7	1	25	0	-	1	50	0	-
Total	15	100	4	100	1	100	2	100	2	50

C – Cases ; AR – Attack rate per 100 cases

The food specific attack rate (%) for idiyappam by age group was 40, 46, 7 and 7 for 1 to 3, 3 to 5, 10 to 14 and >14 year age group. The attack rate (%) for idli was 25, 50 and 25 for 1 to 3, 3 to 5 and >14 year age group, for pongal it was 100% in the 1 to 3 age group, for rice it was 50% and 50% in the 3 to 5 and >14 year age group and for other foods like puttu and rice with idiyappam it was 50% and 50 % in the 1 to 3 and 6 to 10 year age group .

Table 39. Food specific attack rate by Sex, Gastrointestinal Illness Outbreak, Kalyanapuram, Chennai, May 2002 (n=24)

Sex	Food Item									
	Idiyappam		Idli		Pongal		Rice		Others+ Idiyappam	
	C	AR %	C	AR%	C	AR%	C	AR%	C	AR%
Male	6	40	2	50	0	-	0	-	0	-
Female	9	60	2	50	1	100	2	100	2	100
Total	15	100	4	100	1	100	2	100	2	100

C – Cases ; AR – Attack rate per 100 cases

The food specific attack rate(%) by sex was 40 in males and 60 in females for the food idiyappam. The attack rate was 100% for females in all the foods like pongal, rice and others + idiyappam and the AR was 50% each in females and males for the food idli.

Table 40. Attack rate by Place of preparation of food, Gastrointestinal Illness Outbreak, Kalyanapuram, Chennai, May 2002 (n=24)

S.No	Food Item	Place of preparation					
		Home		Vendor 1		Vendor 2	
		C	AR %	C	AR %	C	AR %
1	Idiyappam only	0	-	15	100	0	-
2	Idli only	1	33	0	-	2	67
3	Pongal only	1	100	0	-	0	-
4	Rice only	2	100	0	-	0	-

C – Cases ; AR – Attack rate per 1000

*The category others + idiyappam is not included for this particular analysis as they are not mutually exclusive. However, it was found that the puttu and rice eaten by this category members were prepared at home and idiyappam was purchased from Vendor 1.

The attack rate (%) by place of preparation shows that it was 100 for idiyappam by Vendor 1 and 100 for pongal and rice prepared at home. The AR for idli prepared at home was 33% and that prepared and distributed by Vendor 2 was 67%

Table 41. Food specific Odds Ratio, p values, χ^2 , Gastrointestinal Illness Outbreak, Kalyanapuram, Chennai, May 2002 (n=24 matched pairs, 1:1)

Food Item	Odds Ratio	95% CI	p	χ^2	Attributable(A)/ Preventive(P) fraction
Idiyappam	7.00	1.53,44.55	0.0059	7.56	86 (A)
Idli	0.33	0.05 ,1.81	0.288	1.13	67 (P)
Pongal	0.20	0.01, 1.74	0.2206	1.50	80 (P)
Rice	0.40	0.05 ,2.31	0.449	0.57	60 (P)
Others+ Idiyappam	0.20	0.01 ,1.74	0.2206	1.50	

The Odds of eating the food item idiyappam in those who had the gastro intestinal illness is seven times when compared with that of those who did not have the illness.

The Odds of eating the food items like idli, pongal , rice and others + idiyappam in those who had the gastro intestinal illness is less than 0.5 as compared to that of those who did not have the illness.

Water Sample:

The water analysis report of the Kilpauk Water Supply showed that the water from the hand pump as well as from the three households is potable drinking water.

Stool Sample:

The stool samples from all the admitted inpatients of both Stanley Medical College and Infectious Disease Hospital were negative for *Vibrio Cholerae*.

5. Discussion

The gastro intestinal illness was reported only for one day (5/16/2002) except for the one exceptional case the previous night(5/15/2002). This one case had consumed food supplied from the outside vendor the previous day i.e. she had bought idiyappam in the morning and had consumed it in the evening by around 15.00 pm. The other people who had idiyappam on 5/15/2002 in the slum did not have any illness. So, the one history of illness reported in a forty year old lady can be considered as a solitary event. As the whole outbreak period was confined to only one day, this could be classified as “Point Source Outbreak”.

The water analysis showed that water was not the source of infection. The stool samples showed that the infection was not due to *Vibrio Cholerae*. The attack rate for the food idiyappam of vendor one was 67 percent. The Odds of eating the food item idiyappam in those who had the gastro intestinal illness is seven times when compared with that of those who did not have the illness. All these factors computed together shows clearly that the source of infection is the food “ idiyappam”. As this idiyappam was made and supplied by only Vendor one on the day of outbreak (attack rate 100%), we can conclude that the food idiyappam supplied by Vendor one is the source of infection.

The mean incubation period of the illness was four hours and this suggests the possible causative organism to be *Staphylococcus aureus*. The food samples could not be obtained as the remains were thrown away by the time I could reach the site and so the confirmation of the causative organism could not be established.

6. Limitations:

Food samples for confirmation of the causative organism could not be obtained as the remains were thrown away.

The health status of the food vendor and the inspection of the place of preparation of the food could not be done as the food vendor could not be traced.

7. Conclusions:

In Kalyanapuram Slum, Chennai, there was an outbreak of a gastro intestinal illness due to intake of food idiyappam from an outside vendor.

Food sanitation is very much needed and this has to be properly monitored. Strict legislative measures are needed to be implemented to prevent the occurrence of such outbreaks in future.

Annexure XI

Gastro Intestinal Illness Outbreak, Kalyanapuram Slum, Wall tax road, Chennai

Id no :

A . Background Information

1. Name : _____

2. Age : [in completed years]

3. Sex :

4. Informant :

5. Father's Name : _____

Age : [in competed years]

Education : [1- primary; 2- secondary ; 3- higher secondary ;4- college]

Occupation : [1- unemployed ;2- labour ;3- skilled labour ;4- others]

please specify if others

6. Mother's Name : _____

Age : [in competed years]

Education : [1- primary ; 2- secondary; 3- higher secondary ;4- college]

Occupation : [1- unemployed ;2- labour ;3- skilled labour ;4- others]

please specify if others

7. Family size : _____

8. Caste : [1- sc/st ;2- others ,specify]

9. House : [1- hut ;2- tiled ;3- terraced ; 4- dilapidated]

Clinical Information:

10. Did the person have any of the following symptoms?
11. Was the person treated?
12. Where was she/he case treated?
13. When was she/he case admitted?
14. When was she/he discharged?
15. What was the outcome of the illness?

For questions 10-15, fill up the following tabular column

Symptoms	Yes - 1 / No-2	Onset date	Treated Yes-1; No-2	Place of treatment			D.O.A	D.O.D	Outcome	
				1	2	3			R	D
Diarrhoea										
Vomiting										
Fever										
Abdominal pain										
Nausea										

Code

Place of treatment 1- Stanley Medical College Hospital

2- Communicable Disease Hospital

3- Private Nursing Home

D.O.A –Date of admission

D.O.D –Date of discharge

C. Exposure details:

16. What food did the person take ?
17. When was the food taken ?
18. When did the symptom occur ?
19. Was the food prepared at home ?
20. Was the food purchased ? If so, from who ?where ?
21. Were any other family members affected ?

For questions 16-21 ,fill up the tabular column

Food item	Intake time	Time of onset of symptoms	Food			Family Members			
			At home	Purchased V ₁ V ₂ V ₃			T	NT	A
Idiyappam									
Idli									
Pongal									
Rice									
Others+Idiyappam									

Code

V₁. An elderly man who comes regularly to the area

V₂. A resident lady who prepares food at home and sells

V₃ – Others,specify

T – Taken food

NT – Not taken food

A –Affected

NA- Not affected

Laboratory Details:

22. Stool Examination :

23. Water analysis :

Name of the Investigator : _____

Signature : _____

Date of interview : _____

Chapter 8. Investigation of a fever outbreak in Ramarajapuram,

Dindugul District, Tamilnadu, 2003

1. Introduction

1.1 Notification of the illness

Increased number of fever cases in the Ramarajapuram village came to the notice of the nearby Primary Health Centre, Medical Officer by 5th April. Immediate deputation of the village health nurse to the area concerned revealed that more number of cases are still being affected. A fever survey team was deputed and blood smear examination was done for all reported fever cases to rule out Malaria and medical treatment was also given.

In spite of all these measures, the incidence of fever did not come down and hence the Deputy Director of Health Services, Dindugul was informed of the situation on 10th of April.

1. 2. Immediate response

An outbreak response team was formed on 12th April, which consisted of Medical officers, village health nurses, health inspectors and laboratory personnel. Medical camping was set up in the village itself. Blood samples were taken for analysis and treatment was given to all fever cases.

1. 3. Involvement of National Institute of Epidemiology, Chennai

The National Institute of Epidemiology, Chennai was invited by the Directorate of public Health and Preventive Medicine, Tamilnadu on 21st April to conduct an investigation. A team was formed. I, as a FETP student was a part of the team. We reached the village on 24th April and started the investigation the same day.

2. Objectives

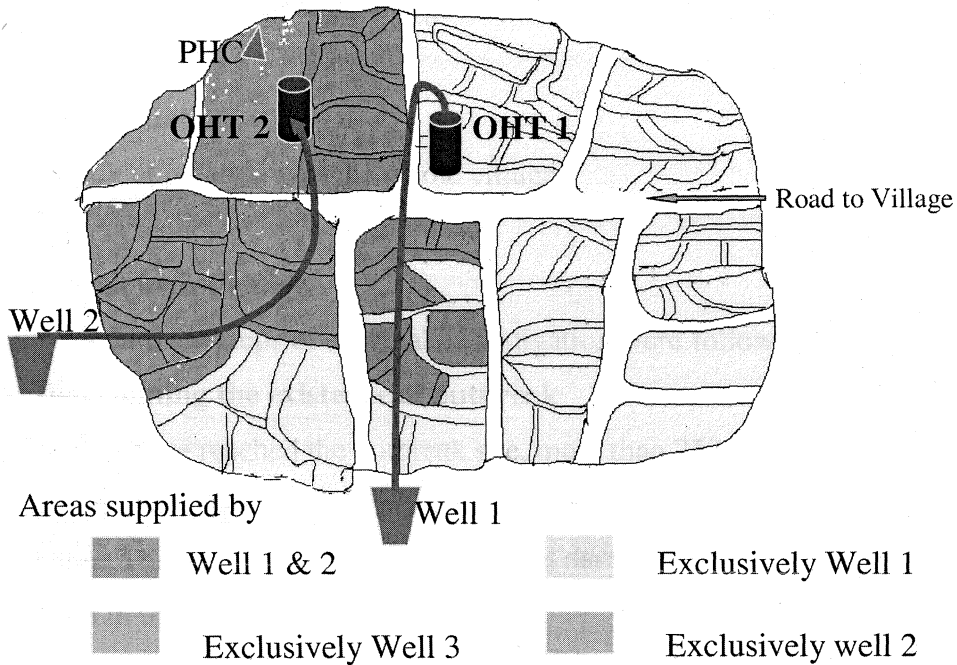
- Investigate and obtain information on the epidemiology of the outbreak
- Identify all cases
- Determine the source and means of contamination
- Recommend measures to prevent future occurrence of such events
- Recommend means to improve the epidemic preparedness and response

3. Geographical and Background information of the affected area

Ramarajapuram is a small village of Dindugul district. It is situated in between Madurai and Dindugul (both are 35 kms away from the village). It has a population of 3337. The general occupation of the village is agricultural farming.

3. 1. Water supply

The water source for the whole village is mainly from two open wells. Water is distributed to the village by means of a distribution system. All the streets have street connections. Very few have house connections. There are two overhead tanks to which the water from the wells are pumped and supplied to the whole village. Some streets like South Street and Sivan Koil Street have a dual supply i.e. they have connections from both the tanks. In addition, there are seven hand pumps in the village and two ground level syntax tanks which receives water from the near by bore well driven by motor. In addition, there are seven hand pumps in the village and two ground level syntax tanks which receives water from the near by bore well driven by motor.



Water is distributed to the village by means of a distribution system. All the streets have street connections. Very few have house connections. There are two overhead tanks (60,000 liters and 40,000 liters capacity) to which the water from the wells are pumped and supplied to the whole village.

The 60,000 liters capacity overhead tank supplies the whole colony and karattur area. Some streets like South Street and Sivan Koil Street have a dual supply i.e. they have connections from both the tanks. In addition, there are seven hand pumps in the village and two ground level syntax tanks which receives water from the near by bore well driven by motor.

Sewage system

Open drainage system is found through out the village. Ninety nine percent of the villagers do not have latrine facilities and the very few who have also, more often than not do not use them.

4. Methods

Study design

The study design was a retrospective study as by the time we received the information and reached the village more than 50% of the cases had already occurred.

Study population

The study population was the whole village.

Outbreak investigation

The standard ten steps of outbreak investigation were followed.

A. Determining the existence of outbreak

By the time we reached the outbreak site, more than 250 cases were reported to have had fever. An outbreak of such magnitude was not found in the past years in that area. The local villagers also expressed the view that they have never been affected in this huge manner before.

B. Confirming the diagnosis

Review of the clinical symptoms and laboratory data showed that there is a definite outbreak. Blood culture report from Government Rajaji Hospital, Madurai (19.4.2003) showed that Salmonella organisms were found to grow in 5 blood samples, 13 out of the 20 collected samples showed Widal positivity and 5 out of the 8 analyzed samples at Hosur showed IgM assay positivity for Leptospirosis

C. Determine the number of cases

The whole village was enumerated and active case search was made with the “suspected case definition”. Though the number of suspected cases was high, we decided to carry out a retrospective study of all the cases. I started administering questionnaire to all probable cases.

Case definitions

Suspected case – Any resident of the village having had fever since 1.3.2003

Probable case – Any resident who had fever, headache, malaise with or without gastrointestinal, respiratory or neurological symptoms since 1st of March 2003

In the case of children – Any resident who had fever with or without headache, malaise, gastrointestinal, respiratory or neurological symptoms since 1st of March 2003

Confirmed case - Any resident who had fever since 1st of March 2003 with laboratory confirmation of blood c & s / stool for Salmonella typhi organism

Data collection

We developed a questionnaire (Appendix I) for assessing demographic characteristics, clinical features and possible risk factors. The risk factors were included in the questionnaire after a review of literature on Typhoid. I conducted the administration of questionnaire to all probable cases, obtained exposure history and details of illness.

D. Environmental inspection

The two main wells are situated in a “kanmai”(pond) of 70 acres land. Though at present the kanmai is dry, during the winter season it is flooded with water and is also the breeding place for fish. The villagers use this area for defecation at other times. In most of the places, the water supply line is found very near or in some places over the drainage line itself. Leakages in the water pipeline (60,000 litre capacity over head tank) was found in six places.

E. Preliminary hypothesis

Based on the information from the case histories , preliminary inspection of the place and from the available laboratory results, the possible causative organism of the outbreak was thought to be Salmonella typhi organism. The possible source of

contamination was identified as the water supply from the overhead tank having a capacity of 60,000 liters.

F. Laboratory investigation

Water analysis

Water samples from three different sources were sent for analysis to the Rajaji Government Hospital, Madurai. The sources of water were (a) Well water (b) over head tank (c) distribution end.

Serology

Based on the history of illness of the persons attending the fever treatment campsite, blood samples were taken for serological analysis. Widal test was conducted at the campsite itself. Some random blood specimens were also collected from the fever cases in the field and were sent to the Rajaji Government Hospital, Madurai for analysis. Our team also collected Blood specimens. Blood samples were collected from one cow and two dogs to rule out leptospirosis as a co-infection in the area as six of the residents were affected by leptospirosis.

Culture and sensitivity

The culture and sensitivity examination was done for both blood and stool specimens collected. The test was carried out both by the Rajaji Government Hospital, Madurai and King Institute of Preventive Medicine, Chennai.

F. Intervention measures

The contaminated water supply was fully cut off. The residents of the village were advised to use alternate water supply from deep bore wells which was made available by the local leaders. Health education was given to them regarding the importance of boiling water and usage of toilets.

All those who had fever were treated as per the standard regimen (ciprofloxacin 500 mg twice a day for 14 days).

G. Surveillance

The health staff did fever surveillance to find out any new cases. During this surveillance, drugs were also supplied door to door to those who were already on treatment. By this method, assurance was made about the daily drug intake by the fever cases.

Our team was there for 10 days from 23rd to 30th of April. By 29th of April there were no more fresh fever cases.

5. Statistical Analysis

We analyzed the risk factors for acquiring disease using both the suspected and confirmed cases. Epi Info 6.04d was used for developing the questionnaire, data entry and data analysis. Odds ratio, attributable fraction of the risks and the corresponding 95% confidence intervals were computed for the exposure variables.

6. Results

6. 1. Environmental investigation

The village is situated 40 kms away from both the cities Madurai and Dindugul. The nearest primary health centre (PHC) is Mattaparai PHC which is 1 km away from this village.

The whole village is mainly divided into three areas namely (a) Colony (b) Karattur and (c) main village. The colony area had poor environmental conditions when compared to the other areas. Most of the houses were of the kutchra type which were closely built. Many stray dogs were found in this area. Cattle breeding were found in many houses.

Open-air defecation is the most common method adopted by these people. We ourselves could find evidence of this particular habit during our inspection in many places. We were even able to see defecation in and around the water sources.

Water supply

The two main wells are situated in a “kanmai”(pond) of 70 acres land. Though at present the kanmai is dry, during the winter season it is flooded with water and is also the breeding place for fish. The villagers use this area for defecation at other times. In most of the places, the water supply line is found very near or in some places over the drainage line itself.

Water is distributed to the village by means of a distribution system. All the streets have street connections. Very few have house connections. There are two overhead tanks (60,000 liters and 40,000 liters capacity) to which the water from the wells are pumped and supplied to the whole village.

The 60,000 liters capacity overhead tank supplies the whole colony and karattur area. Some streets like South Street and Sivan Koil Street have a dual supply i.e. they have connections from both the tanks. In addition, there are seven hand pumps in the village and two ground level syntax tanks which receives water from the near by bore well driven by motor.

Some houses have small sumps in which they store the water from the street connections and use them as and when needed. More often than not these sumps are left open.

Water samples collected from the well, over head tank and distribution end i.e. pipe showed that it is contaminated with faecal material and is unfit for human consumption.

Sewage system

Open drainage system is found through out the village. Ninety nine percent of the villagers do not have latrine facilities and the very few who have also, more often than not do not use them.

6. 2. Epidemiological investigations

Characteristics of the study subjects

Of the four hundred and twenty two persons who fitted the “probable case definition “ one hundred and ninety five were female (46.2%) and two hundred and twenty seven were male (53.8%). The major castes affected were Thevar (26.5%), Scheduled caste (25.8%), Pillai (23%). The commonest population affected was cooly who constituted 73% of the cases.

Table 42. Age and sex distribution of the population of Ramarajapuram, Dindugul District, Tamilnadu, 2003.

Age in years	Population		Total
	Males	Females	
0 – 4	136	134	270
5 – 14	310	280	590
15 – 44	829	801	1630
45+	427	430	857
All ages	1702	1645	3347

Table 43. Age and sex specific attack rates of fever in Ramarajapuram, Dindugul District, Tamilnadu, 2003

Age	Females		Males		Total	
	Cases	Attack rate (%)	Cases	Attack rate (%)	Cases	Attack rate (%)
0 – 4	10	7.5	10	7.4	20	7.4
5 – 14	74	26.3	77	24.8	151	25.5
15 – 44	77	9.6	113	13.6	190	11.6
45 +	34	7.9	27	6.3	61	7.1
All ages	195	11.8	227	13.3	422	12.6

Table 44. Reported clinical symptoms of cases in Ramarajapuram, Dindugul District, Tamilnadu, 2003.

Clinical Symptoms	Number of cases	%
Fever	422	100
Head ache	335	83.4
Malaise	312	73.9
Diarrhoea / Constipation	20	4.7
Abdominal pain	72	17.1
Eye related problems	12	2.8
Leg pain	14	3.3
Respiratory problems	8	1.9
Urinary problems	7	1.7
Vomiting	39	9.2
Total cases	422	100

Table 45. Risk factors associated with probable cases of Typhoid fever in a village, Ramarajapuram, Dindugul district, Tamilnadu, 2003

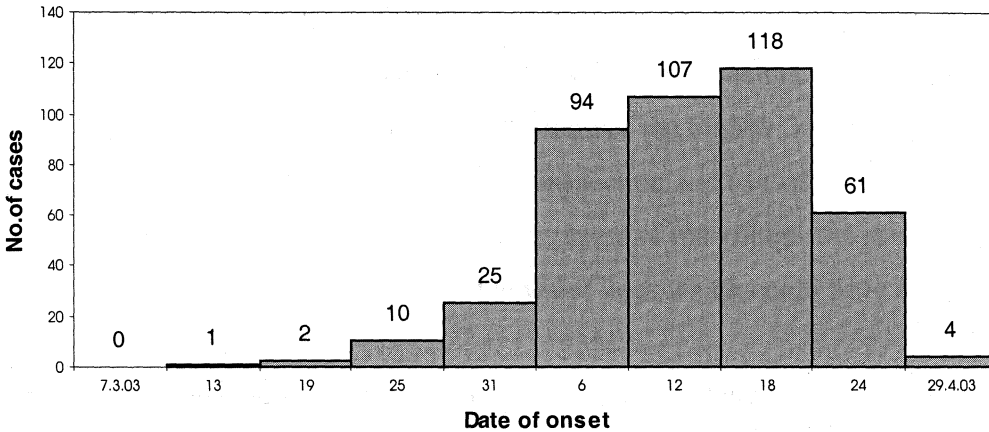
Exposure variable	Attack rate (%)	Odds Ratio	95% CI
1	20.2		
2	4.6	5.23	3.16 – 8.64
3	0.9	27.34	8.71 – 85.81
Source	4	3.37	2.48 – 4.57
Of water	6	5.88	2.98 – 11.59
7	14.6	1.49	0.85 – 2.60
8	9.0	2.53	0.77 – 8.35
9	40.0	0.38	0.19 – 0.76
Availability of Latrine	12.2	1.03	0.77 – 1.38
Availability of separate kitchen	12.2	2.77	2.33 – 3.29

The Epidemic curve

The epidemic curve depicts the distribution of cases by date of onset of fever for probable cases. The cases occurred over a prolonged period (nearly six weeks).

The epidemic curve suggests that the outbreak was a point source type as there is a single peak and then there is a gradual reduction in the no. of cases to nil cases.

No. of fever cases among residents of a village, Dindugul district, Tamilnadu, 2003



6. 3. Laboratory investigations

The water analysis from three different sources done at Madurai Rajaji Government hospital showed that all three were contaminated with fecal material. One hundred and fifteen had laboratory confirmed Widal positive test. Five persons had laboratory confirmed leptospirosis. Nine persons had laboratory confirmed culture positivity for *Salmonella typhi* organism.

7. Hypothesis

The likely source of infection could be

Water from the contaminated well (60,000 liters capacity).

Water from the sumps built in the houses as it could very well be contaminated with the urine or feces of animals.

Close handling of animals

8. Discussion

This was an outbreak of Typhoid fever and Leptospirosis.

The high attack rate of 20.2% amongst the people who consume water from the overhead tank supplied by 60,000 liters capacity well clearly identifies the source of infection.

Though the attack rate was high for those who use own bore well water (40%), this could very well be explained by the fact that the sample in itself is very small (35).

The likely source of infection could be

- Water from the contaminated well (60,000 liters capacity).
- Breakage points in the distribution system of the 60,000 liters capacity. Six such breakages were identified during the inspection and two of them very near to the water pumping station .In most of the places of the village, the sewage pipelines are either running parallel or above the water lines which could have served as the source of infection.
- In addition open-air defecation (which is a habitual action of most of the villagers) could have been another added factor for the fecal contamination of the water. The attack rate was 12.2% among the latrine users but the association of availability of latrine with that of the fever remained non significant (OR- 1.03; 95% CI – 0.77 – 1.38)
- Water from the sumps built in the houses as it could very well be contaminated with the urine or feces of animals.
- Close handling of animals

The mode of transmission for typhoid fever and leptospirosis (in this outbreak) is consumption of contaminated water .The OR was not significant for those who used water from mixed sources (i.e..) 60,000 liters capacity OHT + Mattaparai OHT – 0.85 to 2.60 (95% CI); 40,000 liters capacity + Hand pump 0.77 to 8.35 (95% CI)

Laboratory tests

Water Sample

The water analysis from three different sources done at Madurai Rajaji Government hospital showed that all three were contaminated with fecal material

Blood Samples

Place	Test done	Number	Result	Positivity rate %
GRH, Madurai	Widal	72	48	67
PHC Team	Widal	96	67	70
GRH, Madurai	Blood culture	50	7	14
King Institute, Chennai	Blood culture	9	2	22
IVCZ, Hosur	MAT for Leptospirosis	8	5	62.5

Our team also collected Blood samples. Of these, nine samples were sent to the King Institute, Guindy, Chennai for culture and sensitivity out of which two were positive for Salmonella Typhi organism.

9. Conclusion

This was an outbreak of both Typhoid fever and Leptospirosis. The water from the 60,000 liters capacity OHT was the likely source of contamination. Once the source of water was cut off and alternate water was arranged, the outbreak gradually declined and finally resulted in the successful control.

The investigation has reinstated the importance of access to safe drinking water to all.

SECTION.3

SECOND FIELD POSTING

Chapter 9. Evaluation of the Rural Malaria Surveillance System,

Saidapet health unit district, Tamilnadu

1. Introduction

Surveillance is the key requisite for any disease control programme. Proper surveillance averts disease outbreaks and epidemics, reduces human suffering and improves the efficiency of the existing health programme. It also provides essential data to monitor progress of on going disease control programs and help in optimizing allocation and utilisation of available resources.

In the absence of surveillance, disease may spread without being recognized by those responsible for health care or public health agencies, because sick people often seek health care from many private practitioners/institutions. By the time the outbreak is recognized, it may be too late for intervention measures. Continuous monitoring is essential not only for detecting the 'early warning signals' of an outbreak of any disease but also to mobilise rapid response to arrest spread of disease and to generate essential data for decision making on a regular basis. Early diagnosis and prompt treatment can reduce the number of patients actively transmitting the infection to others. AFP surveillance under National Polio Eradication Initiative is a robust example of how surveillance contributes to disease eradication / control efforts. Surveillance data can also be used for the purpose of social mobilization to help the public participate actively in controlling diseases of public health priority.

Importance of evaluation of disease Surveillance system

The emergence and re-emergence of infectious diseases have reinforced the need for the establishment of an effective disease surveillance system in Tamilnadu. Monitoring and evaluation is essential for any ongoing surveillance system to ensure that surveillance objectives are met as well as to assure the smooth and effective functioning of the system.

2. Objectives of the evaluation

- To assess the achievement of the objectives of the malaria surveillance system in Saidapet district, Tamilnadu
- Identify existing gaps and factors contributing to the gaps
- Suggest appropriate measures to narrow down the identified gaps

3. Epidemiology of malaria

Malaria is the most important tropical disease, remaining widespread throughout the tropics, but also occurring in many temperate regions. It exacts a heavy toll of illness and death - especially amongst children and pregnant women. It also poses a risk to travellers and immigrants, with imported cases increasing in non-endemic areas. Treatment and control have become more difficult with the spread of drug-resistant strains of parasites and insecticide-resistant strains of mosquito vectors. Health education, better case management, better control tools and concerted action are needed to limit the burden of the disease.

Four species of protozoan parasite of the plasmodium genus - *P. falciparum*, *P. vivax*, *P. ovale*, and *P. malariae* - cause malaria in humans. Though malaria brought on by *P. vivax* is the most common, it is, however, malaria caused by *P. falciparum* that is most lethal. There are more than 2,500 known species of mosquitoes worldwide. Out of that, only around 50 to 60 species of *Anopheles* mosquitoes are capable of transmitting the infection. Numerous epidemiologic and ecologic factors play a vital role in determining the effect of malaria on human health and in the intensity of disease transmission. The immunological status of a person also has a bearing on the severity of the disease.

3.1. Global Scenario

At present, some 90 countries or territories in the world are considered malarious, almost half of them being in Africa, south of the Sahara. Although this is considerably less than it was in the mid-1950s (140 countries or territories), 36 per cent (2020 million) of the world's total population is still exposed to malaria

risk. Malaria is most serious in the poorest countries and among populations living under the most difficult and impoverished conditions. It contributes to a vicious circle of disease-poverty-disease and to the continued marginalization of people living in malarious areas. Malaria impairs physical and mental development in children, diminishes the returns achieved through education, and limits their potential to contribute fully to the social and economic growth of the country.

It is estimated, therefore, that the incidence of malaria in the world may be in the order of 300-500 million clinical cases each year. Ninety per cent of the burden of malaria is estimated to exist in Africa, south of the Sahara, almost all in the *Plasmodium falciparum* form. Estimates of mortality vary from 1.5 to 2.7 million malaria deaths worldwide, each year, of which approximately one million are among children under the age of five years in Africa, south of the Sahara. This constitutes nearly 25 per cent of all childhood deaths in Africa, mostly resulting from cerebral malaria and anaemia. Thus, malaria continues to be one of the main public health problems in the world.

3.2. South-East Asia Region

The overall malaria situation in the Region remained more or less static during the period 1994-1996. However, the distribution of malaria cases within the Region was uneven. In 1996, a total of 1212 million people lived in areas where malaria transmission had occurred. Ten per cent of this number resided in areas with a high risk of infection, a further 20 per cent in areas with moderate risk, and the remainder in areas with relatively low risk of infection. The number of reported deaths from malaria has increased by 5.2 per cent over the period 1994-1996.

Two outstanding features of malaria in the Region relate to:

1. Significant variations in the evolution of drug resistance of *P.falciparum* in areas with different parasite and vector ecology, and
2. Emergence and spread of *P.vivax* resistance to chloroquine.

The problems and constraints in the control of malaria were of technical, operational and administrative nature.

3.3. Burden of disease

Malaria causes about 3000 death a day, over 90% of which are in Sub-Sahara Africa. It is both a disease of poverty and a cause of poverty slowing economic growth by 1.3% per year in endemic areas. Of the 10% malaria, 70% malaria cases are in SEA Region, and of the remaining 30% cases, 1/3rd cases are from WP Region. WHO estimates 40,213,000 DALYs in the world, of which 2,390,000 are in Asia (SEA 1,874,000 DALYs or 4.66%) and (WPR 516,000 DALYs or 1.28%), WHO Report 2001. Although Asia contributes only about 6% DALYs in the world, but malaria causes high morbidity and mortality in the endemic countries. The disease is deeply rooted in the poor communities affecting national development and takes away major share of health budgets.

In South-East Asia countries, the number of people death due to malaria is 26,800 out of 20.9 million estimated cases in 2001. The number of reported death is only 4,367 cases out of 2.6 reported cases, which is indicated about 1.7 deaths out of 1000 malaria cases in the region. The highest number of estimated cases was reported by India followed by Indonesia, Myanmar and Bangladesh. However, the maximum malaria deaths were reported from Myanmar (2,748 deaths) followed by India (946 deaths), Thailand (625 deaths) and Bangladesh (484 deaths). This figure shows a very wide gap between estimated and reported number of both cases and death due to malaria in the region. This is a reflection of low coverage of information system in almost all country in the SEA region.

Malaria situation in the Region is somewhat static during last ten years. On average 3.0 to 3.6 million cases are reported annually. The slide positive rate (SPR) is around 3% to 3.8%. Annual Parasite Incidence (API) is around 2.3 to 3 per thousand and Pf% between 37.6 % to 41.7% .

3. 4. Indian Scenario

In India, malaria is a serious re-emerging public health problem. India contributes 75% cases in the SEA Region. In 2000, 1.95 million parasite positive cases were reported, of which 51.3% were P falciparum and 946 deaths. Thirteen monitoring teams of NAMP monitor resistance to Plasmodium falciparum in different geographical regions, so as to cover the entire country in one year. Monitoring is done following the WHO methodology of in vivo (7-day and 28- day) standard techniques for determination of resistance of P falciparum to chloroquine and other antimalarials. Since 1978 till June 2001, a total of 15,069 P.falciparum cases in 178 districts of 28 states and union territories have been completed. Of these 3,965 (26.3%) were sensitive to chloroquine; 7,661 (50.8) were S/RI; 2,142 RI resistant; 752 RII resistant (5%) and 549 (3.6%) RIII resistant to chloroquine.

The disease burden due to infectious diseases in India is among the highest in the world. Infectious diseases are major causes of admissions in the hospitals and visits to health facilities. Tuberculosis and malaria are the leading causes of deaths in the country. The DALY loss due to Malaria in India was 0.3 (1990) and 2.4 (1999) as compared to that of 2.6 (1990) and 3.1 (1999) in the world. (Source- World Bank Report 1993)

Year	B.S.E. million	ABER	Positive Cases in million	API	SPR	P.f.	SFR	Deaths
1976	55.98	9.73	6.47	11.25	11.55	0.75	1.35	59
1984	66.36	9.34	2.18	3.08	3.29	0.65	0.99	247
1985	69.13	9.38	1.86	8.52	2.74	0.54	0.8	213
1989	72.07	9.37	2.05	2.66	2.84	0.76	1.05	268
1990	74.42	9.48	2.02	2.57	2.71	0.75	1.01	353
1991	75.16	9.3	2.12	2.62	2.82	0.92	1.22	421
1992	79.01	9.59	2.13	2.58	2.69	0.88	1.11	422
1993	77.4	9.3	2.2	2.64	2.84	0.85	1.1	354
1994	82.18	9.54	2.51	2.91	3.06	0.99	1.2	1122
1995	81.16	9.23	2.8	3.19	6.45	1.09	1.34	1061

Source: Directorate of PH & PM, Tamilnadu

3. 5. History of National Anti- Malaria Programme

In April 1953, Government of India launched the National Malaria Control Programme with the following objectives:

1. To bring down malaria transmission to a level at which it would cease to be a major public health problem and
2. Thereafter an achievement was to be maintained by each state to hold down the malaria transmission at low level indefinitely.

With effective reduction in malaria cases and mortality due to malaria, it was recommended in the 8th World Health Assembly to change the concept from control to eradication of malaria. Thus, the National Malaria eradication Programme (NMEP) was launched in 1958 with the objective to eradicate malaria in 7-9 years.

The NMEP suffered set backs due to various constraints like financial, logistic, technical and administrative. This resulted in resurgence of malaria during the 70's. As it was realized that urban areas did not receive their due attention and this could have resulted in the resurgence, the Urban Malaria Scheme was launched in 1971. In spite of this, a high number of cases were reported every year. This necessitated the adoption of Modified Plan of Operation (MPO) in 1977.

3. 5. 1. Objectives of MPO:

1. Elimination of malarial deaths
2. Reduction of malaria morbidity
3. Maintenance of the gains achieved so far by reducing transmission of malaria

This modified plan was able to control the malaria deaths at lower level for the subsequent years. But, in 1994 resurgence of malaria was observed in some states. An expert committee was constituted to review the situation. Based on their

recommendations, guidelines for the malaria control known as “Malaria Action Programme” were formulated. The principal aim was to identify “high risk” malaria areas.

3. 5. 2. Objectives of the Malaria Action Programme

1. Early case detection and treatment
2. To reduce the morbidity and mortality due to malaria
3. To monitor changes in the trend of the disease
4. To detect epidemics, if any

To achieve the above said objectives, the strategies applicable to the operational field area are:

1. Active case detection and presumptive treatment
2. Passive case detection and presumptive treatment
3. Blood smear collection and examination
4. Radical treatment with priority to Plasmodium falciparum cases within 48 hours

3. 5. 3. Case Definitions

3. 5. 3. 1. Suspected Malaria

All fever cases unless and otherwise proved.

3. 5. 3. 2. Probable Malaria

Fever cases without the following associated symptoms and not subjective to microscopic examination. These will be diagnosed by the Medical officers and reported by them separately as Clinical Malaria.

Associated symptoms:

1. Cough- Acute respiratory infections
2. Cold with running nose
3. Skin rash suggestive of eruptive illness
4. Burning micturition
5. Skin infections like boils, abcess and infected wounds

6. Painful swelling of joints
7. Ear discharge

3. 5. 3. 3. Seriously Sick Malaria

Those malaria cases who present with following signs and symptoms:

1. Cerebral malaria - Case of unrousable malaria not attributable to any other cause in a patient with P.falciparum infection
2. Other cases with hyperpyrexia, convulsions, severe anemia, pregnancy with fever, pulmonary edema in P.falciparum infection, hyper parasitemia and malaria causing hemoglobinuria

3. 5. 3. 4. Deaths due to malaria

Deaths due to P.falciparum infection

In the event of any fever case having signs and symptoms cited above dies without microscopic confirmation, the death can be attributed to malaria.

3. 5. 3. 5. Confirmed Malaria death

Death of microscopically confirmed P.falciparum infected patient due to any of the complications mentioned above.

3. 6. Tamilnadu Scenario

Malaria in Saidapet Health Unit District

Saidapet District is mainly a peri – urban area and lots of ongoing works like construction, summer vocations like brick kilns and industries like Ford Car company are the main reasons for people to migrate from various parts of the State and bordering States to this area. Very high possibility of import of Malaria cases is present.

Table 46. Malaria Indicators, Saidapet HUD, 1999 to 2002

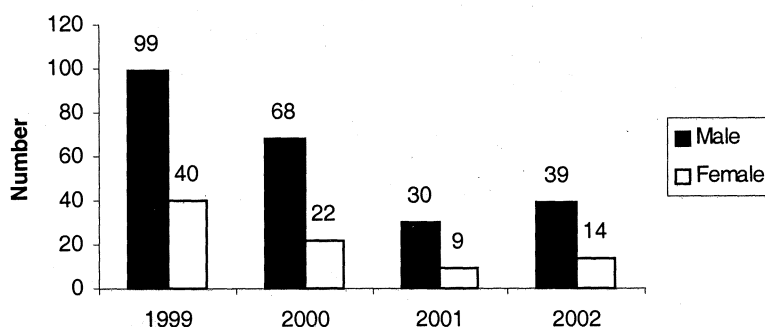
Year	ABER [%]	SPR [%]	API [/1000 population]	PF Cases [as % of total cases]
1999	11.33	0.08	0.08	1.4
2000	11.12	0.05	0.06	1.03
2001	11.01	0.02	0.02	2.5
2002	10.2	0.03	0.03	5.56

Source: Office of Saidapet DDHS

Table 46 shows that the ABER (%) and API (per 1000 population) are consistently decreasing over the years from 1999 to 2002. But, the Pf rate (%) has been increasing over the past two years.

Figure 21 shows the rural malaria cases by sex in Saidapet Health Unit District from the year 1999 to 2002

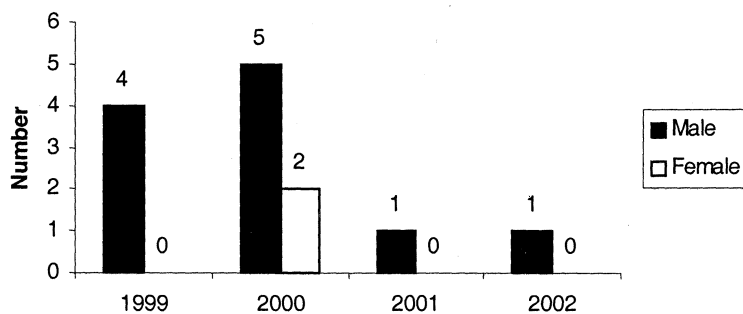
Figure 21. Rural Malaria Cases by Sex, Saidapet Health Unit District, 1999 to 2002



This figure shows that the distribution of rural malaria cases by sex has been consistently higher in the male sex over the years. This might be due to the increased health care seeking behavior of the community or due to the true increase in the incidence of malaria in men.

Figure 22 shows the urban distribution of malaria cases by sex from the year 1999 to 2002.

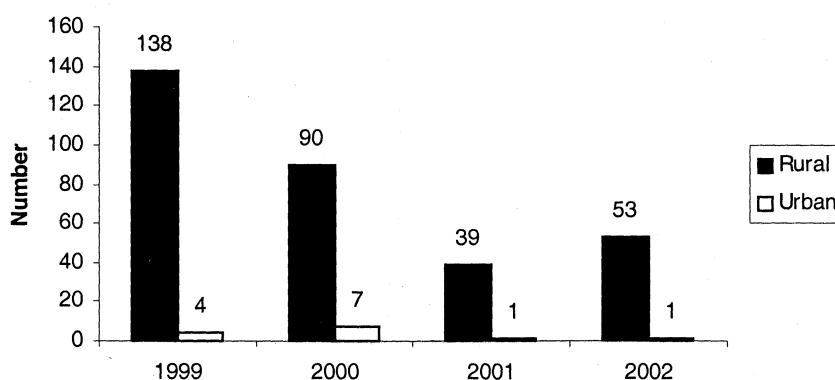
Figure 22. Urban Malaria Cases by Sex, Saidapet Health Unit District, 1999 to 2002



This figure shows that the urban malaria cases are small when compared to the rural cases. This might be due to the fact that the urban malaria surveillance system is poor or the health care seeking behavior of the urban community is mostly from the private sector.

Figure 23 shows the number of imported malaria cases by year and distribution.

Figure 23. Imported Malaria Cases, Saidapet Health Unit District, 1999 to 2002

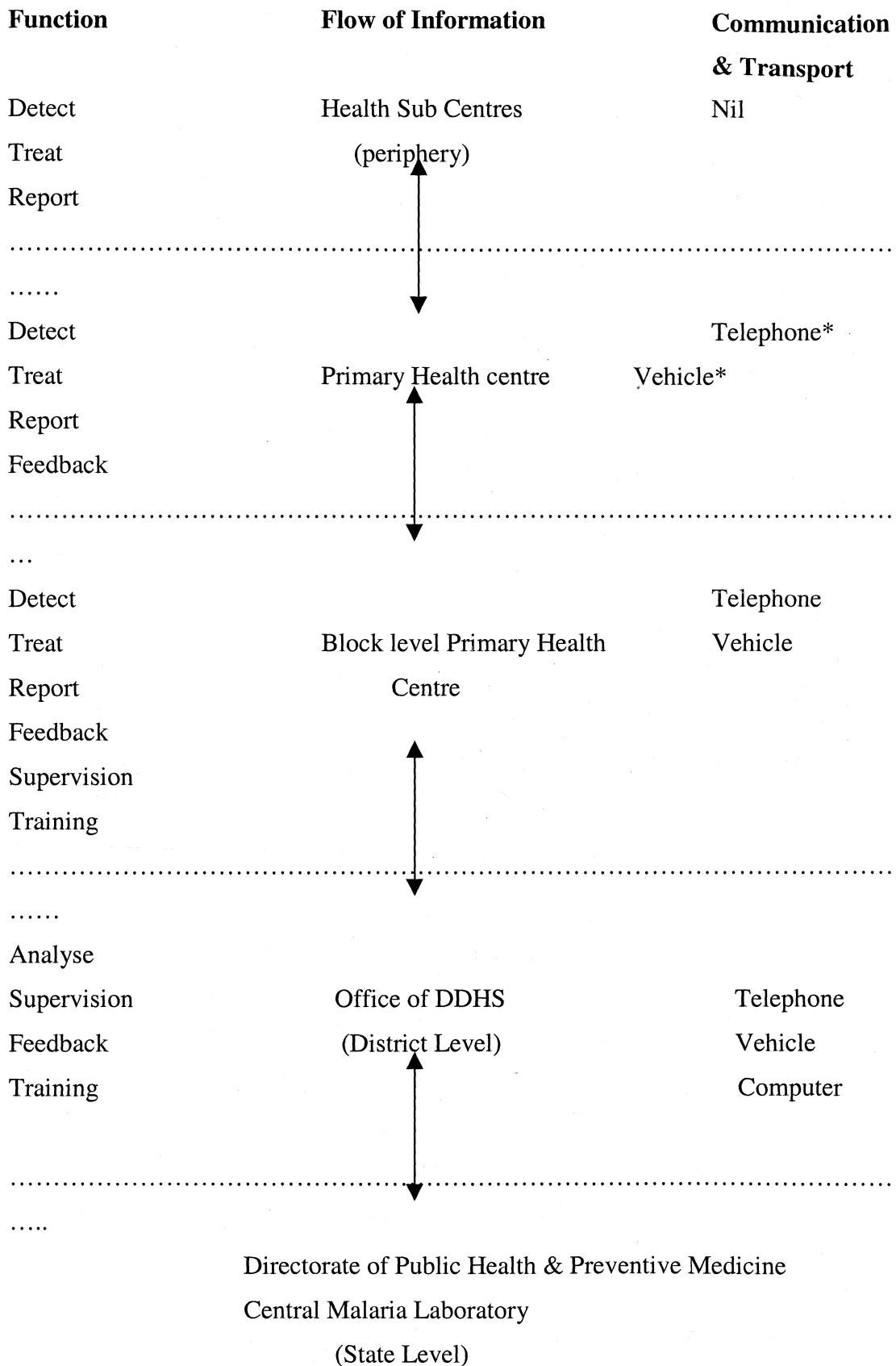


Figures 21,22 and 23 show that the incidence of malaria is higher among males when compared to that of the females over the years. Almost all the

cases of Malaria are imported ones only. One case of indigenous malaria case was found in the year 1999 in rural area.

4. Description of Malaria Surveillance System in Saidapet Health unit District

Flow of Information, Task Orientation & communication



* variable in each centre

4. 1. Description of the flow of information

Case Detection, Confirmation and reporting

Active surveillance for fever cases is being undertaken by the Health Inspectors (Sub Centre level) on a daily basis. Blood smears are made for those cases and administered presumptive treatment. The details of the blood smear are recorded in MF 2 Form. Passive surveillance is made at the Primary Health Centre (PHC) level. Blood smears are made for all reported fever cases at the out patient department. These blood smears are examined by the Laboratory technicians at the PHC. The details of passive blood smear are recorded in MF 2 Register.

In a malaria positive case, the following responses are initiated:

1.Immediate response

Administration of radical treatment to the positive case

Reporting to the Block Level PHC and the DDHS office in the MF 4 Form.

2.Blood smear collection for all contacts in the house hold of the positive case

- 3. A fever mass blood survey is conducted in the neighboring 20 houses and presumptive treatment is given. If in the survey , a +ve case is detected ,then 200 houses or the entire village is screened.**

The treatment details are maintained in the MF 5 Register.

Periodicity of Data flow

The collected data is sent from the periphery (HSC) to the PHC on a daily basis. This data is reviewed at the PHC in the weekly meetings every tuesday. Unless a malaria positive case occurs, the dta collected from the respective sub centres is consolidated and sent to the Block level PHC and DDHS office by 30th or 31st (as the case may be) of every month. The information from all the PHCs are consolidated, analysed and forwarded to the State level by 5th of the subsequent month.

Feed back

Feedback is given to the Village Health Nurses , Laboratory Assistants and Health Inspectors in the weekly review meetings (every Tuesday)conducted by the PHC

Medical Officer. Monthly review meetings (3rd of every month) are held for the Laboratory assistants and technicians by the District entomologist.

Feedback is usually in the form of oral and very occasionally in the form of written reports.

Feed forward

Monthly written reports are sent to the Directorate of Public Health and Preventive Medicine and Central Malaria laboratory, Chennai

Monitoring and Supervision

Supervision is being carried out at different levels.

At the PHC and Block Level PHC

The making of blood smear and treatment given is being monitored by the PHC Medical Officer. Confirmation of blood smear positives (if any) is also being done by them.

At the District Level

The DDHS and the District Malaria Officer visits the PHCs as per the advanced tour programme and supervises the blood smear examination, registers and stock position.

Zonal Level

The Zonal Entomological team visits the district on a quarterly basis and monitoring is done by means of carrying out entomological surveillance.

Quality control of blood slides

All positive blood smears are sent to the Zonal Laboratory, Vellore for cross checking. A sample of 10% of the negative slides are sent to three different places by 10th of the successive month. The places where the samples are sent are – 5% to the Zonal Laboratory, Vellore, 2.5% to the Regional Office of Health and Family Welfare, Chennai and 2.5% to the Institute of Vector Control and Zoonoses, Hosur. Based on the feedback from these centres, the quality of the blood smear examination is maintained.

5. Evaluation of the Malaria Surveillance System, Saidapet HUD

5.1. Methodology:

Study design	- Cross sectional survey
Study area	- Kattangulathur block, Saidapet Health Unit District
Sampling unit	- All 5 PHCs and 10 HSCs
Study period	- January 2003 to June 2003
Reference period	- January 2002 to December 2002
Sources of data	- Pre tested questionnaire, malaria records and registers at the district, block level and Primary Health Centre (PHC) level
Types of data	- Primary and secondary
Data analysis	- Data generated was analysed by use of computer using Epi info and Excel.

Selection of the block

Table 47. Block performance by ABER and API, Saidapet HUD 1999 to 2002

Block	Avg. API (/1000 pop)	Avg. ABER (%)
Kattangulathur	0.03	16.6
Lathur	0.04	16.8
Chithambur	0.08	13.4
Thirukalukundram	0.08	18.27
Mount	0.09	14.77
Thiruporur	0.1	16.8

Using the “best scenario” method, Kattangulathur block was selected. The additional factor which led to the selection of this particular block was the “in migration” of labourers to Reddiplayam PHC to work in brick kilns and to the car industry “Ford” which is located in the Maraimalai Nagar PHC area.

5.2. Data Collection:

1. Quantitative methods:

a. At the PHCs and HSCs - Review of registers and records (Malaria registers, laboratory register, Malaria forms (MF Forms)).

b. At the district - Records regarding the despatch of quality control slides and the feedback reports

2. Qualitative method

In depth interview using semi-structured questionnaires (Annexures XII to XIV).

Both quantitative and qualitative methods have been adopted for the evaluation of Malaria surveillance system. A random check (50%- six months of the reference period) of the records and reports available at the block PHC and the additional PHC were checked for consistency between them.

The Joint Director for Malaria and Filariasis (State level) and the Deputy Director of Health Services, Saidapet Health Unit District were interviewed using the pre tested questionnaire (Annexure XII). The District Entomologist, Malaria Inspector (District level), Block level PHC Medical officer and all the Medical Officers of the five PHCs were requested to fill in the questionnaire and return the same. The same procedure was adopted for the existing twenty Health Inspectors (Annexure XIII), one Health Supervisor, block level (Annexure XIII), thirty Village Health Nurses (VHN) and four Laboratory Assistants and one Laboratory Technician (block level) (Annexure XIV),.

Table 48 PHCs and population of Kattangulathur block , Saidapet HUD,2002

S.No	Name of the PHC	No.of HSC	Population
1.	Nandivaram	6	74,350
2.	Othivakkam	6	32,885
3.	Reddipalayam	6	29,350
4.	Maraimalainagar	6	59,580
5.	Kunnavakkam	6	37,543
	TOTAL	30	2,33,708

Source: Office of Saidapet DDHS

6. Results:

The aim of the study was to look at two issues, namely, whether the objectives of the programme are being achieved and evaluation of the surveillance system with respect to the structure, process and outcome variables.

Objective 1

6. 1. Achievement of anti malaria programme objectives

The objective of the programme in Tamilnadu and in the Health Unit district of Saidapet is to reduce the overall morbidity and mortality. The stated objectives of the programme is not “smart”. It is vague and a time frame is not specified. Moreover, it makes the task of evaluation difficult as it is difficult to measure.

Objective 2

6. 2. Evaluation of the system with respect to Structure, Process and Outcome Indicators

6. 2. 1. Structure indicators

A check list of indicators was prepared (Annexure XV) and information was collected through personal visits from various structures of the system in the district.

1. Manpower
2. Vehicle, fuel
3. Building
4. Laboratory facility
5. Drugs and supplies

a. Buildings:

The State has a separate functional Central Malaria Laboratory in the Directorate of Public Health and Preventive Medicine which functions as the head quarters for the Joint Director of Malaria and Filariasis. The office of the Deputy Director of Health Services Saidapet Health Unit District is functioning in a rental building at Saidapet area (30 kms away from the city centre). Four of the five PHCs of the Kattangulathur block has own building. One PHC i.e Reddipalayam PHC has a rented building for use. All PHCs except for the one Reddipalayam PHC have functional building in good condition and electricity and water supply.

b. Vehicles:

The State and district have adequate vehicles which are in good condition and use. Out of the five PHCs of the selected block, two have vehicle facilities. The Block level PHC has one ambulance and one jeep whereas the other PHC has one vehicle only. These vehicles are in good condition and in use. Though these available vehicles are not ear marked for malaria , it is regularly being used for malaria activities.

c. Logistics and supplies:

NAMP being a centrally sponsored scheme, logistics and supplies are from the central government. Indents are made in anticipation of the requirement and there is no shortage of any anti malarial drugs, slides. Lancets are not in use but large bore needles are being used by the Laboratory assistants which are then fully sterilised and re used. The slides are replenished by the District DDHS office on a monthly basis. Though there is shortage of supply of registers and reporting forms, the health personnel of the PHC see to it that they are purchased and used by making internal fund mobilisation. Hence, it was found that all the PHCs have some sought of registers and forms in which they enter the data.

d. Manpower availability:

The state headquarter is manned with adequate staff. There is a Joint Director for malaria and Filaria . Under him is the team of CML Staff wherein is the Chief entomologist, administrative staff and two laboratory technicians. At the district level, Deputy Director of Health Services is the administrative chief under whom serves the District Malraia officer. There is a Malaria Inspector who collects, collates and helps in analysis of the data from all the PHCs. One Laboratory Assistant is present who is in charge of the smear making and examination at the district level.

At the block level PHC and additional PHCs, there is a block health supervisor, twenty one health inspectors, thirty village health nurses, one laboratory technician and four laboratory assistants. All the posts of Medical officers, village health nurses

and laboratory personnel are filled up. Eleven of the sanctioned health inspector post is vacant.

Table 49. Health manpower of Saidapet HUD (pertaining to Malaria surveillance system), 2002

PHC	HI (PHC)		HI (HSC)		VHN		Lab Assistant	
	S	IP	S	IP	S	IP	S	IP
Nandivaram	1	1	6	4	6	6	1	1
M.M.Nagar	1	1	7	7	6	6	1	1
Othivakkam	1	Nil	4	4	6	6	1	1
Kunnavakkam	1	Nil	6	3	6	6	1	1
Reddipalayam	1	Nil	6	3	6	6	1	1

e. Equipments:

All the PHCs have a binocular microscope and four of the five microscopes were in good condition. One microscope had adjustment problems but the laboratory assistant was able to do blood smear examination by holding the microscope at a defined position which was verified during field visit. Reagents and slides were adequate in all PHCs and clear labelling of the reagents was present in all of them. The quality of the equipments, instruments and other supplies were found to be good.

f. Communication facilities:

The block PHC has only telephone and no other facilities like computer, fax etc., The other four PHCs do not even have telephone.

6. 2. 2. Process Indicators

1. Population under surveillance

The total population of the block is 2,33,708. The major occupation of the people is agriculture. The main workers constitute 58% of the total population. The major religion is Hinduism (>80%). There are many castes in Hinduism and a wide variety of sub sects in each caste. The cultural characteristics of each sect vary. The Scheduled caste and Scheduled tribe constitute a minor proportion of the total population i.e. 6 and 5% respectively.

Table 50. Vital statistics of the block Kattangulathur, 2002

Name of the PHC	BR	DR	IMR	MMR
Nandivaram	19.0	3.8	17.0	1.0
M.M.Nagar	19.7	5.0	23.5	1.6
Kunnavakkam	19.7	5.9	27.9	1.3
Othivakkam	19.4	3.9	31.7	-
Reddipalayam	18.5	6.1	11.0	-
Block Total	19.0	4.9	23.1	0.8

Out of the five PHCs, only three PHCs have population under surveillance in the range of 30,000. Out of the remaining two PHCs, one has a population of 60,000 whereas the block PHC has a population of eighty seven thousand.

2. Case definitions

Case definitions for malaria cases and deaths are available in the written Operational manual for MAP, 1995. However, none of the field level workers had this manual. It is available only with the State, District and Block level Officers.

All the health personnel interviewed were able to provide a correct definition for malaria in general i.e suspected and confirmed case of malaria. Though, this was not the case when asked for specific case definitions such as seriously sick malaria cases and deaths due to malaria. Five of all the sixty five interviewed (8%) were able to provide the correct definition for all five categories of malaria cases and deaths as per the Operational Manual for MAP, 1995, Government of India.

3.Data structure

- who collects the data?
- how often?
- Are standard formats being used?
- Data validation
- Data storage
- Feedback?

6. 3. 1. Case Detection, Confirmation and reporting

During field visits, it was found that active surveillance for fever cases is being undertaken by the Health Inspectors (Sub Centre level) on a daily basis. Blood smears are made for those cases and administered presumptive treatment. The details of the blood smear are recorded in MF 2 Form. Passive surveillance is made at the Primary Health Centre (PHC) level. Blood smears are made for all reported fever cases at the out patient department. The details of passive blood smear are recorded in MF 2 Register.

These blood smears though are supposed to be sent and examined on a daily basis, it was found that none of the field level functionaries are sending it daily as per the norms. The blood slides are sent for examination twice a week usually on tuesdays when they attend the weekly review meeting at the PHC and by the weekend. These slides are examined by the Laboratory assistants and technician (block level) at the PHC and the results are communicated to the respective health inspector/ village health nurse on their subsequent visit to the PHC. If the blood smear is found positive, then the result is communicated to the respective health worker for immediate response.

In a malaria positive case, the following responses are initiated:

1. Immediate response

Administration of radical treatment to the positive case

Reporting to the Block Level PHC and the DDHS office in the MF 4 Form.

2. Blood smear collection for all contacts in the house hold of the positive case

3. A fever mass blood survey is conducted in the neighboring 20 houses and presumptive treatment is given. If in the survey , a positive case is detected ,then 200 houses or the entire village is screened.

The treatment details are maintained in the MF 5 Register.

6. 3. 2. Periodicity of Data flow

The collected data is sent from the periphery (HSC) to the PHC on a twice weekly basis as against the daily basis norms. This data is reviewed at the PHC in the weekly meetings every tuesday. Routinely the data collected from the respective sub centres is consolidated and sent to the Block level PHC and DDHS office by 30th or 31st (as the case may be) of every month. The information from all the PHCs are consolidated, analysed and forwarded to the State level by 5th of the subsequent month.

6. 3. 3. Feed back

Feedback is given to the Village Health Nurses , Laboratory Assistants and Health Inspectors in the weekly review meetings (every Tuesday)conducted by the PHC Medical Officer. Monthly review meetings (3rd of every month) are held for the Laboratory assistants and technicians by the District entomologist.

Feedback is usually in the form of oral and very occasionally in the form of written reports.

6, 3. 4. Feed forward

Monthly written reports are sent to the Directorate of Public Health and Preventive Medicine and Central Malaria laboratory, Chennai

6. 3. 5. Monitoring and Supervision

As per the responses given by the field level health workers, monitoring and supervision is being done regularly by the PHC Medical officers, Block level medical officer, District level officers and the Zonal officers. All the PHCs had more than four visits by the supervisory staff in all the twelve months of the reference period (A quarterly visit by the district level officers is required). This was again cross verified with the supervision register and found to be true.

However, as per the responses, the supervisory activities of each of the staff varied. The PHC Medical Officer is monitoring the making of blood smear and treatment given occasionally. 100% confirmation of blood smear positives (if any) is being done by them. During each visit of the District malaria officer, this procedure of blood smear making is verified apart from the routine checking up of the registers. The DDHS during his visits to the PHCs checks the blood smear examination, registers and stock position. The Zonal Entomological team visits the district on a quarterly basis and monitoring is done by means of carrying out entomological surveillance.

6. 3. 6. Treatment counseling and follow up

The method of treatment counselling was observed by me during field visits. The inference was that though instructions with regard to the dosage and time of administration are given, *no treatment counselling is being done by the health personnel*. Even the side effects due to the intake of drug was not being informed to the patients. In the malaria positive cases, the full follow up as per the norms is virtually nil.

6. 3. 7. Training of the staffs

All the Officer cadres were trained in the orientation course with malaria being one among the subjects dealt during this period. Only few hours are usually spent in the making and examination of blood smears.

Category	Undergone training in blood smear making n(%)		Confident in blood smear making* and identifying malaria positive cases n(%)	
	Yes	No	Yes	No
Medical Officers	4 (57)	3 (43)	3 (43)	4 (57)
Health Inspector	21 (100)	Nil	21 (100)	Nil
Laboratory Assistant/ Technician	5 (100)	Nil	5 (100)	Nil
Village Health Nurse	Nil	30 (100)	5 (17)	25 (83)

Only three of the Medical officers were confident in identification of malaria positive blood smear. All the existing Health Inspectors (HI) are trained in blood smear collection and none of the twenty one HIs expressed any difficulty in collection of the smear. All the four Laboratory Assistants and one Laboratory technician were given adequate training for five days. But, since three of them had undergone this training seven years ago, they all felt that they needed refresher training course periodically. The Village Health Nurses though are supposed to do blood smear making, none of them had undergone formal training at a training institute. However, in places where the post of HIs remain vacant, they do make blood smears from the training experience they had from the HIs over the years.

6. 3. 8. Preventive measures

As the API has been consistently low over the years, unless there is an outbreak of malaria, no spraying activities are undertaken in the district. There has been no outbreak of malaria in the past four years. Hence, concentration is mainly focussed on sustained operational efficiency and Information, Education and Communication (IEC) activities. IEC activities are carried out a routine basis with special emphasis during the “Malaria Week” in which all local leaders and the community are mobilised to participate in functions related to topics of malaria. Rallies are organised by schools to create awareness among school children and their respective families. Health education campaigns in schools are organised by the Block Health Supervisor. Competitions like essay writing, oratorical contest and quiz programmes are organised by the DDHS office in each block and motivation is generated amongst youngsters by rewarding the winners.

6. 3. 8. Quality control of blood slides

It was found that all positive blood smears are sent to the Zonal Laboratory, Vellore for cross checking. A sample of 10% of the negative slides are sent to three different places 5% to the Zonal Laboratory, Vellore, 2.5% to the Regional Office of Health and Family Welfare, Chennai and 2.5% to the Institute of Vector Control and Zoonoses, Hosur.

The slides are supposed to be sent for quality control by 10th of every successive month, and it was found that the slides are sent to Regional office of Health and

Family Welfare, Chennai on a monthly basis due to easy access. Even to this place, it was evident from the despatch records that during the reference period, the slides were sent on time for four months only (33%).

To the rest of the places, the slides are being sent once in two to three months or sometimes even more due to logistics problems. On enquiry it was found that the courier services are reluctant to take glass slides delivery and even if they undertake it, they insist on certain minimum weight. Moreover due to the financial constraints, it has become a regular practice of sending it on a quarterly basis to out stations for cross verification.

6. 3. 8. a. Feedback from referral centres

Records were available for the reply received from these Centres for cross verification of blood slides. The ten month replies of the reference period (83%) from Vellore, seven months (58%) from Hosur and three months (25%) from Regional Office, Chennai were available. Though replies were sent, they were found to be delayed by three to four months on an average.

6. 4. Indicators being used

Annual Parasite Incidence (API) and Annual Blood Examination Rate (ABER) are the common indicators that are being used. The API of the block was found to be 0.01 per 1000 population. Since the ABER was found to be in and around the target to be achieved by the end of the year, split up detail for six months i.e January 2002 to June 2002 has been analysed.

Figure 51. ABER of Active Surveillance, Kattangulathur Block, Saidapet health Unit District, January 2002 to June 2002

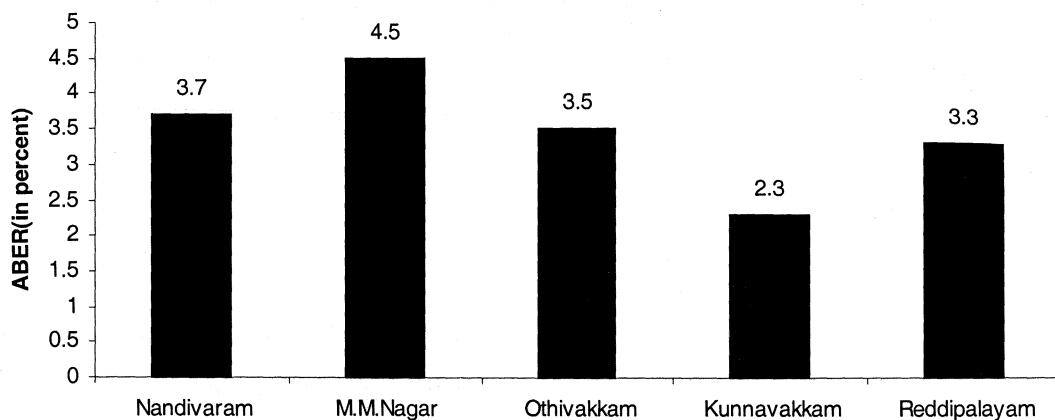


Figure 51 shows that none of the PHCs had reached the cumulative target of 6% ABER achievement in the corresponding reference period. This could be either due to the increased population under surveillance in some of the PHC areas or could be due to the ineffective surveillance.

Figure 52. ABER of Passive Surveillance, Kattangulathur Block, Saidapet Health Unit District, January 2002 to June 2002

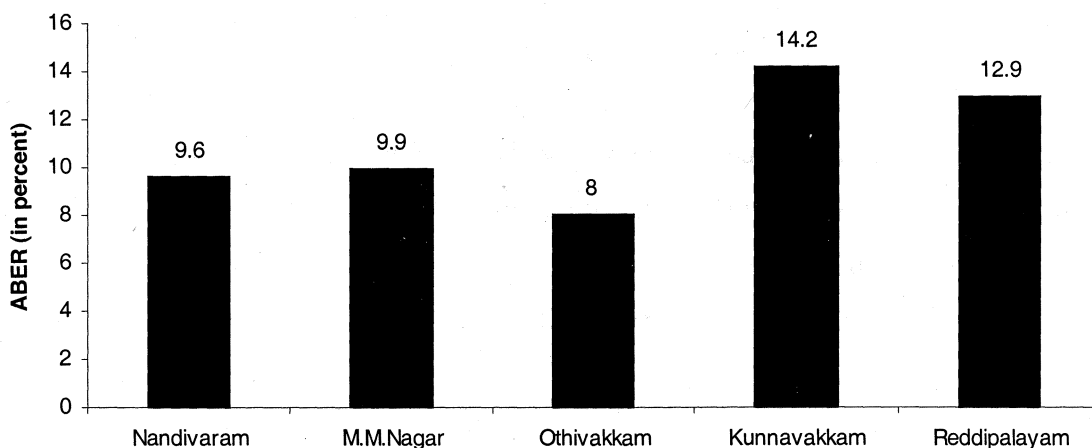


Figure 52 shows that one PHC had come nearer (14.2%) to the standard coverage of 15% of the OPD cases, one had 12.9% and the rest of the PHCs had less than 10% coverage. This again could be due to the increased population under surveillance in some of the PHC areas or could be due to the ineffective surveillance.

6. 5. Functioning of laboratories

Four of the five PHCs have a separate laboratory space with adequate electricity and water supply. All the PHCs have mono ocular microscope. Four of the five PHCs have microscopes in good condition. Though there is adjustment problem in one PHC the laboratory assistant is able to examine the blood smear made by holding the microscope at a defined angle. All the PHCs have adequate slides, needles and reagent supplies.

6. 6. System capacity & Attributes

6. 6. 1. Simplicity and Acceptability

6. 6. 1. 1. Simplicity

All the seven Medical Officers, 21 Health Inspectors, five laboratory personnel and 30 village health nurses at various levels of the system found the surveillance system to be simple. The case definitions are simple and easy to use. The forms are simple and there is no difficulty in filling up of the forms. The existing reporting system is easy for the staff to follow and there is no difficulty. The main difficulty expressed by the health workers is the invariable delay (the smears are sent only twice weekly in contrast to the norms of daily smear despatch and examination) in sending the blood smears to the PHC for examination.

6. 6.1. 2. Acceptability

All the health personnel interviewed readily accepted to participate in the study and this showed their willingness. The acceptability and simplicity were also tested by means of analysing the completeness and consistency of the data filled in the reporting forms that are routinely sent as these serve as indirect indicators of these attributes of the system.

6. 6. 2. Completeness

One PHC had 100% completed reporting formats. Three of the five PHCs had fully completed forms for nine months of the total reference period of twelve months (75%) and the remaining one PHC had completeness for four months(33%)

Consistency of the data was verified by means of cross verifying:

1. The active weekly register and the monthly register that is maintained at the PHC

2. The data in the MF registers and the data that is being sent to the DDHS office in the reporting format.

The discrepancy between these two was taken as a measure of inconsistency. It was found that the discrepancy rate between the weekly and the monthly register in all the five PHCs ranges from 5 to 8% and the inconsistency between the PHC register and the report that is sent to the District vary in the range of 10 to 13%

6. 6. 3. Timeliness

Timeliness was analysed for the following aspects:

1. blood smear receipt and examination at the PHC
2. reporting to the higher officials
3. receipt of replies from the centres for cross verification of blood smear slides

6. 6. 3. 1. Timeliness with respect to blood smear receipt and examination at the PHC

None of the Laboratory assistants were receiving the blood slides on a daily basis. They all receive the slides twice a week. On an average, 80% of the reports of the slides received are available by the next visit of the respective field worker.

Receipt of blood slides by Lab. Personnel	Number (of HSC level HI)	N %
Daily	0	0
Thrice weekly	0	0
Twice weekly	21	100 (21/21)
Once weekly	0	0

6. 6. 3. 2. Timeliness with respect to reporting

Reports from the grass root level worker reaches the PHC routinely by Tuesday of the successive week (weekly review meeting) and the monthly PHC report reaches the district level by 3rd to 5th of next month when the monthly review meeting for the laboratory assistants is convened by the District Malaria Officer every month. It was evident from the records available that this periodicity of data flow is being maintained. Out of the twelve months of the reference period, reports from the DDHS office to State level was sent on time for four months (33%) i.e by 15th of

successive month. An average delay of 5 days was found for five months (42%). Details regarding the reports sent was not available for three months (25%)

6. 6. 3. 3. Timeliness with respect to Feedback

Records were available for the reply received from these Centres for cross verification of blood slides. The ten month replies of the reference period (83%) from Vellore, seven months (58%) from Hosur and three months (25%) from Regional Office, Chennai were available. *Though replies were sent, they were found to be delayed by three to four months on an average.*

Referral Centres	Feedback Availability (Number of months)	Feedback Availability (n%)
Vellore	10	83 (10/12)
Hosur	7	58 (7/12)
Regional Office of H & FW	3	25 (3/12)

6. 6. 4. Specificity

It was found that there was no false positive case in the reference period in this block. *The positive predictive value has been 100%.* The case definitions used at various points of detection and the quality of blood smear making was found to be satisfactory.

The blood smear receipt on a twice weekly basis could result in fixing up of blood thus making it difficult at times to find the plasmodium in the smear. In spite of this, it was found from the communications from the referral centres that the negative predictive value (true negative case) has been 100% in the same reference period.

6. 6. 5. Representativeness

To have the holistic picture of the malaria situation and for that matter any health event in a given area, it is desirable to have complete and accurate data from all possible sources. *The reported occurrences of malaria do not represent the correct distribution of all occurrences of malaria in the population.* It is very common amongst the population of this district to seek health care from the Private sector due to its ample availability and easy access. These events go un noticed in spite of

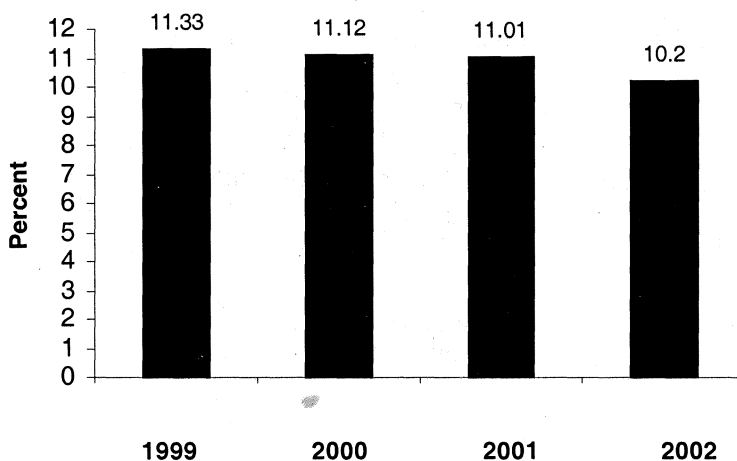
malaria being a notified disease in Tamilnadu.

6. 7. Outcome indicators

The outcome indicators like sensitivity of the system and number of epidemics detected and the actions taken in the past and present have not been evaluated in this study. A community survey was not conducted for want of time to find out the sensitivity of the system. As there was no outbreak of malaria in this block, the second indicator could not be assessed as well.

However, the change in the trend of the disease could be analysed. Figure 53 shows the trend of ABER (%) over the period of 1999 to 2002 Saidapet Health Unit District.

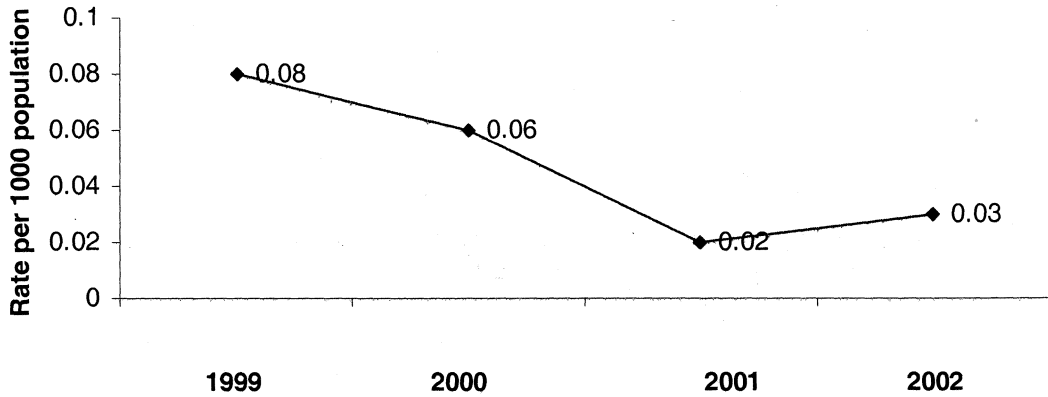
Figure 53. Trend of Annual Blood Examination Rate, Saidapet health Unit District, 1999 to 2002



The Annual Blood Examination Rate (ABER) is a tool of operational efficiency. There is a norm saying that at least 10 % of the population should be covered each month. From this figure, it is evident that for the past four years the average ABER has been more than the requisite 10%. Though this being the case, there is constant decrease in this indicator i.e. 11.33 % in the year 1999 to 10.2% in the year 2002. This is a cause for concern as Malaria is a disease that has a high potentiality for outbreak and if the surveillance is slackening, there is always the possibility of an outbreak.

Figure 54 shows the trend of API (%) from 1999 to 2002 Saidapet Health Unit District.

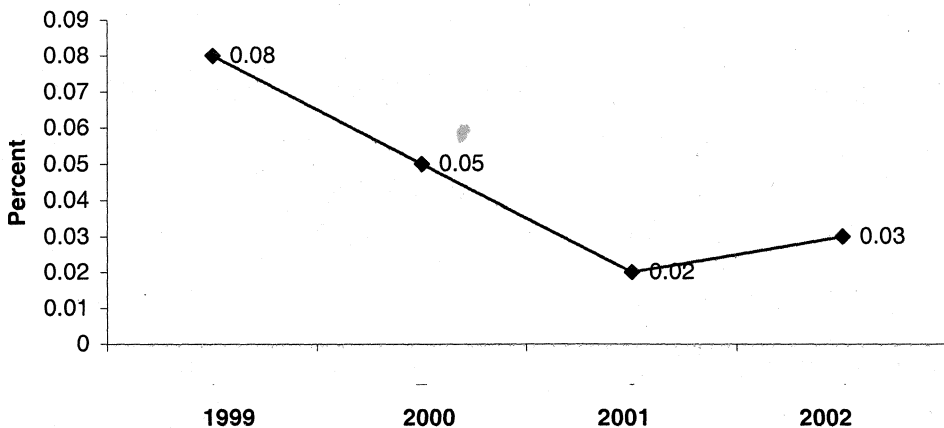
Figure 54. Trend of Annual Parasite Incidence, Saidapet Health Unit District, 1999 to 2002



The Annual Parasite Incidence (API) is the most sensitive indicator of the Malaria Surveillance. This is the total number of cases per 1000 population in a given area. From this graph it is seen that though there was a decreasing trend for three years i.e. 1999 to 2001, there has been a slight increase in the rate in the last year.

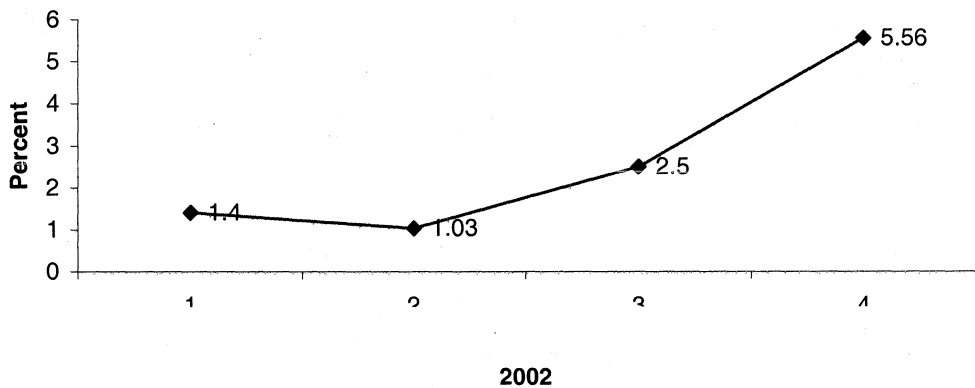
Figure 55 shows the slide positivity rate from the year 1999 to 2002 in Saidapet Health Unit District.

Figure 55. Trend of Slide Positivity rate, Saidapet Health Unit District, 1999 to 2002



There is an increase in the slide positivity rate in the last year. This could be attributed to two reasons One is that there is a true increase in the positivity rate and the other is that there has been an increased rate/ efficiency in the detection of positivity by the Laboratory assistants. All the posts of the laboratory assistants has been recently filled (in the reference period) and this could have contributed to the increased rate of detection of malaria positive cases.

Figure 56. Trend of Plasmodium Falciparum Cases, Saidapet Health Unit District, 1999 to 2002



This figure shows that the Plasmodium falciparum cases are on the increasing trend from the year 2001.

The Figures 53 to 56 give a picture of the Malaria situation and the Surveillance system indicators in Saidapet Health Unit District for the past four years. It is evident from these that (1) the malaria disease is on an increasing trend (2) more and more of Plasmodium falciparum cases are being detected and (3) the ABER is on a decreasing trend. Given this situation, there is always a possibility of an impending outbreak in this district. This figure shows that the Plasmodium falciparum cases are on the increasing trend from

Tables 51 to 54 show the malaria positive cases by distribution, age and species from the period 1999 to 2002

Table 51. Malaria positive cases by Distribution, Age and Plasmodium species, 1999

Distribution	P.Vivax			Total	P.Falciparum			Total	Grand Total
	0-4	5-15	>15		0-4	5-15	>15		
Rural	5	18	115	138	0	0	1	1	139
Urban	0	0	3	3	0	0	1	1	4
Total	15	18	118	141	0	0	2	2	143

Table 51 shows that in the year 1999, the urban cases form 2.7% of the total cases. 1.5% of the total positive cases are due to Plasmodium faciparum.

Table 52. Malaria positive cases by Distribution, Age and Plasmodium species, 2000

Distribution	P.Vivax			Total	P.Falciparum			Total	Grand Total
	0-4	5-15	>15		0-4	5-15	>15		
Rural	4	8	77	89	0	0	1	1	90
Urban	0	0	7	7	0	0	0	0	7
Total	4	8	84	96	0	0	1	1	97

Table 52 shows that in the year 2000, the rural cases form 7.2% of the total cases. 1.0% of the total positive cases are due to Plasmodium faciparum.

Table 53. Malaria positive cases by Distribution, Age and Plasmodium species, 2001

Distribution	P.Vivax			Total	P.Falciparum			Total	Grand Total
	0-4	5-15	>15		0-4	5-15	>15		
Rural	0	4	35	39	0	0	0	0	39
Urban	0	0	0	0	0	0	1	1	1
Total	0	4	35	39	0	0	1	1	40

Table 53 shows that in the year 2000, the rural cases form 0.03% of the total cases. 0.03% of the total positive cases are due to Plasmodium faciparum.

Table 54. Malaria positive cases by Distribution, Age and Plasmodium species, 2002

Distribution	P.Vivax			Total	P.Falciparum			Total	Grand Total
	0-4	5-15	>15		0-4	5-15	>15		
Rural	1	6	43	50	0	0	3	3	53
Urba	0	0	1	1	0	0	0	0	0
Total	1	6	44	51	0	0	1	3	54

Table 54 shows that in the year 2002, that there were no urban cases and 0.6% of the total positive cases are due to Plasmodium faciparum.

Tables 51 to 54 shows that the Plasmodium species particularly attack the more than 15 year age group. This picture is consistent over the years for both the species. Since the age wise split up details were not available for the corresponding years, the attack rate for age, year and species wise could not be made. It is also evident that though Saidapet HUD is a neighbouring district to Chennai (which contributes to 70% of urban malaria), the urban cases are found to be decreasing over the years from 1999 to 2002. This could be due to the following factors:

1. There is a true decline in the urban positive cases
2. The positive cases are not being picked up and reported by the urban surveillance system.
3. The change in health seeking behaviour of the people leading to getting care from the urban practitioners

As the existing urban surveillance system has not been evaluated in this exercise, it is not possible to get a correct picture of the urban malaria scenario.

7. Discussion

Figures 53 to 56 and Tables 51 to 54 show that for the past four years the average ABER has been constantly in a decreasing trend i.e. 11.33 % in the year 1999 to 10.2% in the year 2002. There was a decreasing trend in API for three years i.e. 1999 to 2001 but, there has been a slight increase in the rate in the last year and this

warranties constant effective surveillance. The decreasing trend might have been due to the following factors :

1. Local transmission has stopped.
2. Indigenous cases are no longer present.
3. Due to the decrease in rainfall, the mosquito density has decreased.
4. Parasitic load is considerably reduced due to early health interventions [radical therapy]

Added to these factors is the additional fact that the Plasmodium falciparum cases are on the increasing trend from the year 2001. These are all a cause for concern as Malaria is a disease that has the potentiality for outbreak and if the surveillance is getting weak there is always a reason for outbreak to occur at any time.

There has been an increase in the slide positivity rate in the last year. This could be attributed to two reasons One is that there is a true increase in the positivity rate and the other is that there has been an increased efficiency in the detection of positivity by the Laboratory assistants. In fact this could well be the truth as all the Laboratory Assistant post vacancy has been filled in the last year.

Strengths of the programme:

Structure

1. Good infrastructure
2. Adequate manpower and
3. Adequate logistics at all levels

Process

1. Regularity of monthly reporting mechanisms and channels well established
- 2. Quality control of blood slides instituted
- 3. Well maintained, consistent and credible reports and records
- 4. Timeliness and completeness of reports well instituted
-

Identified gaps / Constraints

1. Active surveillance is slackening
2. No disease surveillance cell district level
3. Weekly trends of the disease are not monitored at any level

4. No Rapid response team at district level
5. Private sectors not involved
6. Co-ordination with other departments practically nil
7. Delayed diagnosis, laboratory support needs strengthening
8. Analysis at peripheral level limited. Delayed analysis at district or state level.
9. Little analysis and response. Feedback on analysed data irregular
10. No training institute, irregular training for staffs.
11. No research conducted

8. Recommendations.

1. Active surveillance to be strengthened
2. Disease surveillance cell at district level should be established so that close monitoring of the change in the disease patterns could be done and early detection of outbreaks could be made possible.
3. Trend analysis of the disease should be done at district level preferably on weekly basis / if not on a monthly basis at least and the results of the same should be disbursed to the peripheral level immediately also.
4. A functional "Rapid response team" should be available at district level
5. Private sectors and private practitioners are to be involved in the surveillance system as they are the care givers to more than 70% of the population.
6. Laboratory support needs strengthening
7. Periodical training needs to be assessed and imparted to the concerned health personnel on a regular basis.

9. Conclusion

The malaria surveillance system in Saidapet Health Unit District though performing well above the normal expected indicator of operational efficiency, seems to be slackening currently. With the district being very ear to the Chennai city where 70% of the urban malaria positive cases are occurring, care should be exercised in strengthening the surveillance system performance in the near future.

Annexure XII

Checklist for structure indicators

District

Block

PHC

S.No	Structure Indicator	Availability		In use		Adequacy		
		Y	N	Y	N	Req	IP	Deficit
1.	Building - Rented - Own							
2.	Vehicle - Ambulance - Jeep							
3.	Fuel							
4.	Laboratory Microscope Slide Reagents Colorimeter Centrifuge Others Records Forms							
5.	Drugs Chloroquine Primaquine Others							
6.	Insecticide Insecticide Sprayer Fogging machine							
7.	Electricity							
8.	Water supply							
9.	Staff MO SHN HI(PHC) HI(HSC) VHN Lab assistant							
10.	Communication Telephone E-Mail Fax							

Annexure XIII.

Questionnaire for Health Inspectors / VHN

Name	District	
Block	PHC	HSC
Total no. of service years	No. of service years in this position	

1. What is the population under surveillance?

2. What are the problem diseases in this area?

3. What are your responsibilities?

4. Is malaria a problem disease? (1- yes, 2- No)

5. Is there an active anti malaria programme in your area?(1- yes, 2- No)

6. If yes, name the current programme _____

7. When was this programme started in your area? _____

8. What do you understand by surveillance?

9. What is the type of surveillance in this programme?
(1- active, 2- passive, 3- sentinel, 4- don't know)

10. Is there an available written guideline for malaria surveillance?
(1- Yes, 2- No)

If yes, please show it

11. Please define the case definition used by you

12. How often is a visit made for fever surveillance?
(1- daily, 2-weekly, 3- once in 15 days, 4- once a month, 5- don't know)

13. In a fever case, what is done first?
(1-presumptive treatment, 2- radical treatment,3- blood smear, 4- don't know)

14. In a fever case what is the next step?
(1-presumptive treatment, 2- radical treatment,3- blood smear, 4- don't know)

15. Do you make blood smear?
(1- Yes, 2- No)

16. Where do you send the blood smears for examination?
(1- PHC, 2- Block PHC, 3- District/State, 4- don't know)

17. How often are the blood smears supposed to be sent for examination?
(1- daily, 2-twice a week, 3- weekly,4- once in 15 days, 5- once a month)

18. How often are the blood smears sent for examination?

(1- daily, 2-twice a week, 3- weekly,4- once in 15 days, 5- once a month)

19. How often are the results collected?

(1- twice a week,2- weekly, 3- once in 15 days, 4- once a month)

20. In a positive case, what is done?

(1-presumptive treatment, 2- radical treatment,3 – not sure)

21. Who decides what is to be done?

(1- self, 2- MO, 3- District officials , 4- Others)

22. When is the decision taken?

(1- immediate, 2- within 1day, 3- <5 days, 4->5 days)

23. In a positive case, how do you make follow-up visits?

24. Are you able to do the full follow up? (1- Yes, 2- No)

25. What are the steps adopted to ensure quality of the slides made and examined?

26. Where do you send the consolidated report?

(1-PHC,2- Block PHC, 3- District/State, 4- don't know)

27. How often do you send the report?

(1- weekly, 2- once in 15 days, 3- once a month, 4- don't know)

28. How do you send the report?

(1-forms by post/courier/in- person, 2- telephone, 3- e-mail, 4- fax)

29. Do you get any feedback from the higher officials?

(1- Yes, 2- No)

30. If yes, what type of feedback?

(1- oral, 2- written letter, 3- bulletin,4- others)

31. When do you get the feedback?

(1- weekly, 2- once in 15 days, 3- once a month, 4- quarterly, 5- others)

32. No. of times supervised / month

33. Details of supervision (last month)

S.no	Designation of the supervisor	Date of supervision	Remarks made

34. How often is the entomological surveillance made?
 (1- daily, 2- once a week, 3- once in 15 days, 4- once a month, 5 – others)
35. Who does the entomological surveillance?
36. Who decides about the insecticidal spray?
37. Are the forms and registers clearly understandable? (1- yes, 2- no)
38. Is it easy to fill? (1- yes, 2- no)
39. If no, reasons
40. Did you receive any training in blood smear making and examination for malarial parasite? (1-Yes ,2-No)
41. If yes, when did you receive it ?
 (1-<1 year back, 2- 1-2 years back,3- 2-4 years back,
 4- >4 years back)
42. How long was the training programme ? (days /hours)
43. Where was the training given ; by who?
44. Was the training repeated ? (1-Yes ,2- No)
45. If yes, how many times ?
46. Was it useful ? (1-Yes,2- No)
47. Do you think that refresher training course is needed? (1-Yes , 2- NO)
48. Suggestions

Signature of the respondent

Date

Annexure XIV.

Questionnaire for Laboratory personnel

Name _____

Designation _____

Name of the District _____

Name of the Block _____

Name of the PHC _____

Name of the HSC _____

Total no. of service years

No. of service years in this area

1. What is the space available for laboratory?

2. Are the registers and forms available? (1-Yes ,2-No)

3. What are the registers and forms available? Give details

4. Are there adequate equipments for malaria smear examination?

(1-Yes ,2-No)

5. Is there enough supply of reagents? (1-Yes ,2-No)

6. Did you receive any training in blood smear making and examination of malarial parasite? (1-Yes ,2-No)

7. If yes, when did you receive it ?

(1-<1 year back, 2- 1-2 years back , 3- 2-4 years back, 4- >4 years back)

8. How long was the training programme ? (days /hours)

9. Was the training repeated ? (1-Yes ,2- No)

10. If yes, how many times ?

11. Was it useful ? (1-Yes,2- No)

12. Do you think that refresher training course is needed?

(1-Yes , 2- No)

13. How often do you examine slides?

(1-daily, 2- once a week, 3- once in 15 days, 4- once a month)

14. How often are the results communicated?

(1- weekly, 2- once in 15 days, 3- once a month)

15. How do you communicate the results?

16. In a positive malaria case, what is done?

(1-presumptive treatment, 2- radical treatment, 3 - don't know)

17. Who takes the decision of what is to be done?

(1- self, 2 – HI , 3- PHC MO, 4-others)

18. How often do you send the report to the district?

(1- once in 15 days, 2- once a month, 3- once in a quarter, 4- yearly)

19. How do you send the report?

(1- forms by post/courier/in-person, 2- telephone, 3- e-mail, 4- fax)

20. Do you get any feedback from the higher officials?

(1- Yes, 2- No)

21. If yes, what type of feedback?

(1- oral, 2- written letter, 3- bulletin, 4- others)

22. When do you get the feedback?

(1- weekly, 2- once in 15 days, 3- once a month, 4- quarterly, 5- others)

23. No. of times supervised / month

24. Details of supervision

S.no	Designation of the supervisor	Date of supervision	Remarks made

25. Are the forms and registers clearly understandable? (1- yes, 2- no)

26. Is it easy to fill? (1- yes, 2- no)

27. If no, reasons

28. How do you ensure quality control of the blood slides made and examined?

29. Mention the last date when the blood slides were cross-checked by the higher officials

30. Last date when feedback was received from higher officials

31. No. of false positive slides/month in the last one year

32. No. of false negative slides in the last one year

Signature of the respondent

Date

Annexure XV

Questionnaire for District Health Officials/Medical Officers

Name

Designation

Name of the District

Total no. of service years

No. of service years in this position

1. Is malaria a problem in your area? (1- Yes, 2- No)

2. When was the NAMP started in your area?

3. Does a rapid response team exist in the district? (1- Yes, 2- No)

4. Is there a written action plan for epidemic preparedness and response of malaria?
(1- Yes, 2- No)

5. Is there a written guideline for malaria surveillance?(1- Yes, 2- No)

If yes, please provide a copy of it

6. Is a standard case definition available for malaria at all levels?

(1- Yes, 2- No)

7. If yes, please define the case definition used for malaria

8. Is there a written case management protocol for malaria?

(1- Yes, 2- No)

9. If yes, is it available at all levels? (1- Yes, 2- No)

10. Are the structural inputs adequate? Put a tick mark where you agree

Agree Don't agree Remarks

Staff			
Building			
Vehicle			
Fuel			
Lab facilities			
Drugs and supplies			
Forms, registers			
Communication facilities			
Others			

11. Are the forms and reports sent from the periphery regularly?

(1- Yes, 2- No)

12. If yes, how often are they sent?
(1- once a week, 2- once a month, 3-once in two months,4-irregular)
13. How are the forms and reports sent?
(1- post/courier, 2- e-mail, 3- fax, 4- telephone)
14. Are the sent forms complete in all the details needed?(1- Yes, 2- No)
15. Are the sent data reliable? (1- Yes, 2- No)
16. If yes, how do you assure the reliability? Details
17. Do you give any feedback to the periphery?(1- Yes, 2- No)
18. If yes, what type of feedback?
(1- oral, 2- written letter, 3- bulletin,4- others)
19. When do you give the feedback?
(1- weekly, 2- once in 15 days, 3- once a month,4- quarterly, 5- others)
20. Where is the analysis done?
(1- district, 2- block, 3- PHC, 4- periphery)
21. How often is the analysis done?
(1- weekly, 2- once in 15 days, 3- once a month,4- quarterly, 5- others)
22. How are the results of the analysis presented?
(1- tables, 2- diagrams, 3- others)
23. No.of supervision made in the last month(related to malaria surveillance)
24. Are the decisions of insecticidal spray based on epidemiological data?
(1- Yes, 2- No)
25. What are the IEC materials used?
26. Is there any special programme for enhancing the awareness of the community?
(1- Yes, 2- No)
27. If yes, details of it
28. Did you receive any training in blood smear making and examination for malarial parasite? (1-Yes ,2-No)
29. If yes, when did you receive it ?
(1-<1 year back, 2- 1-2 years back,3- 2-4 years back, 4- >4 years back)
30. How long was the training programme ? (days /hours) _____
31. Where was the training given ; by who?
32. Was the training repeated ? (1-Yes ,2- No)
33. If yes, how many times ?

34. Was it useful ? (1-Yes, 2- No)

35. Do you think that refresher training course is needed?

(1-Yes , 2- No)

36. How good is the existing surveillance system?

(1- very good, 2- good, 3- not good, 4- poor, 5- very poor)

37. Give reasons for your statement for Q.13

38. Was there any recent outbreak of malaria? (1- Yes, 2- No)

If yes, please furnish the details

39. Recommendations

Signature of the respondent

Date

**Chapter 10. Evaluation of Maternal Health Services Component of
the Reproductive and child health programme, Saidapet Health
Unit District ,Tamilnadu**

1. Introduction

The National Population Policy (NPP), 2000 has paid special attention to the health of women and children to achieve population stabilisation by the year 2045 A.D. For the first time, the policy has pre-poned the time period for attaining the goal of replacement level fertility (i.e. Net Reproductive Level of 1.0) by the year 2010 A.D. Only Tamilnadu and Kerala have reached the goal of NRR of One which approximately corresponds to a birth rate of 21 and a Death rate of 9.

The NPP has also elaborated twelve strategies to achieve its socio-demographic goals. To achieve its objective, the NPP reaffirms continuation of the “Target Free Approach” (TFA) which is being adopted by the Reproductive and Child Health Programme (RCH) and emphasises on informed contraceptive choice and availability of good quality services.

1. 1. Status of Maternal Health Care in Tamilnadu

Progress in the maternal health care can be assessed by declines in infant mortality rate and Maternal Mortality Ratio (MMR) which may be attributed to institutional deliveries, improved access to antenatal care and abortion services. MMR in Tamilnadu has been fluctuating between 120 / 100,000 live births in 1996 and 140 / 100,000 live births in 1999 in Tamilnadu (DANIDA Survey , 1996 & 1999). Tamilnadu State’s medium – term goal is to bring down MMR to less than 100 / 100,000 by the year 2005 A.D.

1. 2. Purpose of the evaluation

The RCH Programme has been ongoing since 1997-98. This first phase has come to an end in March 2003. The RCH –II programme is expected to be launched by middle of 2004. An evaluation of maternal health services in the sample Saidapet health unit district in Tamilnadu would prove a useful exercise to assess the current

situation and the achievements of the programme during the past five years. This would enable identification of existing lacunae in the programme and suggest appropriate remedial measures to bridge the gaps identified.

1. 3. Maternal health care scenario in Tamilnadu

As mentioned earlier, the progress in the maternal health care can be assessed by declines in infant mortality rate and Maternal Mortality Ratio (MMR). The figure 57 shows the trend of infant mortality rate in Tamilnadu and India from 1991 to 1999.

Figure 57. Infant Mortality Rate in India & Tamilnadu, 1991 to 1999

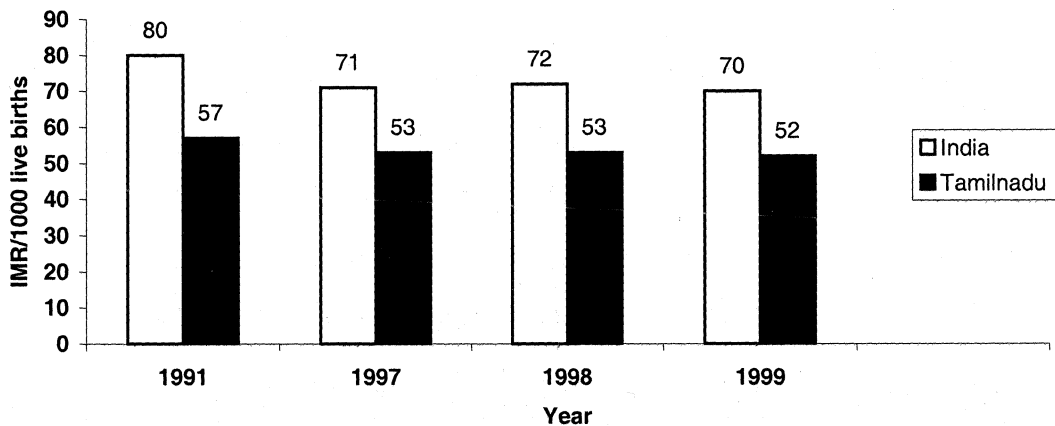


Figure 57 shows that though the trend of IMR has decreased in India, when the state Tamilnadu is looked at separately, the IMR has been between 57/1000 LB in 1991 to 52/1000 LB in 1999.

Similarly, the MMR in Tamilnadu has been between 120/100000LB in 1996 to 140/100000 LB in 1999 (DANIDA Survey). These indicators show that maternal health care in Tamilnadu has been in a stagnant position over the years.

Table 55 shows the current status of maternal health care indicators and goals to be achieved by 2005 in Tamilnadu.

Table 55. Maternal health care indicators, Tamilnadu

Indicator	Current level in TN (1999	
	SRS)	T.N goals for 2005 A.D
Infant Mortality Rate	52	<30
Maternal Mortality Rate	1.4	<1

Source : Sample Registration Survey, 1999

2. Objectives

The objectives of the evaluation are to:

- a. Evaluate the achievement of the objectives of Reproductive and Child Health Programme with special reference to maternal health care services
- b. Identify the existing gaps in the service and
- c. Suggest appropriate measures to strengthen the services

3. The Reproductive and child health (RCH) programme

3.1. Origin

The National Family Planning Programme was launched in the year 1951 with the objectives of promoting the small family norms using a “Cafeteria Approach”. In the mid seventies, the programme received a set back due to rigid implementation of a “target based approach”. In 1997 – 1998, the programme underwent a name change viz. “National Health and Family Welfare Programme” (NHFWP). The NHFWP adopted a “family welfare and health need approach” to population sterilisation that involved strengthening MCH services at the grass root levels.

In view of the objectives of improving the health of the mothers and young children during the seventh plan period, various programmes like Universal Immunisation Programme (UIP) and Oral Rehydration Therapy (ORT) were introduced. Though these programmes had a beneficial impact, the divergence was causing problems its effective management. Hence, in the eighth plan, all these programmes were integrated under the Child Survival and Safe Motherhood (CSSM) Programme. This was implemented from 1992-1997 with the objective of provision of an integrated package of services for the betterment of the health status of mothers and children.

3.2. Child survival and safe Motherhood Programme

This programme addresses the major causes of morbidity and mortality in women and children which are preventable by readily available cost-effective interventions. Many of these interventions are on - going under the existing MCH programme. Treatment of Acute Respiratory Tract Infections (ARI), essential newborn care and

strengthening of emergency obstetric services were the thrust areas of the programme.

3. 2. 1. The Package of services

3. 2. 1. 1. For the Mothers

Immunisation

Prevention and Treatment of anaemia

Antenatal care and early identification of maternal complications

Deliveries by trained personnel

Promotion of institutional deliveries

Management of obstetric emergencies

3. 2. 1. 2. For the children

Essential new born care

Immunisation

Appropriate management of diarrhoea

Appropriate management of ARI

Vitamin A Prophylaxis

Treatment of anaemia

3. 2. 1. 3. Infants

New born care

Birth weight of all new borns

Resuscitation of asphyxiated babies

Care of low birth weight babies

Prevention of hypothermia

Exclusive breast feeding within 1 hour of delivery

Referral of new borns who show signs of illness

Advice to the mother on essential new born care, prevention of hypothermia and infections, nutrition, immunisation, Vitamin A and early signs when to seek help and immunisation

3. 2. 1. 4. Children (1-3 Years)

Immunisation

3. 2. 1. 5. Children(1-5 Years)

IFA - Small if child has clinical signs of anaemia

Stool examination for hook worm infestation

De worm with Mebendazole

3. 2. 1. 6. Prevention of death due to diarrhoeal Diseases

3. 2. 1. 7. Prevention of death due to Pneumonia

3. 3. Reproductive and Child Health Programme

The International Conference on Population and Development in Cairo (1994) recommended that the participant countries should implement unified programmes for Reproductive and Child Health (RCH). During the ninth plan, the RCH Programme has integrated all the related programmes of the eighth plan. The concept of the RCH Programme is to provide to the beneficiaries a need based, client centred, demand driven, high quality and integrated RCH services. In India and Tamilnadu, the RCH –I was launched in 1997.

The RCH is a composite programme incorporating the inputs of the Government of India as well as funding support from external donor agencies including World Bank and European Commission .The overall objective since the beginning has been that the population of the country should be stabilised at a level consistent with the requirement of national development. Therefore, the RCH Programme by ensuring small families also ensures stable population in the medium and long term, though in the short term, population is controlled by use of spacing methods and terminal methods for avoiding unwanted pregnancies.

3. 3. 1. Components of RCH Programme

All components of CSSM Programme and two additional components , one relating to sexually transmitted diseases(STD) and the other relating to reproductive tract infections(RTI).The main highlights of the programme are:

- The programme integrates all interventions of fertility regulation of maternal and child health with reproductive health of both men and women
- The services provided are client centred, demand driven, high quality care based on the needs of the community arrived at through decentralised participatory planning and target free approach
- The programme envisages up gradation of the level of facilities for providing various interventions and quality of care
- The programme aims to improve the access of the community to various services which are commonly required.
- The programme aims at improving the out- reach services particularly for the vulnerable groups of population.

3. 3. 2. 2. Ante Natal Care

3. 3. 2. 2. 1. Registration

The village health nurse conducts the antenatal clinic every Monday and attends to the health care seekers with special reference to the pregnant women. A pregnant mother is registered as soon as she visits the VHN. This registration is done in the record maintained by the VHN and an antenatal card is provided to the mother.

Basic tests like urine sugar and albumin, hemoglobin estimation are done. A minimum of three antenatal visits is prescribed by the programme. Height, weight, obstetric history, other relevant history and general examination of the mother is done.

3. 3. 2. 2. 2. Subsequent visits

On subsequent visits, the weight (gain / loss) , blood pressure of the mother is examined. Risk factors like anemia, high blood pressure should be detected early and referred to the appropriate higher centres. Abdominal examination for appropriate gestational age should be made. Health education and counselling for

family planning methods should be provided. Two doses of Tetanus Toxoid and prophylactic/ therapeutic Iron and folic acid tablets to be given as per the requirements.

3. 3. 2. 3. Natal care

“Five cleans” of the delivery should be strictly adhered.

3. 3. 2. 4. Post natal care

A minimum of two visits by the health worker is required. Apart from examination of lochia and enquiry about any problems, focus should be made on breast feeding of the child and family planning methods to be adopted.

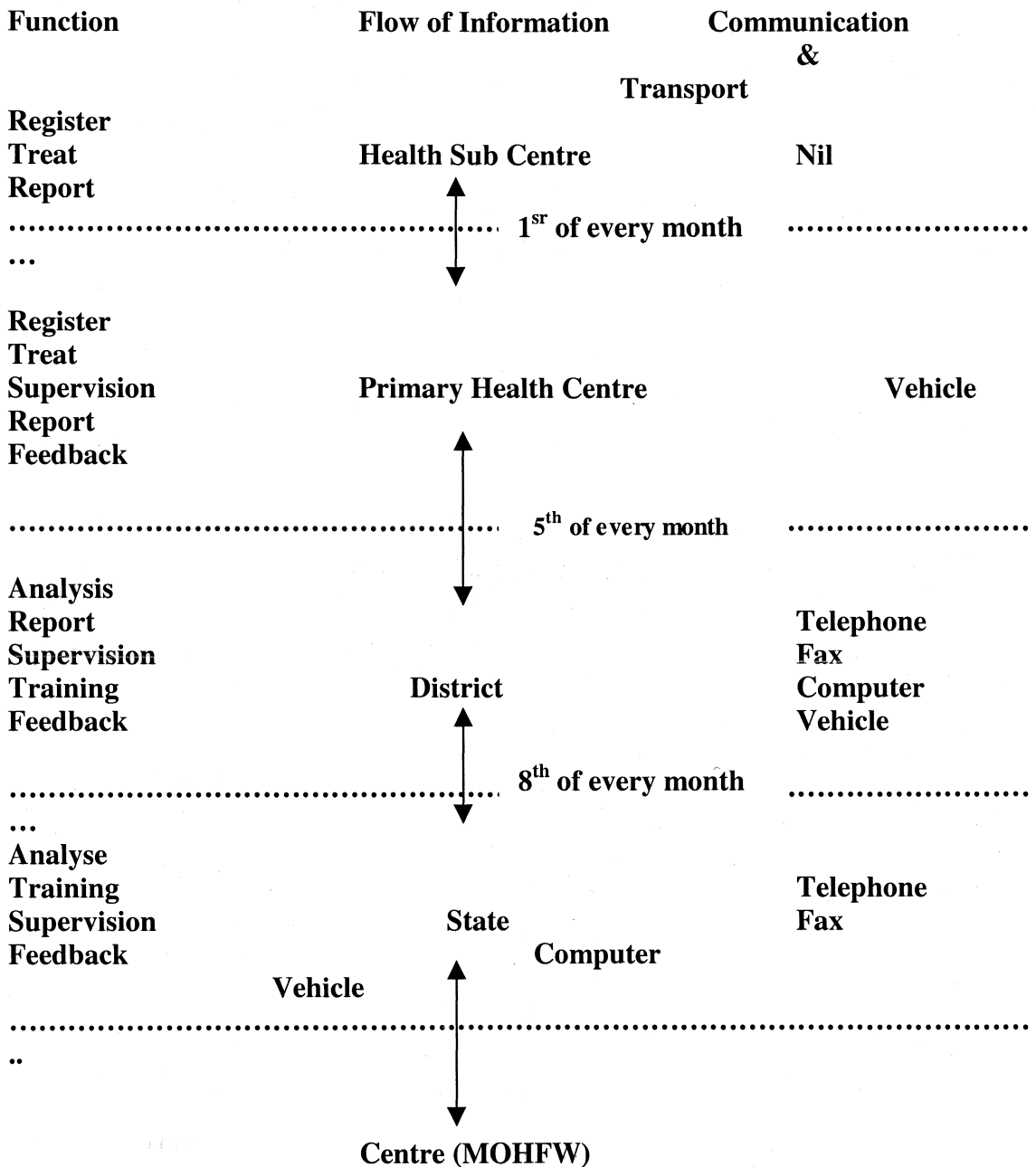
3. 3. 2. Management Information System

RCH approach has been built upon the participatory planning approach. In this, on the basis of the community needs assessed by the health workers, sub-centre action plan is prepared. This process involves the discussion and approval of the supervisor of the health worker (MO/LHV). Similarly, the PHC action plan is prepared under the supervision of the next supervisory officer. The PHC plans will be an integral part of the district plan which will be formed once a year.

3. 3. 3. Reporting system

- The health worker submits the reports to the PHC in the Form 6 by 1st day of every month
- The reporting PHCs consolidates information from all facilities and submit the same in Form 7 to the district level by 5th day of the month
- The district consolidates the reports and sends the report in Form 9 to the State head quarters by 8th day of the month

Flow of Information, Task Orientation & communication



3. 4. Evaluation

The programme evaluation has been made under the following aspects

3. 4. 1. Planning and preparation

- Prepare background information
- Prepare data collection tools
- Organising logistics

3. 4. 2. Conducting the evaluation

- Field visits and conducting evaluation
- Preparation of final report and submission to higher authorities
- Presentation of evaluation results and recommendations to the scientific community and other policy making groups

3. 4. 3. Evaluation team

MAE - FETP scholar (myself) as the principal investigator, representatives from the Deputy Director of Health Services (DDHS) office, Social scientist, volunteers / social workers

3. 4. 5. Training programme

Training was given to the evaluation team to prepare them for the evaluation per-se. Data collection tools were pre tested and finalised during this programme.

3. 4. 6. Methodology

Study design - Cross sectional

Study area - Kattangulathur block, Saidapet Health Unit District

Table. Kattangulathur block , Saidapet HUD,2002

Name of the PHC	No.of HSC	Population	BR*	DR*	IMR*	MMR*
Nandivaram	6	74,350	19.0	3.8	17.0	1.0
Othivakkam	6	32,885	19.7	5.0	23.5	1.6
Reddipalayam	6	29,350	19.7	5.9	27.9	1.3
Maraimalainagar	6	59,580	19.4	3.9	31.7	-
Kunnavakkam	6	37,543	18.5	6.1	11.0	-
TOTAL	30	2,33,708	19.0	4.9	23.1	0.8

Source: Office of Saidapet DDHS

*per 1000 live births

BR – Birth rate DR – Death rate IMR – Infant Mortality Rate MMR – Maternal Mortality Rate

Selection of the block – Using the “best scenario method” the block Kattangulathur was selected out of the six blocks of the Health Unit District.

Sampling Unit - All five PHCs of the block and two randomly selected HSCs from each PHC (total of 10 HSCs)

Study period	- January 2003 to June 2003
Sources of data	- Pre tested questionnaire, maternal and child health records and registers at the district, block level and Primary Health Centre (PHC) level
Types of data	- Primary and secondary

3. 4. 1. Data Collection

Discussions were held with the Project Director, Deputy Director and Medical Officers of the Reproductive and Child Health Programme. The Deputy Director of Health Services, District Public Health Nurse were interviewed using the pre tested questionnaire. The Primary Health Centre Medical Officers, Community Health Nurse (CHN), Sector Health Nurse (SHN) , Village Health Nurse (VHN) , Auxillary Nurse Midwives (ANM) and Health Inspectors were requested to fill in the questionnaire and return the same.

Questionnaires were administered to the health seeking pregnant women to have a picture of their perspective as well.

The records and registers at the district, block, PHC and sub centre were reviewed.

3. 5. Results

The aim of the study was to look at two issues, namely, whether the objectives of the programme are being achieved and evaluation of the system with respect to the structure, process and outcome variables.

3. 5. 1. Objective 1

Achievement of reproductive and child health programme objectives

The objective of the programme in Tamilnadu and in the Health Unit district of Saidapet is to provide “client centred, need based, good quality, comprehensive health care services” to all beneficiaries . The stated objectives of the programme is not “SMART”. It is subjective and difficult to measure. A time frame is not specified. The “target free approach” poses a difficulty in measuring the achievement of the programme since there are no fixed targets to be achieved. The targets are self affixed by the peripheral health workers after conducting the “Community Needs Assessment” (CNA) and hence the targets to be achieved differe from one health sub centre to another..

3. 5. 2. Objective 2

Evaluation of the RCH Programme with respect to health system issues using Structure, Process and Outcome Indicators

3. 5. 2. 1. Structure indicators

Using the prepared check list of indicators (Annexure XVI), information was collected through personal visits from various structures of the system in the district.

1. Manpower
2. Vehicle, fuel
3. Building
4. Laboratory facility
5. Drugs and supplies

3. 5. 2. 1. 1. Buildings

Table 58 shows the existing building facility in Kattangulathur block and District Office, Saidapet Health Unit district, 2003

Level	Availability of building		Building in use		Electricity, Water supply		Vehicle availability and use	
	n	n%	n	n	n%	n%	n	n%
District Head Quarters	1	100	1	1	100	100	5	100
Block PHC	1	100	1	1	100	100	2	100
PHC	5	100	4	4	80	80	1	25

The State has a separate Directorate for the programme and this has a functional building in the campus of the Directorate of Medical Services Complex, Chennai. The office of the Deputy Director of Health Services Saidapet Health Unit District is functioning in a rental building at Saidapet area (30 kms away from the city centre). Four of the five PHCs of the Kattangulathur block has own building. One PHC i.e Reddipalayam PHC has a rented building for use. All PHCs except for the one Reddipalayam PHC have functional building in good condition and electricity and water supply.

3. 5. 2. 1. 2. Vehicles

The State and district have adequate vehicles which are in good condition and use. Out of the five PHCs of the selected block, two have vehicle facilities. The Block level

PHC has one ambulance and one jeep whereas the other PHC has one vehicle only. These vehicles are in good condition and in use.

3. 5. 2. 1. 3. Logistics and supplies

RCH being a centrally sponsored scheme, logistics and supplies are from the central government. Indents are made in anticipation of the requirement and there is no shortage of any drugs, forms and registers. Currently, under the Health Management Information System (HMIS), each PHC is adequately provided with forms for various levels of the health system. These forms are not yet being utilised by the PHCs.

3. 5. 2. 1. 4. Manpower availability

Table 59 shows the health manpower availability of the Kattangulathur block in Saidapet Health Unit District, 2003

Table 59. Health manpower of Kattangulathur block, Saidapet HUD , 2003

PHC	HI (PHC)		HI (HSC)		VHN		SHN		MO	
	S	IP	S	IP	S	IP	S	IP	S	IP
Nandivaram	1	1	6	4	1	1	6	6	2	1
M.M.Nagar	1	1	7	7	2	2	6	6	2	2
Othivakkam	1	Nil	4	4	1	1	6	6	1	1
Kunnavakkam	1	Nil	6	3	1	1	6	6	1	1
Reddipalayam	1	Nil	6	3	1	0	6	6	2	1

Source: Office of the DDHS, Saidapet HUD

HI – Health Inspector; VHN- Village Health Nurse; SHN- Sector Health Nurese; MO- Medical Officer ; S- Sanctioned; IP- In Position

The state headquarter is manned with adequate staff. There is a Project Director, two Deputy Directors, one Medical Officer, one District Public Health Nurse, computer assistants and other administrative staff. At the district level, Deputy Director of Health Services is the administrative chief under who serves the District Public Health Nurse. At the block level PHC and additional PHCs, the staff are adequetely posted. There are six Medical Officers, one Community Health Nurse, five Sector Health Nurses, thirty Village Health Nurses, six Auxillary Nurse Midwives (ANMs) and twenty three health inspectors in place. All the posts of Medical officers and village health nurses are filled up. Eleven of the sanctioned health inspector post is vacant.

3. 5. 2. 1. 5. Equipments, Drugs and Supplies

Table 60 shows the availability of equipments and its use in the Kattangulathur block of Saidapet Health Unit District, 2003

Level	Relevant Kits		Relevant kits in use	
	n	n%	n	n
Block PHC	1	100	1	1
PHC	4	100	3	75
HSC	10	100	10	100

List of the contents of the kits are provided in the Annexure

Sub Centre Kit – Drug Kit A

- Drug Kit B
- Sub centre Equipment Kit

Mid wifery Kit

PHC Equipment Kit

All the PHCs and HSCs have adequate equipments and drugs as per the programme requirement. Reagents and other laboratory items needed for basic tests are present. Tests like urine sugar, albumin, hemoglobin estimation and VDRL are being carried out in the block PHC. Urine albumin, tests are being carried in all the PHCs. Clear labelling of the reagents was present in all of them. The quality of the equipments, instruments and other supplies were found to be good.

Though the equipments were present, deliveries were not being conducted in one PHC as the building is in a dilapidated stage and new building construction is under progress.

3. 5. 2. 1. 6. Communication facilities

The block PHC has only telephone and no other facilities like computer, fax etc., The other four PHCs do not even have telephone.

3. 5. 2. 2. Process Indicators

Process has been evaluated under the following headings :

1. Antenatal care
2. Natal care

3. Post natal care

3.5.2.2.1. Indicators

Both coverage and impact indicators has been used for analysis

1. % of pregnant women with early registration
2. % of pregnant women who had 5 antenatal visits
3. % of pregnant women antenatal women who had two doses of TT
4. % of pregnant women identified as high risk
5. % of identified high risk women who were referred
6. % of pregnant women administered IFA tablets
7. % of women who delivered in institutions
8. % of deliveries conducted by trained personnel
9. % of mothers who had two post natal visits by the health worker
9. % of mothers who had health education in the antenatal, intra natal and post natal period

Outcome Indicators

1. Maternal mortality rate
2. Infant Mortality Rate
3. No.of mothers accepting contraception

3. 5. 2. 2. Population under surveillance

The total population of the block is 2,33,708. The major occupation of the people is agriculture. The main workers constitute 58% of the total population. The major religion is Hinduism (>80%). There are many castes in Hinduism and a wide variety of sub sects in each caste. The cultural characteristics of each sect vary. The Scheduled caste and Scheduled tribe constitute a minor proportion of the total population i.e. 6 and 5% respectively.

Out of five PHCs only three PHCs have population under surveillance in the range of 30,000. Out of the remaining two PHCs, one has a population of 60,000 whereas the block PHC has a population of eighty seven thousand.

3. 5. 2. 2. 3. Man Power Development

Training under RCH has been provided to Health personnel of all levels of the District. This training was provided once for a duration of 12 days for all categories. Irrespective of the cadre, every body was of the opinion that they needed refresher training courses periodically i.e. once in three years at least. Training module has been provided to all health personnel .

3. 5. 2. 2. 4. Data structure

- who collects the data?
- how often?
- Are standard formats being used?
- Data validation
- Data storage
- Feedback?

Antenatal Care

Table 61 shows the status of antenatal care provision in Kattangulathur block of Saidapet Health Unit District.

Table 61. Antenatal and Natal care provision in Kattangulathur block of Saidapet Health Unit District, 2003

PHC	Registration			Early AN Registration			Three AN visits / two doses of TT			High risk identified		
	T	A	%	T	A	%	T	A	%	T	A	%
Nandivaram	912	920	100*	912	486	53.3	920	920	100	136	142	100*
M.M.Nagar	678	681	100*	678	358	52.8	681	680	99.8	102	95	93
Othivakkam	408	420	100*	408	219	53.6	420	420	100	61	50	82
Kunnavakkam	360	340	94	360	211	58.6	340	340	100	54	53	98
Reddipalayam	276	264	96	276	154	55.8	264	260	98	41	40	98

* more than 100%

Table 61. Antenatal and Natal care provision in Kattangulathur block of Saidapet Health Unit District, 2003 (contd.)

PHC	High risk referred			Institutional deliveries			Deliveries by trained personnel		
	T	A	%	Tot al	A	%	Tot al	A	%
Nandivaram	142	115	81	821	656	80	821	821	100
M.M.Nagar	95	81	85	608	512	84	608	606	99.6
Othivakkam	50	42	84	365	305	84	365	363	99.5
Kunnavakkam	53	48	91	320	264	83	320	315	98.4
Reddipalayam	40	40	100	246	201	82	246	241	98

It was observed during field visits and from the records that 100% of the antenatal clinics planned have been conducted by the VHN. The antenatal clinics were regularly conducted on every Monday as per schedule. The registration of antenatal mothers is 98%. However, it was found from the records that early registration (<12 weeks) is about 55% altogether in all the five PHCs of the block. On an average, 98% of the registered mothers had three antenatal visits and two doses of TT. Of the total

pregnancies, 10 to 12% of the high risk pregnancies were detected and out of these, 88% of them were referred to appropriate higher centres. Ninety eight percent of the registered mothers had two doses of tetanus toxoid.

Natal Care

Of all the deliveries, 83% of them are institutional deliveries and of these, 60 to 70% of the deliveries occur in Government hospitals and 20 to 25% of the deliveries occur in Private Hospitals. During field visits, the procedure of conduct of delivery at the five PHCs and selected ten HSCs was observed. The “five cleans” of delivery were adhered to in all the centres and the conduct of delivery as such was found to be satisfactory. Acts like fundal pressure or pulling of the cord was not found.

Post Natal Care

Table 62 shows the status of postnatal care provision in Kattangulathur block of Saidapet Health Unit District.

Table 61. Postnatal care provision in Kattangulathur block of Saidapet Health Unit District, 2003

PHC	Two Post natal visits		
	T	A	%
Nandivaram	821	821	100
M.M.Nagar	608	605	99.5
Othivakkam	365	361	98.9
Kunnavakkam	320	315	98.4
Reddipalayam	246	245	99.5

The required two post natal visits was found in 99% of the mothers.

3. 5. 2. 2. 5. Periodicity of Data flow

The registered data is sent from the periphery (HSC) to the PHC on a monthly basis usually in the first weekly review meeting. The collected, compiled data of all the HSCs are sent to the block once a month at the time of review meeting. The consolidated report of the block is sent to the district by the end of 1st week of every month.

This periodicity is found to be maintained as the review meetings are regularly held. The reports were found to be sent in the prescribed forms only.

3. 5. 2. 2. 6. Feed back

Feedback is given to the Village Health Nurses , ANMs and Health Inspectors in the weekly review meetings (every Tuesday) conducted by the PHC Medical Officer. Monthly review meetings (5th of every month) are held for the Sector Health Nurses and Community Health Nurse by the District Public Health Nurse.

Feedback is usually in the form of oral and very occasionally in the form of written reports.

3. 5. 2. 2. 7. Feed forward

Monthly written reports are sent to the Directorate of Public Health and Preventive Medicine and Office of the Reproductive and Child Health Programme. Chennai.

3. 5. 2. 2. 8. Monitoring and Supervision

As per the responses given by the field level health workers, monitoring and supervision is being done regularly by the PHC Medical officers, Block level medical officer, District level officers and the Zonal officers. All the PHCs had more than four visits by the supervisory staff in all the twelve months of the reference period (A quarterly visit is required as per the norms). This was again cross verified with the supervision register and found to be true.

3. 5. 2. 3. Knowledge and practices of health personnel

Table 62 Selected Indicators of knowledge of health peronnel, Kattangulathur block, Saidapet Health Unit District, 2003

Indicator	Number Aware (%)
Full correct response regarding the	
Package of services -Antenatal care	42/48 (87.5)
Natal care	44/48 (92)
Post natal care	48/48 (100)
High risk pregnancies	41/48 (85)
Warning signs of pregnancy	32/48 (67)
Five cleans of delivery	47/48 (98)

This table shows that on the whole, most of the health personnel involved are aware of the basic care to be given during the antanatal, natal and postnatal period .

Table 63 Selected Indicators for skill assessment of health peronnel, Kattangulathur block, Saidapet Health Unit District, 2003

Indicator	Number Aware (%)
Correct Measurement of Blood pressure	35/48 (73)
Correct Measurement of weight	42/48 (88)
Fundal height measurement	41/48 (85)
Urine examination	32/48 (67)

This table shows that the health personnel of various cateories need refresher training course to update their skills.

Outcome indicators

The maternal mortality rate has declined from 1.7// 1000 LB in the year 1999 to 0.8/ 1000 LB in the year 2002. Similarly, the IMR has reduced from 27/1000LB in the year 1999 to 23.1/1000 LB in the year 2002. Around 70% to 75% of the mothers accept contraceptive methods.

3. 5. 2. 4. Client Satisfaction

Client satisfaction was assessed by administering the semi-structured questionnaire to a sample of mothers (n=100) who attend the antenatal clinic and immunisation clinic at the 5 PHCs and the selected 10 HSCs of the block.

Table 64 Selected Indicators for assessment of client satisfaction, Kattangulathur block, Saidapet Health Unit District, 2003

Indicator	Number Aware (%) n=100
Measurement of Blood pressure	95 (95)
Measurement of weight	97 (97)
Measurement of height	90 (90)
Nutrition education and counselling	62 (62)
Promotion of breast feeding	74 (74)
Family planning promotion and counselling	94 (94)
Two Post natal visits	51 (51)

Health education and counselling

The method of counselling and health education given to the mothers was observed during field visits. The inference was that the importance of nutrition and exclusive breast feeding were not stressed adequately. Motivation for iron rich foods was found deficient. However, family planning counselling given was found to be satisfactory. The mothers were advised of the various ways of spacing and were motivated for permanent methods of sterilisation as well.

4. Discussion

Strengths of the programme

1. Good infrastructure, adequate manpower and logistics at all levels
2. Periodicity of monthly reporting mechanisms and channels well established
3. Co-ordination with ICDS is good.

Gaps identified:

1. Early registration of pregnancy not adequate
2. Awareness about the compliance of early appropriate referral is deficient among mothers.
3. Laboratory support is not adequate at PHC and HSC levels.

4. Analysis of reports at peripheral level is limited.
5. Review meetings are mainly target oriented.

5. Recommendations:

1. Laboratory facilities to be strengthened so that needed tests like blood grouping and typing, VDRL could be made in the HSCs if not at the level of PHCs atleast.
2. Early registration to be encouraged by imparting knowledge about the importance of it to the all women.
3. Information, education and communication to be strengthened.
4. Written feed back should be given to all the officials visited by the Supervisory staff.
5. News letters should be published regarding maternal health which should be made available to all levels.

Annexure XVI

QUESTIONNAIRE FOR HEALTH PERSONNEL

Name

Designation

Name of the District

Name of the Block

Name of the PHC

Name of the HSC

Total no. of service years

No. of service years in this area

1. What is the population under surveillance?

2. What are the problem diseases in this area?

3. What are your responsibilities?

4. Are you aware of RCH programme? (Yes -1, No -2)

5. If yes, when was the programme started ?

6. Did you receive any training in RCH? (Yes -1, No -2)

If yes, when did you receive it ?

(<1 year back - 1, 1-2 years back - 2, 2-4 years back - 3,
>4 years back - 4)

7. How long was the training programme ? (days /hours)

8. Was the training repeated ? (Yes -1, No -2)

9. If yes, how many times ?

10. Was it useful ? (Yes -1, No -2)

11. Do you think that refresher training course is needed?

(Yes -1, No -2)

Antenatal care

12. When are the pregnant mothers supposed to be registered ?

(<12 weeks - 1, 12-20 weeks - 2, >20 weeks - 3)

13. How many antenatal visits are needed?

14. How many TT doses are to be given ?

15. How many IFA tablets are to be given ?

16. During each visit following are to be done - Put a tick mark where you agree

Agree Don't agree

Weight recording		
BP recording		
Height recording		
Urine – albumin,sugar		
Abdomen examination		
PV examination		

17. Following are to be done once at least during the pregnancy period

– Put a tick mark where you agree

Agree Don't agree

Weight recording		
BP recording		
Height recording		
Urine – albumin,sugar		
Hb%		
VDRL		
PV examination		

18. Following are the “warning signs” of pregnancy – Put a tick mark where you agree

Agree Don't agree

Swelling of the feet		
Fits		
Headache		
Blurring of the vision		
Bleeding or discharge per vagina		
All of the above		

Natal care

19. What are the five cleans of delivery?

20. When is the baby weighed ?

(soon after delivery – 1, <30 minutes – 2, 30 minutes-1 hour – 3, 1-4 hours-4, >4 hours - 5)

21. When is the baby given bath ?

(soon after delivery – 1, <30 minutes – 2, 30 minutes-1 hour – 3, 1-4 hours-4, >4 hours - 5)

22. When is breast feeding started ?

(soon after delivery – 1, <30 minutes – 2, 30 minutes-1 hour – 3, 1-4 hours-4, >4 hours - 5)

Postnatal care

23. How many post natal visits are needed ?

24. List the advices given during this period

General Remarks

25. Is the programme successful ? (Yes –1, No –2)

26. If no, reasons (problems encountered)

27. Recommendations

Supervision

28. Time since the last supervisory visit

(last month –1, month before last –2, three or more months ago – 3, more than one year,4, do not know –5)

29. Designation of the supervisor

30. Supervisory activities during the visits – Put a tick mark where you agree

Agree Don't agree

Check registers		
Participate in ANC clinics		
Participate in home visits		
Participate in IEC activities		
Participate in immunisation		
Check records and registers		
Check medicines and equipments		
See patients		
Meeting/discussion		

Signature of the respondent

Date

Annexure XVII

Questionnaire for the beneficiaries

Name

Age

Husband's Name

Age

Address

G P L A

1. Antenatal card (present - 1, not present - 0)

2. Registration (registered -1, not registered -2)

3. If registered, when was the registration done ?

(<12 weeks - 1, 12-20 weeks - 2, 21-28 weeks - 3, >28 weeks-4)

4. If not registered, reasons for it -Put a tick mark where you agree

Agree Don't agree

Not aware		
Aware but do not believe		
Family does not believe		
Distance		
Non availability of the health worker		
Other reasons		

If others, specify :

Antenatal care

10. When were you registered ?

(<12 weeks - 1, 12-20 weeks - 2, >20 weeks - 3)

11. How many antenatal visits did you have?

12. How many TT doses were you given ?

13. How many IFA tablets were you given ?

13. How many did you consume?

15. During each visit following were done – Put a tick mark where you agree

Agree Don't agree

Weight recording		
BP recording		
Height recording		
Urine – albumin,sugar		
Abdomen examination		
PV examination		

16. Following are to be done once at least during the pregnancy period – Put a tick mark where you agree

Agree Don't agree

Weight recording		
BP recording		
Height recording		
Urine – albumin,sugar		
Hb%		
VDRL		
PV examination		

17. Was health education given ? (Yes – 1, No –2)

18. If yes, what was the education given ? Put a tick mark where you agree

Agree Don't agree

Diet		
Personal Hygiene		
Warning signs		
Drugs		
Breast feeding		
Spacing		

19. Was any risk identified by the health worker ? (Yes – 1, No –2)

20. If yes, what was the risk ?

21. Were you referred ? (Yes – 1, No –2)

22. If yes, where were you referred ?

Natal care

23. Where was the delivery conducted ? (Home-1, institution- 2)

24. Who conducted the delivery ?

(doctors-1, paramedical-2, trained dai -3, untrained personnel /family members -4)

25. Was delivery kit used ? (Yes -1 , No - 2)

26. If no, what was used ?

27. Was the baby weighed ? (Yes -1 , No - 2)

28. If yes, when was the baby weighed ?

(soon after delivery - 1, <30 minutes - 2, 30 minutes-1 hour - 3, 1-4 hours-4, >4 hours - 5)

29. When was the baby given bath?

(soon after delivery - 1, <30 minutes - 2, 30 minutes-1 hour - 3, 1-4 hours-4, >4 hours - 5)

30. When was the breast feeding started ?

(soon after delivery - 1, <30 minutes - 2, 30 minutes-1 hour - 3, 1-4 hours-4, >4 hours - 5)

Post natal care

31. How many visits did the health worker make ?

(No visits - 1, one visit -2 visits -3 , >2 visits -4)

32. Where there any complications ? (Yes -1 , No - 2)

33. If yes, what was the complication?

34. When did the complication occur ?

35. Were you referred ? (Yes - 1, No -2)

36. If yes, where was she referred ?

General remarks

37. What is the name of the health worker in her area?

39. Does she stay in the area? (Yes -1, No-2)

Annexure XVIII

Check list of structural inputs in HSC

Contents of drug kit A

Name of the item	Quantity Norms	Availability		Quantity available
		Yes	No	
Oral Rehydration salt (O.R.S)	150 packets			
Tablet I.F.A (large)	15,000 tablets			
Tablet I.F.A (small)	13,000 tablets			
Vitamin A solution	6 bottles of 100ml each			
Tablet Cotrimoxazole (paediatric)	1,000 tablets			

Contents of drug kit B

Name of the item	Quantity Norms	Availability		Quantity available
		Yes	No	
Tab Methylergometrine Maleate (0.125 mg)				
Tab Paracetamol				
Inj Methyergometrine Maleate				
Tab Mebendazole 100mg				
Dicyclomine Hcl 10 mg				
Chloramphenicol eye ointment 1%w/w in applicaps				
Ointment Povidone Iodine 5%				
Cetrimide powder				
Absorbant cotton				
Cotton bandage				

Midwifery Kit

Item Description	Quantity norms	Availability		Quantity
		Y	N	
Sphygmomanometr	1			
Weighing scale	1			
Steriliser (ss)	1			
Forcepe(ss)	1			
Basin,kidney, 825 ml, ss	1			
Bowl 600,1200 ml, ss	1			
Catheter,urethral, 12fr, rubber	1			
Sheeting, 910mm . 180 mm	1			
Enema can	2			
Thermometer (o)	1			
Thermometer (r)	1			
Surgeon's hand brush	1			
Mucus extractor	1			
Straight artery forceps, ss	2			
Scissor	1			
Tape,umbilical non-sterile	1			
Nail clipper	1			
Foetoscope	1			
Vinyl multipurpose bag	1			

Check list of structural inputs

Sub-Centre equipment Kit

Item Description	Quantity norms	Availability		Quantity
		Y	N	
Kidney tray,825ml	2			
Tray, ss	1			
Flash light	1			
Dressing jar, ss	1			
Hemoglobinometer	1			
Scale bathroom metric	1			
Plastic sheeting	2			
Lancet ss	1			
Forceps steriliser,tissue, straight,curved	1+1+1			
Straight scissors	1			
Urine reagent strips	1			
Sims retractor	1			
½, 1 L jug	1+1			
Deep basin 6L	1			
Surgeons brush	2			
Sphygmomanometer	1			
Scale infant metric	1			
Speculum-Cuscos,vaginal sims	1			
Battery	4			

Primary Health Centre Equipment

Item Description	Quantity norms	Availability		Quantity
		Y	N	
Kidney tray,825ml	1			
Tray, ss	1			
Flash light	1			
Dressing jar, ss	1			
Hemoglobinometer,Rack	1set+1			
Microscope	1			
Plastic sheeting	2			
Lancet ss	1			
Forceps steriliser,tissue, straight,curved, tongue holding	1+2+1+1			
Scissors- straight,curved	1+1			
Urine reagent strips	1bottle			
Sims retractor	1			
Uterine-curette,dilator	1+1			
Deep basin 6L	1			
Surgeons brush	2			
Sphygmomanometer	1			
Scale infant, adult metric	1+1			
Speculum-Cuscos,vaginal sims	2(s,m)+1			
Battery	2			
Mucus evacuator	1			
Knife handle maj,min sur	1+1			
Knife blade maj,min	1+1			
Suture needle 3/8 cutt,reg	2 pkts+1			
Needle holder,Mayo	1			
Laryngoscope	1			
Aspirator portable	1			
Connector nylon	1			
Uterine sound	1			
Tracheal catheter	1			
Irrigator	1 set			

Normal Delivery Kit

Item	Quantity	Availability		Quantity
		Y	N	
Dressing trolley	1			
Trolley Towel	2			
Operation gown	1			
Surgeon's cap	1			
Non-sterile gauze	2			
Tray	1			
Macintosh	2			
Face mask	2			
Glove	3			
Cotton wool	2			
Sterilising Drum	2			
Instrument Table with tray	1 set			

Chapter 11. . Literature Review of dissertation

‘Effectiveness of liquid iron alone and iron with folic acid on hemoglobin status of children aged 6-35 months, Rural Area, Tamilnadu, 2003: A double blind, randomized comparative trial’

5.1. Introduction

Anemia is a condition which is characterized by a reduction in red blood cell volume and a decrease in the concentration of hemoglobin in the blood. Commonly, anemia is the final outcome of a nutritional deficiency of iron, folate, vitamin B12 and some other nutrients. Although many other causes of anemia such as hemorrhage, infection, genetic disorders, and chronic disease have been identified, nutritional deficiency, due primarily to a lack of bioavailable dietary iron, accounts for the majority of cases of anemia⁴⁸⁻⁵⁰.

5. 2. Historical Background Of Iron Deficiency Anemia

Ancient Greeks recognized the benefits of iron salts to improve muscular weakness among injured war veterans. The weakened sufferers hoped to regain strength by drinking water in which a sword had rusted⁵¹. In 16th century the term “chlorosis” was associated with a series of symptoms like pallor, fatigue, poor appetite, gastro intestinal, neurological, and menstrual disturbances common in adolescent girls⁵². In the 18th century, blood was shown to contain iron, and from 1832 to 1843, chlorosis was noted to be associated with low levels of iron in the blood and a reduced number of red cells⁵³. Hemoglobin was discovered by Hoppe-Seylers in the 19th century. A method of estimating the hemoglobin concentration by color comparison to a standard was described by Gowers by about 1880. This was quickly followed by Sahli hemoglobinometer which is used even today with certain modifications. Understanding of anemia improved around 1890s when, Hufner, Haldane, and Smith demonstrated stoichiometric relationships between hemoglobin and its iron content, iron, and oxygen, and hemoglobin and oxygen carrying capacity⁵⁴.

5. 3. Epidemiology Of Iron Deficiency Anemia

5.3. 1. Global

The importance of anemia was recognized by the World Health Organization (WHO) as early as the first meeting of Joint Advisory Committee in 1949. A

national survey of anemia was sponsored by WHO in Mauritius between 1955 and 1958. The prevalence of hypo chromic microcytic anemia ranged between 15 to 64%. This anemia subsequently responded to bread enriched with iron. Follow up investigations of nutritional anemia among pregnant women in India revealed that 38% of them were anemic; half of them with severe anemia who responded to combined iron and folic acid supplementation.

The WHO first attempted to collate the available information about women from a global perspective in 1982⁵⁵. The same was updated in 1992⁵⁶. The prevalence was highest in young children and pregnant women, and varied from about 56% in young children in Africa and South Asia, and 20 to 26% in Latin America and East Asia, to about 8 to 18% in developed countries. This did not include the large group of individuals who were iron deficient but without anemia⁵⁶. In the U.S. and Europe, the prevalence of anemia is 7 to 12 percent among women and children. The WHO estimates (2000) indicates 2 billion people to be anemic globally and 4 billion to be iron deficient^{2,3} which is due to the fact that iron deficiency anemia generally occurs after iron stores have been depleted.

Table 1. Global Prevalence of Anemia and Iron Deficiency

WHO Region	Anemia		Iron Deficiency Anemia *		Iron Deficiency [†]	
	Number	%	Million	%	Million	%
Africa	237	39	175	29	438	73
Americas	142	18	106	14	266	34
SEA	765	53	574	39	1435	99
Europe	80	9	60	7	150	17
E.Med.	179	38	135	29	337	72
W.Pacific	578	38	434	29	1084	72
TOTAL	1981	34	1484	26	3710	64

Source : Malnutrition, The Global Picture, World Health Organization, Geneva, 2000

* Assuming that 75% of the anemic population is also iron deficient.

† Estimated as 2.5 times the prevalence of iron deficiency anemia in regions with up to 40% prevalence of iron deficiency anemia. When prevalence is >40%, virtually the entire population is iron deficient.

5. 3. 2. Developing Countries

According to World Health Organization (2000), 35 percent of women and 43 percent of young children in the world are anemic globally. In developing countries however, about 50 percent of women and young children are anemic^{2,3}. Wide inter country differences in the prevalence of anemia are observed among developing countries with poorer countries being most affected (Table 1) . The prevalence among pregnant women in East Central Africa, West Central Africa, Southeast Asia and South Central Asia is 47, 56, 63 and 75% respectively. Among pre-school children also in these areas, the prevalence is high: 42 to 53% in Africa and 47 to 64% in South Central and South East Asia respectively. Studies report that anemia is highly prevalent in Kazakhstan, Uzbekistan and other countries of former Soviet Union. The highest overall rates of anemia are reported in Southern Asia and certain regions of Africa⁴ About 50% of global anemic women live in the Indian sub continent where about 88% of pregnant women are affected³⁷ .

5. 3. 3. India

Micronutrient deficiencies like Vitamin A, Iron and Iodine deficiencies are widely prevalent in India and this is attributed more to the improper, inadequate intake rather than non-availability.

Several surveys, during the last four decades conducted in different parts of India, though admittedly of varying quality in terms of methodology, age coverage and Hemoglobin cut offs used, indicate that iron deficiency anemia among infants and toddlers vary from about 40% to 86% (Table 2).

Table 2 : Prevalence of iron deficiency anemia among infants and toddlers in India

Study Region /Reference	Age	Prevalence [%]	Criteria For Assessment*
North India			
Delhi			
Dhar et al, 1969 ⁷	6m –3 y	60	Hb <12g/dl
ICMR,1977 ⁸	1 –3 Y	83	Hb <10.8g/dl
Gomber al,1998 ¹⁴	3m –3y	76	Based on response
Kapur et al,2002 ¹³	9 –36 m	64	Hb <11g/dl
Ludhiana			
Uberoi et al, 1972 ⁹	<3y	70	Hb <11g/dl
Varanasi			
Singla et al,1982 ¹⁵	6m- 5y	Urban 56; Rural 75.6	Based on response
Agarwal et al,1986 ¹⁰	3 m- 3y	55	Hb <11g/dl
South India			
Vellore, ICMR, 1977	1 –3 y	54.3	Hb <10.8g/dl
Hyderabad ICMR,1977 ⁸	1 –3 y	60.5	Hb <10.8g/dl
	5 –6 m	63.3	
	7 –9 m	77.5	
Raman et al,1990 ¹¹ &1992 ¹²	10 – 12 m	86.2	
	13 – 15 m	75.0	Hb <11 g/ dl
	16 – 18 m	75.0	
	19 – 24 m	76.9	
	24 – 36 m	47-57	
West India			
Mumbai, ICMR,1977 ⁸	1 – 3 Y	70.6	Hb 10.8g/dl
Pune, ICMR,1977	1 –3 Y	79	Hb <10.8g/dl
Malin et al, 1982 ¹⁸	1-3 y	61	PCV<33%
East India			
Kolkatta			
ICMR,1977	1-3 Y	38.9	Hb <10.8g/dl
India combined data	0-3Y	65	Hb <10.8g/dl

* Hemoglobin estimation and based on response to supplementation

The highest prevalence of anemia was found in Delhi (83%) followed by Pune (78%), Mumbai (70.6%), Hyderabad (60.5%), Vellore (54.3%) and Kolkatta (38.9%). Prevalence of severe anemia was 36% in Delhi and about 14% in Hyderabad and Pune⁸ Earlier studies from different regions in the country during the last three decades have also reported a similar high prevalence^{12,14,15,57,58}.

5. 3. 3.1. North India

In an Integrated Child Development Scheme (ICDS) centre of an urban slum of Delhi, the prevalence of anemia was 64% in children aged 9-36 months¹³. In a rural setting of Ludhiana, Punjab, 70% of children in the below three years were anemic⁹. In a Varanasi study¹⁰ (1986), 55% of children aged 3 months to 3 years were found to be anemic and offspring of anemic mothers had a significant higher prevalence of anemia. Singla et al¹⁵ (1982) reported that prevalence rates in urban and rural pre school children(6 months to 5 years) of Varanasi was 56.2 and 75.6% respectively. Kapur et al¹³ (2002) observed that 64% of children aged 9 to 36 months were anemic and 7.8% of them were severely anemic.

5. 3. 3. 2. South India

The ICMR, Hyderabad study in 1977⁸ reported the prevalence of IDA among children under 3 years of age as 63% using a hemoglobin concentration of 10.8g/dl as the cut-off to define anemia. In a multi centric study by Food and Nutrition Board & UNICEF in 1981⁵⁹, the prevalence of anemia in urban centre of Madras (currently Chennai) was 19.1% and 66.3% in villages near Hyderabad. Visweswara Rao⁶⁰ reported that studies from Hyderabad in 1978, 1980 and 1983 indicated that the prevalence among children aged 1 to 6 years was around 50 to 70%. A study by NIN Hyderabad (1992), reported that children between 1-3 years were the most affected by IDA. The prevalence of IDA was found to be 63% among children 12-23 months old, 67% among those 24-35 months old and between 27-44% in 3-5 years old age group.

. 3. 3. 3. West India

Malin et al¹⁸ (1988) reports an overall anemia prevalence of 43% in a slum area of Pune in children aged 6 to 60 months. The children aged 12 to 36 months were the most affected and accounted for 61% of the total prevalence. Studies from Gujarat⁶¹ report a prevalence of 66% in children aged 1 to 5 years. Seshadri⁵⁷ reported that studies carried out between 1980 and 1996 in Baroda have indicated a prevalence of 67% among urban pre school children.

5. 3. 3. 4. East India

The multi centric study done by Government of India⁵⁹, reported the highest prevalence of anemia (96.3%) among children aged 1 to 5 years in villages near Kolkatta. The same study reported that prevalence of severe anemia was also highest in Kolkatta (18%)

The National Family Health Survey²¹ (NFHS II) conducted in 1998-99 reported the prevalence of iron deficiency anemia in children in 6 to 35 months age group to be 74% in India and 69% in TamilNadu (Table 3). The anemia level was highest in the 12-23 months age group (77.7%) as compared to the children in the age group of 6-11 months (71.7%) and 24-35 months (72%). Earlier studies from different regions in the country during the last three decades have also reported a similar high prevalence^{12,14,15,57,58}.

Table 3 : Percentage of children age 6-35 months classified as having iron-deficiency anemia by state, India, 1998-99 (NFHS II)

State	Percentage of children with			
	Anemia			
	Total	Mild	Moderate	Severe
India	74.3	22.9	45.9	5.4
North				
Delhi	69	22.2	42.9	3.9
Haryana	83.9	18.0	58.8	7.1
Himachal Pradesh	69.9	28.7	39.0	2.2
Jammu & Kashmir	71.1	29.1	38.5	3.5
Punjab	80.0	17.4	56.7	5.9
Rajasthan	82.3	20.1	52.7	9.5
Central				
Madhya Pradesh	75.0	22.0	48.1	4.9
Uttar Pradesh	73.9	19.4	47.8	6.7
East				
Bihar	81.3	26.9	50.3	4.1
Orissa	72.3	26.2	43.2	2.9
West Bengal	78.3	26.9	46.3	5.2
North east				
Arunachal Pradesh	54.5	29.1	24.7	0.7
Assam	63.2	31.0	32.2	0.0
Manipur	45.2	22.6	21.7	0.9
Meghalaya	67.6	23.4	39.8	4.3
Mizoram	57.2	32.2	22.7	2.3
Nagaland	43.7	22.0	18.7	3.0
Sikkim	76.5	28.4	40.7	7.5
West				
Goa	53.4	23.5	27.9	2.0
Gujarat	46.4	29.5	14.4	2.5
Maharashtra	76.0	24.1	47.4	4.4
South				
Andhra Pradesh	72.3	23.0	44.9	4.4
Karnataka	70.6	19.6	43.3	7.6
Kerala	43.9	24.4	18.9	0.5
Tamilnadu	69.0	21.9	40.2	6.9

5. 3. 4. Iron Deficiency Anemia In Infants And Children

5. 3. 4. 1. Iron Balance In Children

5. 3. 4. 1. 1. First Six Months of life

During the first four months of life, the total body iron content is fairly adequate due to the trans placentally transferred storage iron content^{32,62} and about half the storage iron is mobilized for the production of hemoglobin, myoglobin and enzymes. About fifty percent of the iron in breast milk is absorbed compared with about fourteen percent of the iron in other milks or breast milk substitutes³². Hence, healthy term infants are unlikely to become iron deficient in the first six months⁶³⁻⁶⁵. However, infants who are pre-term or who have low birth weight⁶⁶ or those who are born to anemic mothers have poor iron stores^{67,68} could manifest with iron deficiency in the first three to six months itself.

5. 3. 4. 1. 2. Six To Twelve Months of life

After about 4- 6 months, infants need more iron than can be supplied in breast milk alone. In industrialized countries, this problem is tackled by fortification of supplementary foods recommended for all infants starting at around 6 months. In developing countries, about half the infants are anemic by one year of age¹⁹.

In India, not only is supplementary feeding delayed beyond 6 months but the type of supplementary foods given to infants contain low bio available iron. This implies that some form of iron supplement is needed by most infants between 6 months and 2 years of age³³. After 2 years, the prevalence of anemia tends to fall because iron requirements are lower and children start to eat a varied diet³⁶. However, the high prevalence in many countries persists due to (a) iron depletion in early years, (b) inadequate diet⁶⁹ and (c) frequent parasitic infestations in children.

5. 3. 4. 1. 3. Other Risk Factors For Iron Deficiency Anemia

Low birth weight (LBW), which is especially common in developing countries is clearly a risk factor for anemia early in infancy. Infants with LBW are born with reduced iron stores which are depleted by 2 to 3 months of age. The

International recommendation for LBW infants is to start supplemental iron in the form of drops as early as 3 months of age⁴.

Premature clamping of the umbilical cord deprives infants of up to one third of their potential blood volume which in turn leads to reduced iron resources. The delay in clamping until one minute after the cord ceases to pulsate, and holding the infant at or below the level of the placenta can significantly improve the amount of blood and therefore the amount of iron delivered to the new born infants⁷⁰.

5. 3. 4. 2. Public Health Importance Of Iron Deficiency Anemia In Infants And Children

Infants and preschool children form the most vulnerable group as they have increased risk of iron deficiency and anemia due to high physiological demands combined with low iron stores, inadequate dietary intake of bio available iron, and losses due to infection⁴⁸. Iron deficiency is more widespread than iron deficiency anemia. For every person who is anemic, there is likely to be another person who is iron deficient, but not anemic. *In other words, if the prevalence of anemia is fifty percent or more, the entire target population is likely to be iron deficient and in need of an iron intervention*¹.

Infants who are fed canned, powdered, or fresh milks are at risk for iron deficiency at a younger age than infants who are exclusively breastfed. Introduction of iron-rich supplementary foods beyond six months makes the infant at risk of developing iron deficiency. Where iron-fortified complementary foods are not widely and regularly consumed by young children, routine iron supplementation is recommended beginning at six months³⁴.

5. 3. 4. 3. Functional Consequences Of Anemia

Anemia leads to a reduction in the transport of oxygen to the cells of the body. The main signs and symptoms of anemia are lethargy, fatigue, shortness of breath, and pallor of the skin and inner eyelid. When anemia is moderate to

severe, the nail beds of the fingers, the palms, and the inside of the eyelids become pale³¹. As anemia becomes more severe, anemic individuals may experience palpitations of the heart and heart failure.

Iron-deficiency anemia among children has been demonstrated to be associated with impaired cognitive performance^{22,23} motor development, coordination, language development and scholastic achievement²⁴⁻²⁸. In terms of public health, the consequences of severe anemia with or without iron deficiency are increased maternal and child mortality³⁰. A significant body of evidence also points to iron deficiency anemia (tissue iron deficiency) leading to impaired productivity and delayed child development. More evidence is needed in support of the suspected relationships between iron deficiency anemia and low birth weight and between iron deficiency anemia and infectious disease.

Infants with iron deficiency anemia have been shown to experience delays in mental development compared to infants who are not anemic²³. Iron deficiency also affects the emotional state of infants, making them more cautious and maintaining closer contact with their mothers^{71,72}. These infants may interact to a lesser degree with their environment, and the lack of interaction could impede their ability to learn.

Because most brain development after birth occurs during the first two years of life, infants and children younger than two years old are at higher risk of developmental delays than older children. Delays among children younger than two years old includes both mental and motor development and these are not fully reversed after the children were treated with iron⁷³.

The relationship of iron status, immunity and infections in children is yet unclear. Some studies have demonstrated impaired cell immunity due to iron deficiency anemia^{74,75} whereas some did not show any effect⁷⁶.

5. 4. Preventive Strategies To Control Anemia

The three basic approaches for prevention of Iron deficiency anemia are:

- a) Supplementation with medicinal iron
- b) Dietary modifications which includes food fortification and enrichment
- c) The control of infection

Although the technology for the fortification of salt has been available for the past one decade, it has not been introduced on a large scale to combat iron deficiency anaemia in India, despite being strongly recommended⁵³. Iron-fortified salt is currently being produced on a small scale only by a few private manufacturers and by the Food and Nutrition Board of the Ministry of Food and Agriculture. Large-scale introduction of iron-fortified salt is currently being organized only in Tamil Nadu by the Tamil Nadu government with support from UNICEF, The Food and Nutrition Board and the Tamil Nadu State Industrial Corporation.

In view of this, a new technology for the double fortification of salt with iron and iodine has been recently developed⁵⁴ and this is currently undergoing field evaluation. If the iron balance in the total population is improved through iron-fortified salt, the anemia prophylaxis programme among pregnant women and children through distribution of folifer tablets will have better success. Iron fortification of salt is being suggested as an adjunct and not as an alternative to the present anemia prophylaxis programme.

5. 4. 1. Supplementation With Medicinal Iron

Supplementation with medicinal iron has the advantage of producing rapid improvements in iron status. As a strategy it also has a desirable specificity. It can be targeted at the population groups at the greatest risk of becoming iron deficient i.e infants , preschool children and pregnant women.

Intervention trials conducted in children below three are few. In a study of Honduras and Swedish infants aged 4-9 months, the effect of iron supplements at the level of 1mg per kg body weight per day was investigated⁷⁷. The Honduran

infants who received iron from 6 month onwards showed a significant drop in the prevalence in anemia. A similar reduction among Swedish infants was not observed. The reason as given by the author was that the prevalence of anemia among these infants was low to begin with. However, the iron supplementation from 4 month onwards produced a significant rise in hemoglobin among both groups of Honduran and the Swedish infants.

A meta analysis of weekly vs. daily supplementation refers to four trials in young children, of which only one was in children 6 to 24 months⁷⁸. The dose level of iron was 8 mg given along with zinc and retinol daily for 12 weeks. Reduction of anemia was very substantial, from the initial 50.9% to final 5.7%. These limited studies indicate that the dose level 1-2 mg/kg body weight that is equivalent to 10-20 mg iron can produce the desired results.

5. 4. 2. Iron Dose For Prevention Of Anemia

A single safe dose that is effective for all children under 2 years old that can be easily dispensed by non-literate mother is required¹⁶. Usually iron drops (or syrup) are given in two to three times daily doses schedule. Recently, use of single daily dose of iron drops has been found to be equally efficacious as three times daily doses, (at the same total iron dose on treatment of anemia) without side effects⁷⁹.

In a prophylactic programme, a supplementation of 1-2 mg iron/kg/day is adequate for prevention of iron deficiency anemia. A dose of 2 mg /kg/d could be considered in India as nearly one third babies born have low birth weight²¹. However, for implementing community based anemia prevention programme calculation of iron dose in terms of body weight is impractical. A simple and suitable fixed dose strategy rather than an exact dose based on a body weight basis is more appropriate.

5. 4. 3. Fixed Dose Strategy

The International Nutritional Anemia Consultative Group (INACG), based on a iron dose of 2 mg/ kg body weight for prevention of anemia, have recommended an uniform dose of 12.5 mg for children aged 6-24³⁴ . This is based on the assumption of 5 percent iron absorption, which is a very conservative estimate of absorption¹⁷ . A 12.5-mg oral dose of iron would provide 0.625 mg of absorbed iron. The 12.5 mg dose is equivalent to 2.5 mg /kg body weight for a 6-month-old child with an average weight of 5 kg, 1.6 mg/kg body weight for a 12-month-old infant weighing 8 kg, and 1.2 mg/kg body weight for an 18-month-old infant weighing 12 kgs. The total iron requirement remains at 0.7 mg per day for infants up to 18 months of age⁸⁰ and is not dependent on body weight; thus, the 12.5 mg dose would also meet almost 90 percent (assuming absorption 5% X 12.5= 0.625; 0.625/0.7 X 100= 89%) of the estimated total iron requirement of children 6 to 18 months old. Where iron absorption is higher because of low iron stores, the upper safe limit of intake would not be exceeded with this dose.

5. 4. 4. Folic Acid Supplementation Along With Iron Supplement

Though folic acid has been used in the National Nutritional Anemia Control Programme for years together, the role of folic acid in reduction of anemia has been controversial. In India, studies reporting the prevalence of folic acid deficiency anemia among children are very few.

Gomber et al¹⁴ reports that 5% of children of an urban slum were folic acid deficient. Low birth weight and pre term babies could be at risk of folate deficiency due to rapid growth and would need supplementation of folic acid⁸¹ . Hence, it seems that the main rationale for including folate in iron supplements for anemic pregnant women and children is to reduce the risk of neural tube defects in off springs and prevent folic acid deficiency and megaloblastic anemia in the first 2 months of life⁸² .

A meta-analysis of 22 studies in which non-anemic pregnant women had been supplemented with folate for at least 16 weeks, with or without iron was conducted⁸³. Nearly 50% of the studies in the meta-analysis were conducted in the U.K. over 30 years ago. Only four were conducted in the last 20 years. The most significant effects were seen in Africa, where folic acid deficiency and megaloblastosis may have been caused by malaria. Premature, low birth weight infants treated with iron, vitamin E, and folic acid showed an improvement in hemoglobin concentrations when they were also given parenteral vitamin B12⁸². Folic acid treatment was associated with a 40% reduction in risk of anemia in late pregnancy and a 35% reduction in risk of megaloblastosis.

A WHO collaborative study in Burma and Thailand found no incremental benefit of folate on the Hemoglobin concentrations of pregnant women or non pregnant women⁸⁴ but these countries are not known to have a high prevalence of deficiency.

Small non significant increase in Hemoglobin-usually compared to iron alone have been reported in pregnant women in Australia⁸⁵, Burma⁸⁶, India^{87,88}, Liberia⁸⁹, Nigeria⁹⁰ and Thailand⁹¹.

A significant increase in hemoglobin was found only in South Africa⁵⁰ and in a British study in which by addition of folate to iron supplements improved hemoglobin of low birth weight infants aged 6 to 9 months compared to iron alone supplements⁸¹.

5. 4. 5. Forms And Types Of Iron Salts

Liquid iron preparations contain iron salts/complexes like ferrous sulphate, ferrous fumarate, ferrous gluconate, ferric ammonium citrate, colloidal iron and ferric hydroxide polymaltose complex (Iron Polymaltose Complex or IPC). Elemental iron content in these salt/complexes is variable⁵⁸. The absorption of elemental iron depends on the particle size. EDTA has the advantage of greater

stability than ferrous iron, good absorption and improves the absorption of non-heme in the diet. Its only drawback is the higher cost. Amongst ferrous salts, ferrous fumarate has a low ionization constant and high solubility in the entire pH range of the gastrointestinal tract. It does not (a) precipitate proteins or have the astringency of ionizable forms of iron and (b) interfere with proteolytic or diastatic activities of the digestive system. Ferrous fumarate is the least toxic of three popular iron salts.

5. 4. 5. 1. Iron (III) Hydroxide Polymaltose Complex (IPC)

Iron III hydroxide Polymaltose Complex has non-ionic ferric iron and polymaltose in a stable complex. Iron absorption from IPC is physiologically controlled and it is by an active process, where apotransferrin (a transferring molecule that does not contain iron) is found to take up the iron from IPC. It is then transferred to intestinal mucosa for further uptake by transferrin⁴¹. The quantity of this carrier protein depends on the iron stores of the body. So iron absorption from IPC will be rapid in anemic condition and absorption will slow down or halt when the iron store reaches the optimum level. Hence there will be no overloading of iron with the use of IPC; unlike ferrous salts where iron absorption is passive and concentration gradient dependent. Bioavailability is found to be similar, particularly between ferrous sulphate, ferrous fumarate and IPC⁴³. Rise in hemoglobin following supplementation of ferrous salts and IPC were also found to be similar^{92,93} whereas one study conducted by Jacobs P³⁹ reported better tolerance to IPC. Other advantages of Iron polymaltose complex is that it does not produce free radicals as opposed to conventional iron salts⁹⁴. Its non-ionic state helps in avoiding the gastro-intestinal irritation that is common with iron salts^{39,40}. IPC also do not stain the teeth and high elemental content of iron facilitates once a day dosing. Thus IPC may have a potential role in longer term supplementation programme³⁹

A joint OMNI/USAID/UNICEF consultation has recommended that the most practical iron supplement for use in infants and young children is an aqueous

solution of a soluble ferrous salt, such as ferrous sulphate or a ferric complex, such as iron polymaltose.

5. 5. Cost Effectiveness

Under NNACP programme, IFA liquid formulation was discontinued in view of not being cost effective (Cost being Rs. 5.98 per beneficiary as compared to Rs.0.49 for tab per beneficiary), and problems encountered in procurement and distribution of liquid preparations⁹⁵.

5. 6. Summary

Iron supplementation should be given to “high risk target groups” eg. Children aged 6-35 months.

A. Factors that necessitate iron supplementation in children aged 6-35 months are high physiological requirement, low intake of iron rich foods, low bioavailability of iron, public health benefit due to intervention.

B. Factors that warrant usage of liquid form are poor compliance when tablets are given (due to taste preference and inability to swallow in young children)

C. Factors that favour supplementation of Iron (III) hydroxide Polymaltose complex are equal efficacy as that of the conventionally used ferrous salts, high compliance due to the addition of polymaltose component, very few side effects when compared to the conventional salts.

In view of all the issues discussed above, this present study aims to find the solutions to address the problems in children possibly by reintroduction of liquid preparation of iron.

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SECTION.4

CRITIQUING OF JOURNAL ARTICLES

Article 1.

Effectiveness of the direct observation component of DOTS for tuberculosis: a randomised controlled trial in Pakistan.

John D Walley, M Amir khan, James N Newell, M Hussain Khan
The Lancet Vol 357 March 3, 2001

Abstract:

Background

DOTS is the control strategy for tuberculosis promoted by WHO. This randomised control trial was conducted to assess the effectiveness of different types of direct observation of treatment, under operational conditions that is appropriate for local conditions in Pakistan.

Methods

497 new sputum positive tuberculosis were enrolled. 170 assigned DOTS by health workers, 165 assigned DOTS by family members and 162 were assigned self administered treatment. The trial was done at three sites that provide tuberculosis services strengthened according to WHO guidelines. The main outcome measures were cure and cure or treatment completion. Analysis was by intention to treat.

Findings

Within the strengthened Tuberculosis services, the cure rates for the health worker DOTS, family member DOTS and self administered treatment were 64%, 55% and 62% respectively and the cure or treatment completion rates were 67%, 62% and 65% respectively, demonstrating that non of the three strategies tested was superior to others.

Interpretation

The results of the strategies tested was not significant though more or less equal number of cases were assigned for each of the strategies tested.

I. Introduction:

Tuberculosis remains the commonest cause of death in adults in developing countries- South Asia being the region worst affected. Numbers of cases are increasing due to population growth, HIV, and inadequate treatment. Patient's compliance with treatment is commonly poor and non-completion of a course can lead to relapse, possible with drug resistant bacilli.

WHO and International Union Against Tuberculosis and Lung Disease advocates the DOTS strategy to control tuberculosis and recommend that no rifampicin containing treatment should be given without direct observation of treatment. The DOTS strategy is made up of five operational components like diagnosis and follow- up through sputum microscopy, use of standardised short course drug regimens, regular uninterrupted supply of drugs, accurate cohort recording and analysis, and direct observation of treatment by people responsible to the health services.

The direct observation of treatment component is intended to address patient's non- compliance. It has got two important elements : (1) observation of each scheduled dosage the patient intakes for at least the initial two month intensive phase of treatment and (2) giving positive encouragement to patients to ensure treatment completion.

However there is some doubt as to whether direct observation of treatment is essential or indeed effective in reducing patient's compliance as it imposed burdens on patients and health services through prolonged admissions or frequent attendance at clinics. These burdens can only be defended if direct observation of treatment improves cure rates and is not a barrier to care-seeking, though there is little evidence to suggest that this is the case. While there is currently little evidence to suggest that this is the case, published results from the only 2 Randomised controlled trial of direct observation of treatment documents opposite outcomes in terms of its effectiveness.

II. Justification for the study

The need for undertaking this study has been clearly stated by the authors as to presence of neglected tuberculosis services and low treatment completion in Pakistan. Though the National Tuberculosis Programme has adopted DOTS as a policy, the specifics have not yet been addressed. The three strategies adopted in this study, though originally planned by the policy makers, was not yet adopted during the study period.

Studies in Thailand documents that DOTS gives significantly higher cure rates than self-administered treatment, but the DOTS included home visits by the Health workers, a strategy that is not feasible in most developing countries.

In Pakistan, most patients are very poor, the majority of them being labourers and housewives. The stigma for those with tuberculosis is very much prevalent and more so in the case of women.

Hence, it becomes important and relevant to devise treatment strategies tailored to local conditions (1) to improve access to care which has been stated by the authors convincingly(2) to establish the usefulness/ effectiveness of direct observation of treatment in reducing non-compliance of the patients (3) to keep the impact of tuberculosis stigma to a minimum.

III. Methods:

Study design – Randomised control trial

No. of diagnostic centers selected - three (mainly based for convenience but were regarded as typical of tuberculosis treatment centers in Pakistan). All sites served a mix of urban and rural patients

Study population – People who were aged 15 years or older.

Enrollment period - September 1996 to June 1998

Inclusion criteria – Patient residing in one of the three catchment areas + sputum positive for AFB + not taken any previous treatment for tuberculosis.

Exclusion criteria – Patients in the WHO sponsored “ demonstration” site

Strategy identification - An exploratory qualitative study based on observations and interviews of patients and accompanying relatives was done.

Randomisation – was done by sealed envelope method allocation.

A - Self administered treatment

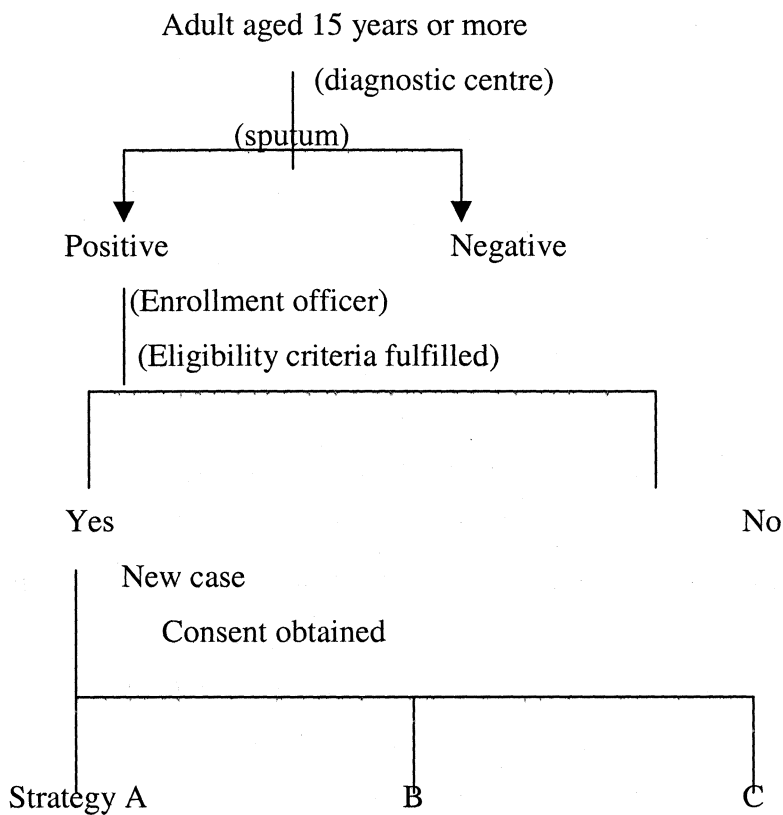
B - Health worker direct observation of treatment

C - Family member direct observation of treatment.

Treatment - All the three groups received the same case management approved by WHO and the National Tuberculosis Programme including uninterrupted supply of free drugs.

Definitions - The definitions of cure, treatment completion and treatment failure was given and followed standard WHO definitions.

Outcome assessment was laboratory examination of sputum by technicians unaware of treatment allocation, the doctor, health educator, laboratory technicians and other regular staff providing health education, monitoring the clinical aspects of case, side effects, and sputum conversion followed the same procedures and were unaware of the trial group.



IV. 1. General Comments

Design

The study design is a randomised controlled trial and is appropriate for this study as it aims to find the most effective component of DOTS.

Methods

The sampling methods are clearly described. The number of subjects assigned to the three study groups were not same-170, 165 and 162 for health worker DOTS, family member DOTS and self-administered groups respectively. Eligibility criteria was described. The subjects were representative of the study population.

Informed consent

Study participants gave informed consent and no inducements were offered.

Data collection Tool

Short questionnaire on demographic characteristics – details of which are not provided.

Baseline characteristics of the study subjects in terms of age, gender, rural/urban were described. Details of the patient's education, socio-economic status, health status at the time of diagnosis were not made. The outcome assessment was clearly mentioned. Outcome assessment was laboratory examination of sputum and the measures used were cure and cure plus treatment completion. A cure patient was confirmed sputum negative at 7 or 8 months and on at least one previous occasion and having completed treatment but smear results were not available on at least two occasions before completion of treatment.

The treatment protocol was clearly given. Treatment failure indicated patients who remained smear (+) at 5 months or later during treatment.

Double blinded

The staffs like the doctor, health educator, Lab. Technician, other regular staff of diagnostic centre providing health education and monitoring the clinical aspects of case, side effects and sputum conversion were all unaware of the trial group of the patients.

Statistical analyses were described fully and a chi square test was used for comparison of outcomes between each direct observation of treatment group and self-administered treatment. An explanatory logistic regression model to control for multiple factors was used. The analyses were appropriate given the study design and hypothesis. Statistical significance/ non-significance was well defined. Confounding variables were not mentioned in the paper.

IV. 2. Results:

The main result was that:

- a. There were no significant differences in cure rates between the three tested strategies of self administered treatment, family member direct observation of treatment and health worker direct observation of treatment.
- b. There was no additional benefit from direct observation of treatment over and above strengthening of services.

It is stated that 27 patients assigned to the health worker DOTS and 3 patients assigned to the family member DOTS changed treatment. But in spite of these factors regarded as defaulted, the overall treatment outcome among the enrolled patients for the health worker DOTS strategy was 87 (51%) were cured, 3(2%) completed treatment, 6(4%) died, 1 was treatment failure, 69(41%) defaulted and 4(2%) were transferred out. Of those on the family member DOTS strategy, 90 (55% were cured, 12(7%) completed treatment, 7(4%) died, none were treatment failures, 54(33%) defaulted and 2(1%) transferred out. Of those on the self - administered treatment 100 (62%) were cured, 5(3%) completed treatment, 3(2%) died, none were treatment failures, 53(33%) defaulted and 1(1%) was transferred out.

IV. 3. Are the results likely to be affected by bias?

Selection bias

The enrolled patients were allotted to the three strategies by randomization. The enrollment officer had no role in care provision. Outcome assessment was by laboratory examination of sputum, conducted by technicians unaware of treatment allocation. The doctor, health educator, laboratory technicians and other regular staff of the diagnostic center providing health education, monitoring the clinical aspects of care, side effects, sputum conversion followed the same procedure for all the patients and were unaware of the trial group of the patients. Therefore the results being affected by bias is minor.

IV.4. Are the results likely to be affected by confounding?

Patients demographic characteristics, rural/ urban residence were similar across the three strategies tested except for the higher proportion of rural patients among the health worker DOTS group than among the family- member group .

Likewise, there were fewer patients aged 15-24 years among the health – worker DOTS group than among the self-administered group.

No data is available about their educational status, general physical and health condition of the patients at the time of enrollment. Details of the cure rate by distribution is not given though mention about no significant difference among all three groups has been made. The eligibility criteria stated that only newly diagnosed cases of sputum positive pulmonary tuberculosis of adults aged 15 years or older were recruited. The exclusion of the patients who are already infected and are receiving TB treatment has eliminated the possibility of having an over estimated cure rate.

IV.5. Are the results affected by chance variation?

The outcome measure assessed was cure or cure and treatment completion. Cure was measured by specific criteria based on laboratory examination.

Cure rates by strategies

The cure rates were 64%, 55% and 62% respectively for those assigned the health worker DOTS, family member DOTS and self administered treatment which was more or less equal. The completion rate was 3%, 7% and 3% for those assigned with the health worker DOTS, family member DOTS and self administered treatment which was more or less equal. The overall cure rates combining all three groups was 60% (95% CI 56-65) and the overall cure or treatment completion rate was 65% (95% CI 60-69)

Cure rates by diagnostic centers

At Rawalpindi center – cure rate was 59% (52-67) compared with 26%(22-31) before strengthening and the cure or completion rate was 67%(60-74%) compared with the 41% (36-46%) before strengthening. Though mention has been made about the results being the same in other centers also, the details of those are not provided. The improved overall cure rate with strengthened services which is statistically significant could not have been affected by chance.

IV. 6. Internal validity:

Is there a correct time relationship?

This is a randomised controlled trial where cases are enrolled and cure or treatment completion was the outcome measure. Tuberculosis patients were treated with 2 months of isoniazid, rifampicin, pyrazinamide, and ethambutol followed by 6 months of isoniazid and ethambutol supplied as loose pills. The cure or treatment completion could have occurred only after the drugs were taken for a period of 8 months, thereby establishing a correct time relationship with the treatment.

Is the relationship strong?

The relationship is strong as cure or cure and treatment completion was better when compared with the period before strengthening of services.

Is there a dose response relationship?

The cases were all given the same treatment, the same dose of anti- tuberculosis drugs. So the dose response relationship is not established

Are the results consistent within the study?

The results were consistent within the study.

Is there any specificity within the study?

Specificity could not be commented upon as other factors like socio economic factors, diet and receipt of treatment or supportive treatment elsewhere etc. which

are also important besides the drugs given to bring about cure have not been mentioned anywhere in this paper.

Conclusions in regard to internal validity of this study

No significant difference between cure rates for self administered treatment or for the health worker DOTS or the family member DOTS strategy as this persists even after the exclusion of analysis for the 30 patients who changed treatment was done. The adjusted odds ratios for factors like diagnostic center, trial group, demographic factors (age and sex) was done and no factor other than sex had an odds ratio significantly different from 1. The overall cure rates and cure or treatment completion rate were significantly higher for women (21% difference [95% CI 13-30], $p < 0.0001$) and (9% difference [95% CI 10-27, $p < 0.0001$) respectively.

IV. 7. External validity:

Can the study results be applied to the eligible population?

497 patients were enrolled in this study and no eligible patients refused to participate. The number of patients enrolled at the three participating centers were more or the same, at 165, 155 and 177 respectively at the Rawalpindi, Gujranwala and Schiwal centers. The study patients were randomised to the 3 treatment groups and the numbers enrolled in the health worker DOTS, family member DOTS and self administered groups were 170, 165 and 162 respectively and these same number of patients were analysed as it was based on intention to treat. Therefore the results can be applied to the eligible population.

Can the results be applied to the source population?

As stated in the methods section, the sites selected were regarded as typical of a tuberculosis treatment center in Pakistan. The study centre represented a mix of urban and rural patients. The data about the utilization of the private institutional services by the local population which is not given in the paper restricts the generalization of the results to the source population .

Can the results be applied to other relevant populations?

When the generalization of the results to the source population is in itself is to be approached with caution, the generalization of the results to other relevant populations is debatable.

Are the results consistent with other evidence, particularly evidence from studies similar or more powerful study design?

In discussion section, the paper states that , WHO DOTS strategy for strengthened control of tuberculosis has been shown to be effective. This study also shows that the overall cure rate has significantly improved after strengthening of services 26 to 59% and the overall cure or treatment completion has also improved 41 to 64% at Rawalpindi center.

Does the total evidence suggest any specificity?

Specificity of the results to the strengthened services with DOTS has been established with the increased cure rates in this study. However, suggesting the improved cure rates to the direct observation component is controversial because of the non mention of the factors like socio economic factors , dietary habits and health status of the patients at the time of enrollment etc.,

Are the results plausible in terms of a biological mechanism?

The results are plausible in terms of biological mechanism as an uninterrupted supply of free drugs in the DOTS strategy is a very important factor for achieving improved cure. The other important factor of the proper utilization by the patients is also assessed in this study.

If a major effect is shown, is it coherent with the distribution of the diseases and the outcome?

The outcome of DOTS strategy is in line with other evidence although the relation between observation treatment component and enhanced cure rate is controversial.

V. Conclusion:

The research question of assessment of the effectiveness of different strategies for tuberculosis treatment under operational conditions in Pakistan has been adequately addressed in the discussion stating that the strategies selected might not have been appropriate for the setting despite having done a qualitative and pilot study.

The doubling of cure rates within three years of implementation of the National Tuberculosis Programme strategy confirms the effectiveness of the whole DOTS package and is consistent with other settings as well.

The findings that were found have been extended to the appropriate population and though the findings of relatively high proportion of patients unable to comply with the health worker DOTS of treatment has been generalised for the whole of Pakistan, stating the unsuitability of the approach, for generalization to other settings, further research has been recommended.

Shortcomings and limitations of the study were addressed i.e. the study settings were typical field conditions of a typical south Asian country and constructive suggestions for further research were given.

As a whole, though the WHO DOTS strategy for strengthened control of tuberculosis in Pakistan has shown to be effective it clearly states that that we no longer can assume that direct observation of treatment is effective and further operational research is needed.

Article 2.

Zinc supplementation in young children with Acute diarrhoea in India

Sunil Sazawal, M.B.,B.S., M.P.H., Ph.D., Robert E. Black, M.D., M.P.H., Maharaj K. Bhan, M.D., Nita Bhandari, M.B.,B.S., Ph.D., Anju Sinha, M.B.,B.S., and Sanju Jalla, Ph.D

(Published in New England Journal of Medicine; September 28, 1995)

Abstract

Objective : To evaluate the effects of daily supplementation with 20 mg of elemental zinc on the duration and severity of acute diarrhoea.

Design : Double blind, randomized, control trial

Setting : Kalkaji neighborhood of New Delhi, India

Participants : 937 children of 6- 35 months of age with diarrhoeal episodes.

Results :

1. Among the children who received zinc supplementation, there was a 23 percent reduction (95 percent confidence interval, 12 – 32 percent) in the risk of continued diarrhoea.
2. Estimates of the likelihood of recovery according to the day of zinc supplementation revealed a 7% (95 % CI , -9 to +22%) in the risk of continued diarrhoea during days 1 to 3 and a reduction of 38%(95% CI , 25- 48%) after day 3.
3. When zinc supplementation was initiated within 3 days of the onset of diarrhoea, there was a 39% reduction(95%CI, 7-61%) in the proportion of episodes lasting more than 7 days.
4. In the zinc supplementation group, there was a decrease of 39%(95% CI, 6-70%) in the mean number of watery stools per day (P= 0.02) and a decrease of 21%(955 CI, 10-31%) in the no. of days with watery diarrhoea.

5. The reduction in the duration and severity of diarrhoea were greater in children with stunted growth than in those with normal growth.

Conclusions : For infants and young children with acute diarrhoea, zinc supplementation results in clinically important reductions in the duration and severity of diarrhoea.

Critical Review:

Title of the paper is not self explanatory as the stated objectives in the abstract section is dealing with the evaluation of the efficacy of zinc supplementation in young children with acute diarrhoea in India. Moreover, the trial was in infants also – mention of which is not in the title. Hence the title could have been as “Evaluation of zinc supplementation in infants and young children with diarrhoea in India – A Double blinded randomised control trial”

The abstract section is interesting enough to capture the reader’s interest. In spite of capturing the interest, it is not dealing with the exact details of selection of the study subjects which makes us to read the whole article. Though this is an interesting way of presenting the things, it might not interest many a readers.

Introduction

- Critical review of relevant literature has been made.
- Need for the present study – supplementation of zinc in children with diarrhoea in addition to oral rehydration and normal diet has been made.
- The research hypothesis - evaluation of the efficacy of zinc supplementation in young children with acute diarrhoea in India is also clearly stated.

Methodolgy:

Double blinded, randomised control trial

Klakaji neighborhood, New Delhi

Cohort selected :

Children of 6- 35 month age group who were reported to have passed atleast 4 unformed stools in the previous 24 hours, who had diarrhoea for less than seven days and who were permanent residents of Kalkaji were included in the study.

Exclusion criteria

Children who presented to the clinic a second time, those who were judged by the physician to have malnutrition requiring hospitalisation, and those whose parents denied consent were excluded from the study.

Zinc supplementation

It has been mentioned in the introduction section that zinc supplementation was given to those children who had more than 7% dehydration as clinically assessed and later on referred to AIIMS for rehydration. Though mention has been made that children with mild or no dehydration were advised to have 50 ml of oral rehydration solution per kilogram of body weight at home, it is not mentioned clearly whether they were given supplementation or not.

Ethical committee approval was got from the AIIMS, John Hopkins School of Public Health, and WHO. Written consent was obtained from the parent's of each enrolled child after reading the consent form.

Baseline assessment, detailed physical examination, height, weight, Venous blood sample for the estimation of zinc levels had been done.

Randomisation and blinding

Randomisation was done with permuted blocks of 10 and the children were categorised into 4 categories:

1. those with a z score of -2 or greater for weight for length who were partially or exclusively breast fed(stratum A1)
2. those with z scores below -2 who were breast fed(stratum A2)
3. those z scores below -2 or greater who were not breast fed (A3)
4. those with z score below -2 who were not breast fed (A4)

Within each stratum enrolled children were assigned sequential numbers indicating whether they would receive zinc or placebo.

Avoidance of bias and ensurement of randomisation

The solutions were identical in taste and colour. The code was kept by WHO personnel and was not available till the end of the study.

Intervention

Both the liquid preparations were made by Sandoz, India(Bombay). Each daily 10 ml dose contained vitamin A(1600 units), B₁ (1.2 mg), B₂ (1.0 mg), B₆ (1.0 mg), D₃ (200 IU), and E (6mg) and niacinamide (20 mg).The zinc preparation had zinc gluconate (20 mg of elemental zinc).

Literature review mention has not been made for the adequate dosage required by the children of this age group.

Compliance was found to be more or less equal in both the groups (78% in the supplementation and 79% in the control group).

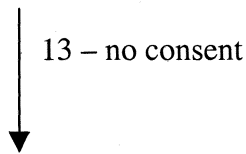
Method of data collection :

Follow-up visits

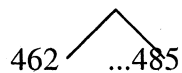
Each enrolled child was visited at home by a trained field worker every 5th day and information was obtained regarding the no and consistency of stools for each of the previous five days.

Period of data collection : September 1992 to November 1994

960 children



947



Supple. Group

Control group

Quality control of compliance was present but how much of it was cross-checked by the other team members and how much by the supervisors has not been mentioned.

Definition :

- A day of diarrhoea – passage of 4 or more unformed stools in 24 hours
- An episode of diarrhoea was considered terminated on the last day of diarrhoea that was followed by a 72 hour diarrhoea free period.
- A day with watery stools was defined as the passage of 3 or more watery stools in 24 hours.

Analysis

Statistical analysis was performed using SPSSPC+ (version 6.0), Epi info (version 6.0) and SAS (version 6.08) software. Relative risks and CI were estimated by Taylor series method. The total duration of episodes was modelled with cox survival regressions with a time-dependent co-variate (PHREG in SAS 6.07 on a VMS mainframe). Mention of the no. of children in each starta (of supplementation group and control group) is not made.

937 children were included for survival analysis and 931 for analysis of total duration of diarrhoea.

Results

- Of 931 episodes of diarrhoea, 44.4% resolved within three days after enrollment and 83.5% resolved by day 7.
- Supplementation with zinc was associated with a 23% reduction in the risk of continued diarrhoea on any given day.
- For the children with stunted growth, the reduction was by 25% and for those who had low plasma zinc concentrations, it was by 27%
- Using Kaplan- Meier curves, the estimated RR of continued diarrhoea in the supplementation group as compared with the control group was 0.93 (95% CI, 0.78 to 1.09) during days 1,2,and 3 of supplementation and 0.62 (95% CI, 0.52 to 0.73) after day 3.
- Using logistic regression model, the OR for diarrhoea lasting more than 7 days was 0.79 with zinc supplementation (95% CI, 0.64 to 0.96).
- The OR was 0.74 (95% CI, 0.57 to 0.95) when the model was restricted to children enrolled by day 3 of the episode of diarrhoea.
- There was a 39% reduction (95% CI, 6- 70 %) in the mean no.of watery stools per day in the supplementation group (P= 0.02) “Significant” and a 21% reduction (95% CI, 10- 31 %) in the no.of days with watery stools.
 - The effect of zinc on the no.of days with watery stools was greater in children with stunted growth than with the normal growth, RR 0.59 (95% CI, 0.48 to 0.73) and RR 0.95 (95% CI, 0.79- 1.15) respectively.

The analysis is very much focused on the stated objectives- it quantifies the importance of zinc supplementation in children with diarrhoea.

Discussion

Description and discussion of the importance of zinc supplementation in normal, stunted growth children with diarrhoea and those having low plasma zinc concentration is quite adequate.

Mention of earlier studies has been made in which no significant results were found to support the theory of adding zinc to children with diarrhoea. But ,

mention about the methodology adopted in those studies and weakness and strength comparisons of the earlier with that of the present study has not been made.

The authors acknowledge the fact that this study is to be repeated in other developing countries as well before any policy change could be thought of.

Article 3

Randomised controlled trial of aminosidine (paromomycin) v sodium stibogluconate for treating visceral leishmaniasis in North Bihar, India.

T K Jha, P Olliaro, C P N Thakur, T P Kanyok, B L Singhanian, I J Singh, N K P Singh, S Akhoury, S Jha

(BMJ Volume 316 , 18 April 1998)

Abstract :

Objectives: To assess the efficacy and tolerability of aminosidine compared with sodium stibogluconate for treating visceral leishmaniasis.

Design: Randomised, unblinded, controlled trial with 180 days follow up.

Setting : Kala – Azar Research Centre, Brahmapura, Muzaffarpur, Bihar, India

Subjects : People of either sex aged 6-50 years with symptoms and signs suggestive of visceral leishmaniasis, with leishmania amastigotes detected in Giemsa stained aspirates of spleen or bone marrow.

Interventions : Aminosidine at 3 doses (12, 16 and 20mg/kg/d) for 21 days and sodium stibogluconate 20mg/kg/d for 30 days.

Main Outcome Measures : Laboratory measures of efficacy – parasite count, hemoglobin concentration, white cell count, platelet count, serum albumin concentration.

Clinical measures of efficacy – spleen size, fever, body weight and liver size.

Measures of safety – liver and renal function tests, reports of adverse events.

Results : 16 and 20 mg/kg/d of aminosidine was significantly more active than sodium stibogluconate in both laboratory and clinical measures of efficacy.

Justification for the study :

The study is important and very much needed as visceral leishmaniasis is still a major public health problem in Bihar and in recent years, these have become increasingly unresponsive to first line treatment with pentavalent antimony compounds. In consequence, as well as increased morbidity and mortality, treatment costs have risen because of the prolonged need for treatment and hospitalization. Identification of alternative treatment strategies for Visceral Leishmaniasis have thus become the utmost need in Bihar.

Objectives :

1. To determine the efficacy and safety of aminosidine alone in treating in treating Visceral Leishmaniasis
2. To establish the optimum dose for a fixed duration of 21 days in comparison with the standard regimen.

The justification and the objectives of the study has been stated very clearly.

Introduction:

Bihar carries the burden of half of the world's annual cases of visceral leishmaniasis and in recent years they have become increasingly unresponsive to first line treatment with pentavalent antimony compounds, which is the treatment practiced. While daily dose of 20mg/kg/d of sodium for 20-40 days **was efficacious in the 1980s, up to 25%** unresponsiveness is now reported even with high doses and longer administration.

Aminosidine as an injectable formulation has been in the market for the past 30 years. It was shown to have anti-leishmanial activity in the 1960s and shown to act synergistically with antimony drugs. Clinical trials with injectable aminosidine combined with antimony compounds for treating visceral leishmaniasis were found

to be efficacious and well tolerated. Minimal comparative data is available on treatment with aminosidine alone.

Methods

Design: Randomised, unblinded, controlled trial with 180 days follow up.

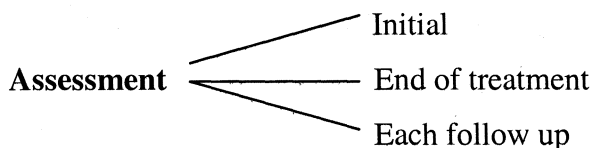
Setting: Kala – Azar Research Centre, Brahmapura, Muzaffarpur, Bihar, India

Subjects: People of either sex aged 6-50 years with symptoms and signs suggestive of visceral leishmaniasis, with leishmania amastigotes detected in Giemsa stained aspirates of spleen or bone marrow.

Exclusion criteria: known allergy to aminoglycosides, previous treatment in the last 12 months, serious concomitant diseases, pregnancy and lactation, severely ill from leishmaniasis

Interventions: Aminosidine at 3 doses (12, 16 and 20mg/kg/d) for 21 days and sodium stibogluconate 20mg/kg/d for 30 days.

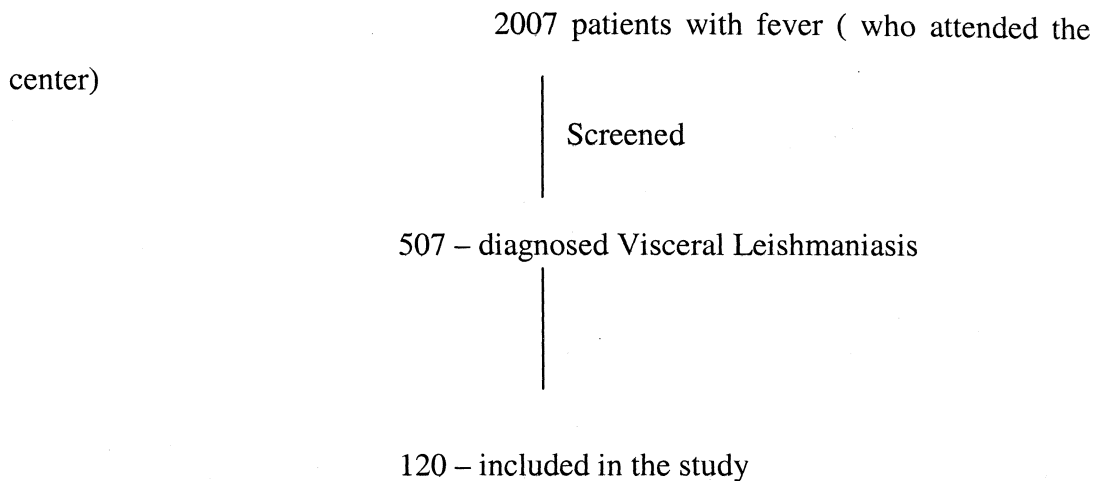
No. of treatment groups: 4 (30 in each arm)



Follow up – 30, 90 and 180 days after the completion of treatment.

Method of assessment: Parasitology, spleen and liver size, blood chemistry, hematology and urine analysis

Period of study : June 1993 to August 1995



Comments :

The study design is appropriate for the stated objectives. The method of randomization has been dealt. Inclusion and exclusion criteria were clearly stated. Definitions for critical illness has been well established. The outcome measures were clinical improvement and parasitological cure persisting at 180 days after completion of treatment and they have been well defined. Definition for “end of treatment” for both the aminosidine and antimony is very clear.

The following details have not been elaborated in the paper:

- 1.who did the clinical assessment?
- 2.Who did the parasitological examination?
- 3.Who did the blood chemistry and hematological and urine analysis?
- 4.Were the examiners the same throughout the study period ?
- 5.Was any training given to all the team members to establish standadisation?
6. Methods of tackling ‘non- response’ and ‘non-compliance’ was not specified
- 7.Quality of data maintanance throughout the study was also not adequately described.

8. Instructions to the patients included in the study was not commented upon.

The study was unblinded and for this reason, bias can occur as the investigators and the patients will be fully aware of the drugs administered.

Ethics : The study acquired clearance from the drug controller of the Indian Government, local ethics committee and WHO secretarial committee on Research Involving Human subjects and was also conducted in accordance with the Declaration of Helsinki.

Statistical methods : The analysis was described appropriately and statistical significance was defined. Chi square test was used to compare dichotomous variables between group and one way analysis of variance for continuous variables . Changes within groups from baseline over time was assessed using paired 't' tests and a one way analysis of variance with post hoc multiple comparison using Tukey's honest significance difference for comparison between groups.

Results :

Baseline characteristics did not differ among the different arms of the treatment groups except for the significance in hemoglobin concentration, platelet counts and albumin concentration. Since seriously ill patients were excluded, the general health was more or less similar. 120 patients were enrolled, 30 patients in each treatment arm and analysis was by intention to treat.

Final cure was achieved in 23, 28 and 29 patients (n=30 in each arm) given aminosidine 12, 16 and 20mg/kg/d respectively, compared with 19 out of 30 patients given antimony (chi square p=0.003). Only 12mg/kg/d dose of aminosidine did not differ significantly from antimony treatment (p=0.26).

Parasitological cure was achieved in 27, 28 and 27 patients given aminosidine 12, 16 and 20mg/kg/d respectively compared with 22 patients given antimony. All the three doses of aminosidine were significantly more effective than the antimony group (chi square $p=0.002$). Only 2 failures were recorded in the group given aminosidine 12mg/kg/d compared with 8 in the antimony group. Follow up results show 5, 1 and 1 relapses given aminosidine 12, 16 and 20 mg/kg/d respectively compared with 3 in the antimony group.

Changes from baseline

Comparison within groups – Albumin concentration was significantly higher at all assessments in the patients given aminosidine 20 mg/kg/d, on days 14 and 21
Comparison between groups – At the end of the treatment, aminosidine was significantly more effective than antimony for most of the variables considered.

Safety evaluation

No clinically relevant difference in laboratory values were recorded in any of the treatment groups.

Comments

Results presented address directly to the objectives. Mean and SD were also presented. Tables were appropriately represented. Results were consistent throughout the paper.

Are the results affected by bias?

Treatment bias - Since the study was unblinded, bias could have occurred as the investigators and the patients would have been aware of the drugs administered. The doctor assessing the clinical efficacy was unaware of the dose of aminosidine given and technicians assessing laboratory measures were unaware of the treatment achieved and so the results obtained could not have been due to bias.

Are the results likely to be affected by confounding?

The baseline characteristics in each treatment arm for male:female ratio, age (years), weight (kg), duration of illness (no. of days with fever), spleen size (cm), white cell count ($10^9/l$) and parasite burden (grade) did not differ significantly between the groups. Characteristics of haemoglobin concentration (g/l), platelet count ($10^9/l$) and albumin concentration (g/l) differed significantly between the groups. Therefore these differences could possibly confound the results.

Analysis was by intention to treat, patients were followed up for 30, 90 and 180 days after treatment. Data is not provided about the patients compliance with the prescribed treatment. As proper treatment compliance affects outcome, this factor could act as a confounding agent, affecting the result.

Are the results likely to be affected by chance?

The outcome of this study was assessed by well defined parameters. The results are very significant at the end of 180 days of follow up, with 23 (77%), 28 (93%) and 29 (97%) cure for patients given 12, 16 and 20 mg/kg/d of aminosidine respectively, compared with 19 (63%) of the patients given antimony (chi square test $p=0.003$). Parasitological outcome of the treatment was also significantly effective for the three doses of aminosidine ($p=0.002$). Therefore the result of the study being affected by chance is very minimal.

Internal validity:**Is there a correct time relationship?**

This is a randomised controlled trial where the cases are recruited and treatment given. Patients are followed up for 30, 90 and 180 days. Cure must have occurred after treatment and so correct time relationship is established.

Is the relationship strong?

The relationship is strong for the 16 and 20mg/kg/d of aminosidine on assessment of clinical and parasitological cure. Treatment failure was only 2 in the group given 12mg/kg/d compared to 8 in the antimony group. All three doses of

aminosidine were significantly more effective than the antimony group (chi square $p=0.002$). So the relationship is strong.

Is there a dose-response relationship?

Aminosidine given at 12mg/kg/day for 21 days produced a final cure rate of 77% which was not significantly different from the sodium stibogluconate administered for 30 days. However, a significant difference was found between the 16 and 20mg/kg/day groups and sodium stibogluconate group. Therefore, it could be seen that the higher the dose of the intervention, the higher was the efficacy.

Are the results consistent within the study?

Consistency in the study has been established as treatment with aminosidine was shown to be significantly effective to antimony by assessing the clinical cure and parasitological cure.

Is there any specificity within the study?

Specificity to a single causation to cure is not established although the effectivity to treatment with 16 and 20mg/kg/d was established.

Conclusions with regard to internal validity:

Though the role of confounding factors has not been clearly excluded, the overall results are however significant to document the effectiveness of the aminosidine (16 and 20 mg/kg/day) for 21 days when compared to the antimony group for treating visceral leishmaniasis.

External validity:

Can the study results be applied to the eligible population?

The patients were randomly assigned to the four treatment arms. Analysis of the result was by intention to treat. So the results of the study can be applied to the eligible population.

Can the study results be applied to the source population?

Of the 507 visceral leishmaniasis diagnosed, only 120 (24%) patients met the inclusion criteria who were eventually recruited in the study, which is one fourth of the source population. So the extrapolation of the results to the source population is to be approached very much with caution. Moreover, the representativeness of the people who come to the centre for treatment is again questionable as Bihar is a hyper endemic state for Leishmaniasis and only 507 were diagnosed to have the disease over a period of two years.

Can the study results be applied to other relevant populations?

The research center is situated in a hyper-endemic area. Many other patients may not be exposed to the same hyper-endemic area, nor resistance to sodium stibogluconate that is very prevalent in the area be applicable to other patients. So the result of this study may not be applicable to those relevant populations of different exposures, background.

Are the results consistent with other evidence, particularly evidence from studies of similar or more powerful study design?

Previous studies conducted in Kenya and Sudan documents that aminosidine combined with antimony was at least 95% effective at the end of treatment and significantly more effective than sodium stibogluconate alone. Two trials conducted in Bihar documents the effectiveness of aminosidine with sodium stibogluconate at 82-88%. On the other hand this study assessed the efficacy of aminosidine alone and shows significantly higher efficacy for aminosidine thereby suggesting that antimony played a minor role.

Are the results plausible in terms of biological mechanism?

The activity of aminosidine against leishmania has been known since the 1960s and has been shown to act synergistically with antimony drugs. Hence, the relationship can be regarded as plausible.

If a major effect is shown, is it coherent with the distribution of the exposure and the outcome?

The exposure in question is not a major cause of the outcome, although proven to be statistically significant in this study and also effective from other earlier studies.

Conclusion:

The research question of assessing the efficacy and tolerability of aminosidine compared with the sodium stibogluconate is adequately addressed. The conclusion of supporting aminosidine of 16mg/kg/day for 21 days for the treatment of visceral leishmaniasis is also well supported by statistical analysis. Conclusions have been extrapolated to the whole of Bihar and this is to be viewed with caution as the sample size is small. In reality, this could only be made after further studies with larger sample size in various localities having the same background.

Competing or alternative explanations for the findings have not been discussed. Limitation of the study in the form of it being unblinded though has been acknowledged, the ways and means of overcoming it has not been addressed. On the whole, this study has also produced results which are consistent with other studies. The results are statistically significant to recommend aminosidine as the first line of treatment for visceral leishmaniasis at a dose of 16mg/kg/day.

SECTION.5

PAPER PRESENTATIONS

The following papers have been presented in various scientific forums:

1. “*Maternal mortality in Tamilnadu – A descriptive analysis*” presented at

a TEPHINET SEA and WP Bi-regional Conference, Manila, Philipines, 2003

b. Joint Annual Conference of the Indian Society for Malaria and other Communicable Diseases and The Indian Association of Epidemiologists, New Delhi, 2002.

2. “*An outbreak of typhoid fever in a village in Tamil Nadu, South India*”

presented by Dr. R. Ramakrishnan, Assistant Director, NIE, Chennai at TEPHINET SEA and WP Bi-regional Conference, Manila, Philipines, 2003

(I was the second author of this paper)

3. “*Evaluation of Malaria Surveillance System, Saidapet Health Unit District, Tamilnadu, 2002*”presented at Annual FETP Conference, National Institute of Epidemiology (ICMR), Chennai, 2003

Maternal mortality in Tamilnadu – A descriptive analysis

*Parvathy S*¹, and Krishnamoorthy P., Vidya Ramachandran, M.D.Gupte

¹Field Epidemiology Training Programme (FETP) scholar, ³ Assistant Director,

National Institute of Epidemiology (ICMR), Chennai - 31

²Deputy Director (Research), ⁴ Director,

Directorate of Public Health and Preventive Medicine, Govt. of Tamilnadu, Chennai-6

Abstract

Background

Maternal Mortality Rate (MMR) is a sensitive index of the health status of women in a society. The MMR in Tamilnadu has been fluctuating between 120/100,000 live births in 1996 and 140/100,000 in 1999 (DANIDA Survey, 1999). As per the Tamilnadu State Government Health Policy 2000, the goal is to reduce MMR to below 100/100,000 by the year 2005. Therefore a study was undertaken to : (1) Identify and describe the various factors influencing MMR in Tamilnadu and (2) Suggest measures to reduce the risks for MMR.

Methodology

Analysis of Maternal Deaths Reported from the Community through the Government Public Health System for the entire state of Tamilnadu during April 2001 to March 2002. Data Source : "Maternal Death – Case Investigation Sheet". Total number of maternal death case investigation sheets received and analysed were 1116, i.e. 68% of all maternal deaths reported.

Results

Factors influencing MMR in Tamilnadu include:

Socio Demographic : maternal age below 19 years (7%) and above 30 years (34%); birth interval less than 3 years (62%) ; female literacy below primary school (68%); Family income below Rs.12, 000 / annum (80%) and Scheduled castes, tribes and most backward communities (68%).

Obstetric: Primi gravida (35%), women with parity > 2 (21%)

Health Care: Incomplete Antenatal care (70%), Domiciliary deliveries(22%), deliveries in private institutions (21%), Maternal Deaths after cesarean sections in private Institutions (27%).

Conclusion

This study has provided important clues to the probable factors influencing MMR in Tamilnadu. Nevertheless there is a need to carry out in-depth case studies to draw final conclusions.

An outbreak of typhoid fever in a village in Tamil Nadu, South India

R.Ramakrishnan 1 ; S.Parvathy 2 H.K.Naik 1 and M.D.Gupte 1

1 National Institute of Epidemiology, Chennai, India; 2 FETP, National Institute of Epidemiology, Chennai, India

Abstract

Background: Ramarajapuram is a village in Tamil Nadu, South India. The population of the village was 3,351, the major occupation being agricultural farming. The water source for the whole village was mainly from two open wells. The village had only open drainage system, very few houses having private latrines. An outbreak of fever occurred in the village and lasted for nearly a month and presented a challenge to investigate.

Methods: An active case finding was carried out by means of door-to-door search. A semi-structured questionnaire was administered to all the available cases. Samples of blood, stool and water were collected for laboratory investigation. Control measures were initiated and we followed up the population till the end of the outbreak.

Results: Seven hundred fifty three persons had fever (attack rate of 22.5%) and a boy aged 11 years died. The epicurve suggested a point source infection. Sixty-four persons had laboratory confirmed Widal positive test and ten persons had laboratory confirmed culture positivity for *Salmonella typhi* organism. Water analysis from the suspected water source showed evidence of contamination with faecal material. There was a clustering of cases of residents using a particular source of water, the attack rates being significantly higher than those using the other sources. Potential risk factors like open-air defecation, non-availability of separate kitchen were statistically associated with illness. A dose response relationship was established for a risk factor. The control measures included chlorinating water supplies, boiling drinking water and health

education. No further cases occurred twelve days after implementing control measures.

Conclusion/Public health impact: The cause of the outbreak and the specific source of infection were identified from the clustering of cases and exposure data. Standard hygienic measures immediately arrested the outbreak. Access to safe water is essential to prevent water-borne outbreaks.

Key words: Outbreak, Typhoid, Contaminated water

Evaluation of Rural Malaria Surveillance System, Saidapet Health Unit District, Tamilnadu, 2003

Abstract

Background

Malaria is serious re-emerging public health problem. The Saidapet Health Unit District is 40 km away from the Chennai city which contributes to 70% of the urban malaria problem in Tamilnadu.

Objectives

The objectives of the evaluation were to:

1. Assess the achievement of the objectives of the rural malaria surveillance system in Saidapet Health Unit District
2. Identify existing gaps with respect to the structure, process and outcome of the surveillance system and
3. Suggest appropriate measures to narrow down the identified gap

Methodology

Out of the six blocks of the health unit district, one block (Kattangulathur) was selected using the "best scenario" method.. All the five PHCs and two health sub centres from each of the PHC were randomly selected for the evaluation. Pre-tested semi- structured questionnaires were administered to Medical Officers of the PHC, health inspectors, village health nurses and laboratory personnel apart from the district officials.

Results

Structure: 32% of the sanctioned post of Health Inspectors are vacant. Four of the five PHCs have functional building. Two of the five PHCs have own vehicle. Logistics and supplies are adequate in all PHCs.

Process: Only one of the five PHCs have a population under surveillance of 30,000. Rest of them cater to a higher population. Written standard case

definitions are not available with the field workers. The blood smears are sent to the PHCs on a twice weekly basis. There is a regular and consistent flow of information from and at all levels. Feedback is usually in the verbal form. 100% training of all health inspectors is present. Quality control of blood slides is maintained regularly.

Outcome: There had been no epidemics in this block in the reference period. The Annual Parasite Incidence (API) was 0.01/1000 population . The Active Annual Blood Examination Rate (ABER%) and Passive ABER were 3.6% and 10.9% respectively for a period of six months reference

System capacity and attributes: The system was found to be simple and acceptable by all the staff (100%). Fully completed MF forms were available with three of the five PHCs. The positive predictive value of the blood smear examination has been 100% during the past year.

Conclusion

The malaria surveillance system in Saidapet Health Unit District is functioning well at present. The reduction in the operational efficiency has to be strengthened to avert epidemics in the near future.