Field Project Reports

By

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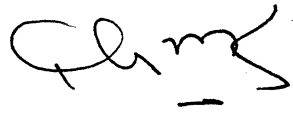
CERTIFICATION

This is to certify that all the field projects submitted in this **Bound Volume** are original work carried out by **Dr. Pachuau Lalmalsawma** 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.



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SECTION - I

FIRST

FIELD POSTING

Work place situation analysis: Aizawl East District, Mizoram

I. Introduction

Health is influenced by a number of factors such as basic sanitation, water supply, socio-economic pattern, health care services and a multitude of other services. Hence, it is necessary to study the work situation of an area in order to bridge the gaps that existed in the present set up and to explore the health needs of a population. An attempt has been made to study the work situation of Aizawl East District of Mizoram for the first time.

II. Objectives:

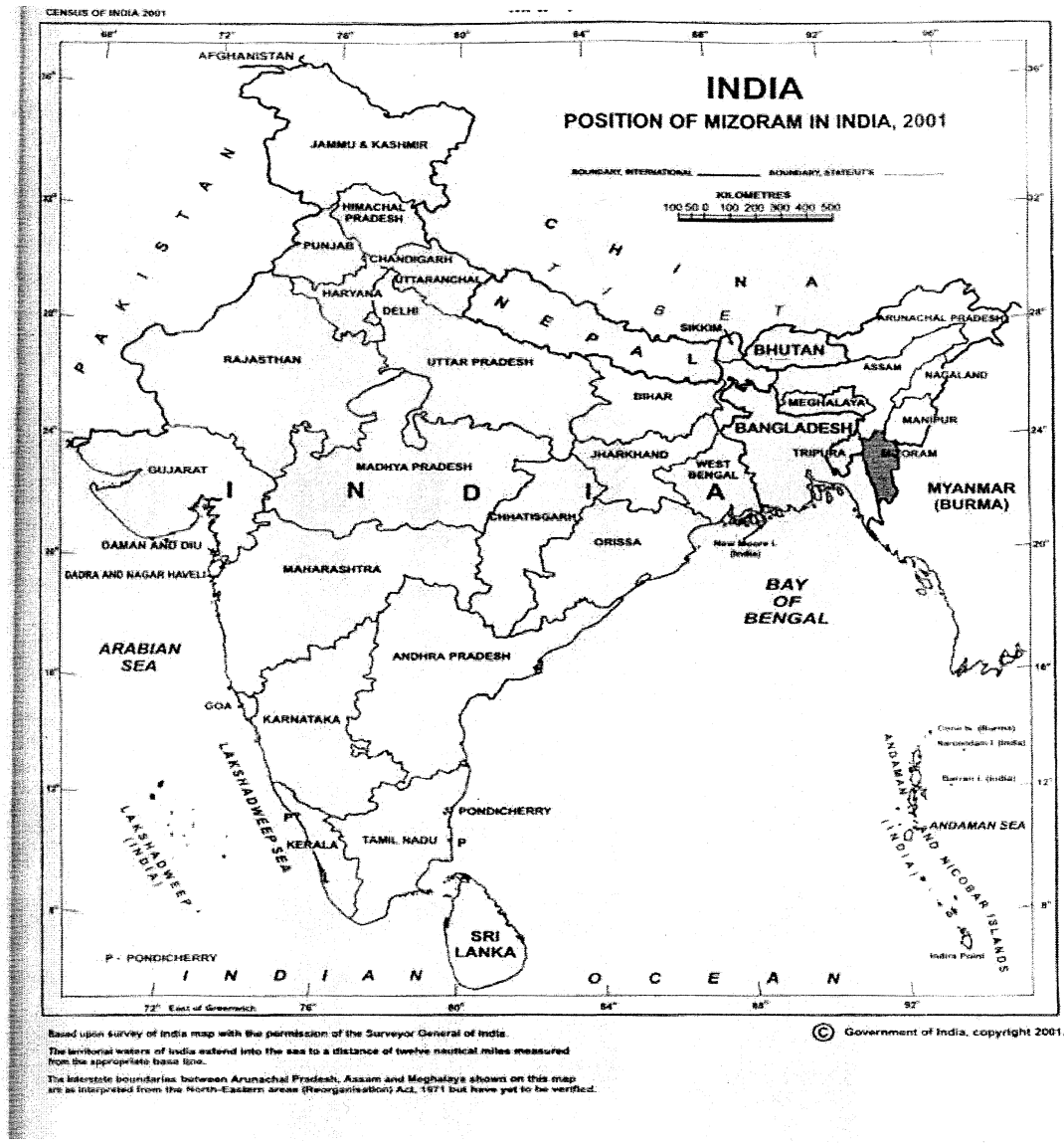
The objectives were to describe

- health infrastructure in the district
- health status of the district.
- information regarding diseases of public health importance, their control and prevention in times of outbreak.

III. Background information

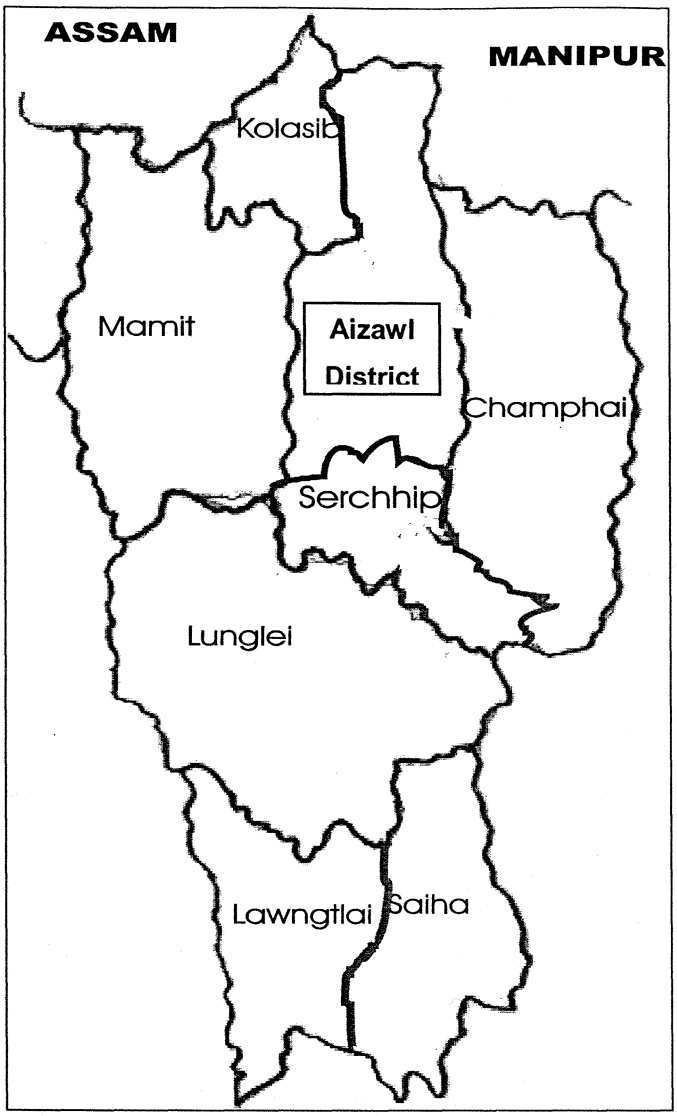
A. Geographical particulars: Mizoram became the 23rd state of India on February 20, 1987. The state, perching on the hills of the northeastern corner, is flanked by Bangladesh on the west and Myanmar on the east and south. The two sister states, Manipur and Assam border it on the north, while Tripura lies in the North-West (Figure 1).

Figure 1: Map showing location of Mizoram.



At present, there are eight districts in Mizoram of which Aizawl district is the largest. In the health sector administrative set up, Aizawl district is further divided into Aizawl East and Aizawl West districts. The Aizawl East District covers almost half of the Aizawl district and is on the eastern part of the district. It has its headquarters in Aizawl, the state capital, which, however, is outside the boundary of the Aizawl East District.

Figure 2: Map of Mizoram showing location of Aizawl District.



The Aizawl East District has a population of 7,36,003 (April 2003, Action Plan) all of whom belong to the native mizos. The district is full of hilly terrains and is separated from Aizawl West District by Tuirial River, which is about 20 kilometers from Aizawl on the Eastern side.

B. Demographic profile:

Table 1. Demographic indicators, Aizawl East District, 2003

Indicators	Aizawl East	Mizoram
Population	73603	891779
Sex ratio	973/1000 males	969/1000 males
Literacy rate	96.64	88.49
Crude birth rate	7.8/1000	22.43
Crude death rate	2.28	4.36

Source : District action plan (2003). Statistical handbook, Economic and Statistics Department, Government of Mizoram (2002), District monthly reports.

C. Occupation and employment: Agriculture is the chief occupation in the district with 9706 (75.2%) of the 12904 families involved in agriculture. The rest belong to government employees, traders and others. There are no industries, factories or institutes of importance in the district. (*Source : Socio-economic review (2001-2002) : Mizoram – Economics and Statistics Department, Government of Mizoram).*

D. Socio-Cultural pattern: The society is closely-knit with plenty of social activities focused on the upliftment of the social life. Each individual above the age of 18 years belong to member of non-governmental organizations like YMA (Youth Group of Mizoram), MHIP (Women's Group) or MUP (Senior Citizens' Group). There is no data available on the income levels of the population in the district. All the people follow Christianity and there are no other religious sects in the district. The health seeking behaviour is such that the people approach the existing health care facilities and in times of treatment failure, they seek care from the faith healers. There are no religious or social taboos in practice.

IV. Health Parameters

A. Health indices: Important health indices of the district are summarized in table-2

Table 2. Health indicators, Aizawl East District, 2002

Indicator	District Aizawl East
Infant mortality rate	30/1000 (2002)
Maternal mortality rate	Not available
Safe deliveries	47.91% (2002)
Institutional deliveries	4% (2002)
Females with RTI symptoms	0.3%
Males with STI symptom	63
% of children with complete immunization	75.6 (2002)

Source : District report (2002), NFHS – NE States (1998-'99)

B. Health facilities: There are two Community Health Centers and five Primary Health Centers with 37 health sub-centres, with 3 Community Health Officers, 12 Health Supervisors, 70 Health Workers and other health staff. At the district headquarters there is 1 Chief Medical Officer, 1 District Immunization Officer, 1 Malaria Inspector and 1 Statistician. The manpower profile of the district is summarized in table-3 and 4.

Table 3: Man-power profile of Aizawl East District, Mizoram, 2002

Category	Posts sanctioned	Posts filled	Post vacant
Medical Officers	9	8	1
Community Health Officers	5	3	2
Health Supervisors	14	12	2
Health Workers	74	70	4

Source : Monthly Reports(2002) Aizawl East District

Table 4: Health Manpower profile – Aizawl East District, Mizoram, 2003

PHC/CHC (Population)	MO	CHO	HS	HW	Pharmacist	Nurses	SN	LDC	Lab. Tech	X-Ray Tech.	OA	Micros	Driver	Gr IV
Thingsulthliah (17996)	1	1	2	13	1	1	5	1	1	1	1	-	1	14
Saitual, CHC (16043)	2	1	3	16	1	1	6	1	1	1		-	1	16
Phuaibuang (5157)	1	-	2	6	1	-	2	-	1	-		-	-	5
Sakawrdai, CHC (9383)	1	-	1	12	-	-	1	-	2	-		-	1	13
Darlawn (9743)	1	1	2	9	1	1	2	-	1	1		-	-	12
Suangpuilawn (8333)	1	-	-	7	-	-	3	-	-	-		-	-	9
Khawruhlian (6948)	1	-	2	7	1	-	4	-	1	-	-	-	1	9
Total	8	3	12	70	5	2	23	2	7	3	1	3	4	78

Total sanctioned posts: 221; Vacant posts:34 (15.4%)

(Source : District pay register (Aizawl East) – 2003)

The National Health Plan (1983) proposed re-organization of Primary Health Centers on the basis of one PHC for every 30,000 rural population in the plains and one PHC for every 20,000 population with 10 beds in hilly, tribal and backward areas. Some of the Primary Health Centres were upgraded as Community Health Centre (CHC) to cater to a population of 80,000 to 1.20 lack with 30 beds and specialists in surgery, medicines, obstetrics and gynecology and pediatrics with X-ray and laboratory facilities. The staffing pattern with bed strength of PHCs and CHCs are given in table 5. Each PHC/CHC has a main centre to be manned by one CHO, two Health Supervisors (Male & Female). The main centre compiles the reports from the sub-centres and supervises the works of the two Health Workers (Male & Female) in a sub-centre.

Table 5 : Standard staffing pattern of PHC and CHC

Designation of Staff	PHC	CHC
Medical Officer	1	4
Pharmacist	1	1
Nurse and Mid-wife	1	7
Dresser	1	-
Health Worker (Female) /ANM	1	-
Block Extension Educator	1	-
Health Assistant (Male)	1	-
Health Assistant (Female)/LHV	1	-
Radiographer	1	-
UDC	1	-
LDC	1	-
Lab. Technician	1	-
Driver	1	-
Class IV	4	-
Bed strength	10	30

While the population served is much less than the normal pattern in the PHCs and CHCs shortfall and excess in manpower can be seen from the two tables.

While Sakawrdai CHC with 30 beds is functioning as PHC, there is deficiency of Medical officers with/without specialities in Saitual CHC.

Functions of CHCs, PHCs and sub-centres:

Activities of CHCs, PHCs and Sub-Centres are listed below :-

- Medical Care
- MCH including family planning
- Safe water supply and basic sanitation
- Prevention and control of locally endemic diseases.
- Collection and reporting of data
- Education about health
- National programmes
- Referral services
- Training
- Basic laboratory services.

Health Infrastructure of Aizawl East District: The health care institutions in the district are given below.

Table 6: Health Care institutions in Aizawl East -

Institution	Number
District Hospital	-
District TB Centre	-
CHC	2
PHC	5

There is no district hospital or District Tuberculosis Centre (DTC) in Aizawl East. The DTC, which was once under the district, was placed under Aizawl West District just recently.

Organizational structure:

Chief Medical Officer - District level

District Immunization Officer

↓

Medical Officer - CHC/PHC level

Community Health Officer ↓ Health Supervisor

Health Worker - Village level

The Chief Medical Officer (CMO) of Aizawl East District holds the overall responsibility for all the health care activities in the district. The National Programmes are managed by the CMO and assisted by the District Immunization Officer (DIO) both functioning from the same district office at Aizawl. At the CHC and PHC levels the Medical Officer is in change of all the health care activities and all report to the CMO directly. At the sub-center level, the male and female health worker carry out the health care activities and they report to the Medical Officer of the PHC/CHC through the Community Health Officer and the Health Supervisor of the CHC/PHC main centre.

C. Health Man-power profile:

Table 7: Average staffing pattern at PHC level, Aizawl East District,2002

Staff	Number
MO	1
Health Supervisor	2
Health Worker	10
Pharmacist	1
Staff Nurse	3
Lab. Technician	1

Table 8: Current Health manpower profile, Aizawl East District, Mizoram, 2002.

Category	Post sanctioned	Post filled	Post vacant	Shortfall
Health Worker	74	70	4	4
Health Supervisor	14	12	2	2
Doctors	9	8	1	1

Source : Pay Roll register, Aizawl East (2003)

D. Disease profile:

The major health problem as seen from the district monthly reports during 2001-2002 and 2002-2003 are stated below:

Table 9: Disease profile in Aizawl East District, 2001-2002 and 2002-2003

Name of disease	*No. of cases (%)*	
	2001 – 2002	2002 – 2003
Acute diarrhoeal Diseases	2210 (11.78)	2177 (26.22)
Respiratory tract infections	2491 (13.28)	1518 (18.28)
Tuberculosis	77 (0.41)	16 (0.19)
Measles	16 (0.08)	3 (0.03)
Viral hepatitis	116 (0.61)	51 (0.61)
Malaria	4023 (21.45)	993 (11.96)
Malignancy	16 (0.08)	15 (0.18)
Nutritional deficiency	1628 (8.68)	993 (11.66)
Conjunctivitis	1635 (8.71)	569 (6.85)
Otitis media	698 (3.72)	187 (2.25)
Ulcer of stomach and duodenum	3865 (20.61)	1213 (14.61)
Urinary tract infection	1396 (7.44)	393 (4.73)
Diabetes	219 (1.16)	90 (1.08)
Hypertension	18 (0.09)	4 (0.04)
Accidents	343 (1.82)	80 (0.96)
Total	**18751**	**8302**

E. Disease surveillance system in Aizawl East District: There are four major disease surveillance programmes and one sentinel surveillance in the district. These are:

i) Weekly disease surveillance system for epidemic prone diseases like Cholera, malaria and acute flaccid paralysis.

ii) Monthly reporting of communicable diseases.

iii) Hospital-based surveillance of disease conditions.

iv) Surveillance for diseases of vertical programmes- TB, malaria, leprosy and others.

There is sentinel surveillance for HIV/ AIDS in the state, but no center in the Aizawl East district.

Except for National Programmes like TB, malaria, leprosy, vaccine preventable diseases (VPDs) and others, no proper case definition is available at the grass-root level. Also, there is no separate register kept for recording case detection. Integrated Disease Surveillance Project (IDSP) is being taken up for implementation and apart from core diseases, the state- specific diseases are – acute lower respiratory tract infection, psychotic and mental disorders, and substance abuse. The programme involves private institutions as well.

F. Disease of outbreak potential: Diseases of outbreak potential in the district are similar to those in other districts of the state. These are acute diarrhoeal diseases, respiratory tract infection and malaria is still endemic in the district as is the case in the whole state .

Recent outbreaks in the district:

a) An outbreak of influenza: There was an outbreak of influenza during June, 2002 at Darlawn village under Darlawn Primary Health Center reported by the Block Development Officer. A medical team was sent from Aizawl and the clinical features were- cough and sneezing with fever. The whole village and the neighbouring villages were affected. It was diagnosed as influenza although

not confirmed in the laboratory. The situation was prevented from getting worse and limited on its own being of viral origin.

b) An outbreak of acute bloody diarrhoea: Mauchar village, under Sakawrdai PHC, was affected with acute bloody diarrhoea during June, 2003 and investigated in collaboration National Institute of Cholera and Enteric Diseases, Kolkata. The causative organism was found to be Shigella type I in the stool culture. Timely intervention brought the outbreak under control and there was no mortality.

V. Other linked sectors

A. Water sanitation: The situation of water supply under different blocks of the Aizawl East district is summarized in table 10.

Table 10: Source of water supply system in Aizawl East District, Mizoram, 2002.

Block	No. of Public Water point	No. of drilled Water point	No. of water connection
Darlawn	203	38	-
Phullen	64	13	-
Thingsulthliah	286	34	88
Total	553	85	88

Source : Block Statistics (2001), Economics and Statistics Department, Government of Mizoram

B. Waste disposal: The Mizoram town and Sanitation Rules, 1980, came into force for the maintenance of systematic handling of sanitation problems. However, the sanitation with respect to waste disposal is being handled by sanitation committee at village level chaired by the President of Village Council. No systematic recording the activities of the committee is not presently available. In some villages, dug- pit is used to dump garbage as advised by the local administration department. The method is being implemented through awareness campaign by the department.

C. Educational facilities:

Table 11: Educational facilities in Aizawl East District, Mizoram, 2002.

Block	College	Higher secondary	High School	Middle School	Primary School	Others
Darlawn	-	-	14	27	52	-
Phullen	-	-	6	17	20	-
Thingsul	1	1	20	36	47	5
Total	1	1	40	80	119	5

Source : Block statistics – 2001, Eco. & Stat., Mizoram

D. Integrated child development projects (ICDS): Three ICDS projects operate in the Aizawl East district – Thingsulthliah, Darlawn and Ngopa projects running 149 Anganwadi Centres in 58 villages. Pre-school education, supplementary nutrition and health care are the highlights of the scheme.

E. Non-Governmental Organisations (NGOs): Big NGOs such as Young Mizo Association, MHIP (Mizo Women Association) MUP (Senior Citizens Association) and others are very active with various issues including health related problems and promotion of health. They are being utilised as channels by various government departments.

Discussion:

Aizawl district, one of the eight districts of Mizoram, is geographically, socially and economically not distinctly different from other parts of the state. Several non-governmental organizations several government sectors work together for the promotion of the people's health in the district.

The office of the Chief Medical Officer, Aizawl East District, is situated at Aizawl, the state capital which, however, is not under the jurisdiction of the Aizawl East health administration, while the rest of the health set up are located outside Aizawl.

There are no private hospitals or laboratories in the district. Most of the Primary Health Centers (PHCs) have shortage of staff in their areas as well as in the PHCs themselves. Important and vital posts like that of microscopists lie vacant in three of the health centers. The total number of posts lying vacant at present (April, 2003) is 34, including posts like drivers and group D staff). Laboratory services are inadequate even where laboratory technicians are posted mainly due to lack of laboratory instruments or reagents, the reason behind this being the financial constraint faced by the state. However, with the implementation of NSPCD and Integrated Disease Surveillance Project (IDSP) in the state, the problems related to laboratory services would be lessened in the near future at least during the period of funding from outside.

The disease profile shows acute diarrhoeal diseases, respiratory tract infections and malaria form the major health burden among communicable diseases. Ulcer of the stomach and duodenum, and nutritional deficiency are the health burden in the non-communication diseases. Other non-communicable diseases such as diabetes and hypertension show increasing prevalence as an emerging disease still occupy the lower rank in disease frequency, which may be due to lack of proper screening in the population.

Most of the diseases covered in the national programmes are under passive surveillance. There is sentinel surveillance site for HIV in the district. RNTCP was launched in February 2003 and the microscopic centers submit their quarterly reports to the District Tuberculosis Center (Aizawl West) at Aizawl. IDSP and NSPCD are being implemented.

Influenza and acute diarrhoeal diseases still show outbreak potential and malaria is endemic in spite of the marked reduction in the number of cases (4023 cases in 2001-2002 to 993 cases in 2002-2003).

There is room for improvement in water and sanitation disposal system in the district. Monitoring of the system from other government sector like local administration is advisable for the improvement.

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Details of Laboratory support in Aizawl East District, Mizoram

I. Introduction:

An effective surveillance system is essential for planning, implementation and monitoring of disease control programmes. A reliable surveillance system can detect the trends in the occurrence of many diseases, which may be seasonal or cyclical in nature. Prevention and control of important disease can be planned realistically only if the exact magnitude of the disease is accurately projected based upon laboratory results. Also, laboratory results are necessary for the confirmation of the cases in outbreak situations for effective intervention. High quality laboratory services play a vital role to reduce mortality and morbidity and the cost of providing health services. Isolation, identification and characterization of the pathogens form an integral part of disease surveillance system.

Suitable laboratory infrastructures like buildings, space, equipments, reagents, manpower development and training programmes are necessary to tackle emerging and re-emerging diseases besides the current health problems. Moreover, well-established functional linkages between various laboratories as well as good electronic communication system are equally important.

Linkages of laboratories at all levels are vital to have complete information at the state and national levels for efficient use of relevant information for control and prevention of communicable diseases and feedback.

II. Objectives:

The objectives of the study are to: -

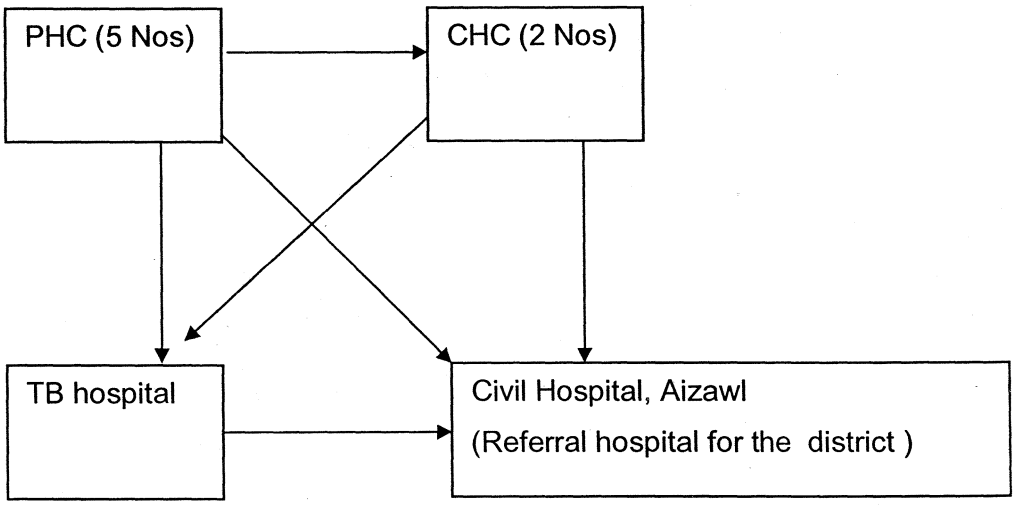
- Assess the situation of laboratory facilities available in the district
- Identify networking links and partnership among the different laboratories in outbreak and disease surveillance
- Prepare checklist of laboratory facilities available in the district using secondary data or information available

III. Laboratory facilities in the district:

There are two Community Health Centers (CHCs) and five Primary Health Centers (PHCs) in Aizawl East district. One laboratory technician is posted in each center except in Sakawrdai CHC where an additional laboratory assistant is posted. District hospital does not exist in the district. Majority of the referred cases attend Civil Hospital at Aizawl.

A separate laboratory room is available in each of the PHC or CHC. The laboratories at four PHCs namely, Suangpuiulawn, Sakawrdai, Darlawn and Thingsulthliah have been upgraded under the Revised National Tuberculosis Control Programme (RNTCP) to function as Microscopic Center (MC).(Figure 1)

Figure 1. Flowchart of Government–owned Laboratories in Aizawl East, Mizoram



Manpower availability in each of the PHC /CHC of the district is given in table 1.

Table 1.Manpower availability in laboratories of PHC/CHC in Aizawl East

Name of PHC/CHC	No. of Laboratory Technician	Laboratory Assistant	Microscopist
Thingsulthliah PHC	1	-	-
Saitual CHC	1	-	1
Phuaibuang PHC	1	-	-
Sakawrdai CHC	1	1	-
Darlawn PHC	1	-	1
Suangpuuilawn PHC	1	-	1
Khawruhlian PHC	1	-	-
Total	7	1	3

In spite of the enormous number of tests expected to be carried out as stated in the form for monthly reporting, the number of tests that were actually performed in the field is much less. A total of 5529 tests were performed (Table- 2). At the same time, some routine tests that should be possible to carry out are not done owing to lack of reagents even at the Central Medical Stores at Aizawl, mainly due to state budgetary constraints in the health sector. This indicates that whenever an outbreak occurs, each center has to depend on the laboratory services of Aizawl Civil Hospital, which is already overburdened with work- load.

Table 2. Performance of the laboratories in Aizawl East district during September 2002-February2003

Name of tests	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Total
Blood routine	29	2	12	-	-	-	43
Stool routine	2	1	1	-	-	-	4
Urine routine	70	6	20	23	27	45	191
Sputum for AFB	-	10	5	5	1	6	27
ESR	20	1	4	-	-	-	25
TLC	19	1	4	-	-	-	24
DLC	20	1	4	-	-	-	25
Haemoglobin	30	-	3	1	1	2	37
Total RBC	-	-	-	-	-	-	-
Bleeding/Clotting time	1	-	1	-	-	-	2
Blood for MP	2306	893	766	307	268	612	5152

IV. Laboratory networking:

At the moment, there is no established networking except for the cases referred to Civil Hospital, Aizawl from the PHCs and CHCs . Cases are also referred to District Tuberculosis Hospital, Aizawl West District. There is hardly any feedback even in such instances. Hence, there is no networking facility for testing and confirming the diagnosis in times of outbreaks except for isolated cases like suspected AFP for polio.

In the context of diseases of break potential in the district, the investigator identified through interview, the willingness of the hospitals to avail laboratory facility and services in the following places:-

1. Civil Hospital, Aizawl (Government)
2. Durtlang Presbyterian Hospital (Church)
3. Greenwood Hospital (private)
4. New Life Polyclinic (private)

Except for Civil Hospital, all the hospitals/clinic agreed to participate on the condition that service and facilities are to be charged. The tests available at the laboratories of the above hospitals/clinic are given in table-3.

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Table 3. Type of tests available in the laboratories of hospitals/clinic identified for networking

Nature of work	Tests done
A. Microscopy	1.Blood – Complete haemogram, blood smear for malaria parasite 2.CSF: staining for Meningococcal meningitis 3. AFB from sputum 4. Throat swabs- diphtheria and streptococci staining 5. Gram staining of pus and exudates 6. Stool examination for ova and cysts 7. Urine microscopy
B.Clinical biochemistry tests	1. Liver and kidney function tests (using auto analyzer) 2. Lipid profile 3. Estimation of T3 and T4 levels 4. Blood sugar
ELISA	1. HIV testing (not available in New life polyclinic)
Culture	Cholera, Salmonella, etc

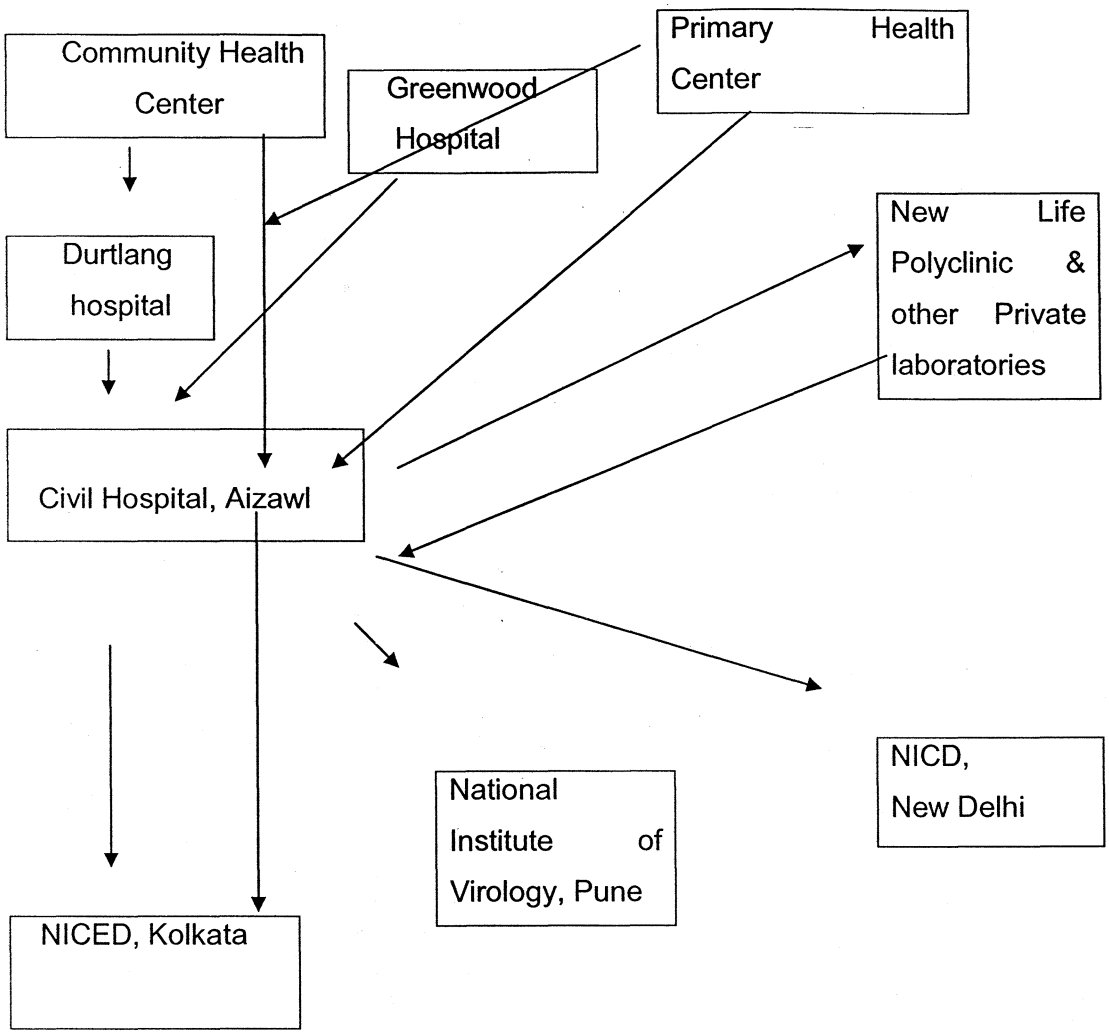
The manpower and workload at these laboratories are given in table 4.

Table-4: Manpower availability and workload at laboratories identified for networking, 2002

Laboratory	No. of specialists available	Laboratory Technician	Laboratory assistant	Work load per day
Civil Hospital, Aizawl	Pathologist-3 Microbiologist-2	4	6	72
Durtlang hospital	Pathologist-1	6	2	50
Greenwood hospital	-	2	-	10
New Life Polyclinic	Pathologist-1	3	1	10

Laboratory networking for Aizawl East District health care is suggested as mentioned in the figure 2.

Figure 2. Current laboratory net working in Mizoram including Aizawl East District.



The state government is yet to take concrete step for establishment of laboratory linkages through agreement for specific tests which are not available in the state. Except for the standard guidelines received from the Ministry of Health and Family Welfare in connection with the laboratory services for detection of polio viruses, there is no established laboratory linkage or networking in the state. It is, therefore, necessary to identify the different national reference laboratory and establish networking at the earliest.

V. Summary

In spite of the existence of laboratory at each and every Primary or Community Health Center in the Aizawl East District, the role being played by these laboratories are negligible in times of outbreak due to deficiency qualified manpower and facilities. The laboratory services in these centers are mainly concerned with the endemic diseases like malaria and certain other blood tests like hemoglobin, erythrocyte sedimentation rate or normal urine tests. This is an example of manpower wastage since the same could be better utilized with further training in the laboratory technique and supply of necessary logistics for the tests. The present scenario is such that even with the limited training they have received earlier, there are times when their services could not be utilized owing to short supply of reagents for the routine tests.

The referred cases from the periphery attend Civil Hospital, Aizawl or some of the private hospitals or polyclinics in Aizawl for laboratory investigations and treatment of their illnesses. The final diagnoses of their ailments are hardly ever reported back to the health centers to which they belong. The various privately owned laboratories in Aizawl city indicated their willingness to fill the gap in their respective capacities in times of outbreak offering utilization of special tests available at their laboratories but on the condition that the necessary expenditure towards chemicals or instruments may be suitably met. The present status of laboratory linkage in the district as well as in the state is not satisfactory and needs immediate strengthening for timely detection of the causative organisms in outbreak situations for effective control of the same.

VI. Recommendations

The following recommendations are made in view of the present laboratory scenario in the state:-

1) The laboratories in the peripheral health centers should be strengthened in terms of manpower development and supply of reagents and other laboratory facilities so that they can function to the maximum capacity in spite of their own limitations.

2) The laboratory at Civil Hospital, Aizawl, which is the first referral center need further strengthening especially in serological tests such as immunoassay and culture of microorganisms and their sub-typing.

3) A properly placed laboratory networking should be established for prompt diagnosis of the diseases for which the facilities are not available in the state.

Description of the existing surveillance system in Aizawl East District, Mizoram, 2003

I. Introduction:

Surveillance is the on-going systematic collection, collation, analysis and interpretation of data and the dissemination of information to those who need to know in order that action may be taken. Detection of disease, as when and where it occurs, and its clustering are essential for disease control. Surveillance is particularly important for early detection of outbreaks of diseases, and in the absence of surveillance, disease may spread unrecognized and the opportunity to take timely intervention may be missed. A good surveillance system in place should, in fact, be able to predict disease outbreak in the community.

Systematic surveillance is also required in the process of eradication of disease. For example, surveillance of acute flaccid paralysis (AFP) is necessary in every part of the country for eradication of the disease. With the alarming increase of non-communicable diseases for which interventions are necessary may also be included in the surveillance system. The surveillance system focuses mainly on the diseases covered under the national programmes. There is on-going sentinel surveillance for HIV/AIDS in the state of Mizoram but the district of Aizawl East has no site for HIV sentinel surveillance.

Mizoram has been identified for the implementation of Integrated Disease Surveillance Programme (IDSP). In addition to the core diseases covered for surveillance in IDSP, the state specific diseases that are included for surveillance for Mizoram include acute respiratory tract infection with pneumonia below five years of age, mental disorders, and substance abuse. The programme, however, is yet to be implemented at the district level. The National Programme for Communicable Diseases (NSPCD) is being taken up with zeal at the moment.

II. Objectives:

- To describe the existing disease surveillance system in the district
- To identify the prevailing constraints
- To suggest means of strengthening the current surveillance system in the district

III. Methods:

- Informal discussion or interview with health care personnel
- Access to available registers, records and monthly reports at various health centers

IV. Description:

The major disease surveillance programmes in Aizawl East District are: -

A. Weekly diseases surveillance for epidemic prone diseases — cholera, malaria

B. Monthly reporting other communicable diseases

- Acute diarrhoeal diseases
- Acute poliomyelitis
- Acute respiratory tract infection
- Enteric fever
- Gonococcal infection
- Diphtheria
- Japanese encephalitis
- Meningococcal meningitis
- Measles
- Neonatal tetanus
- Other tetanus
- Pulmonary tuberculosis
- Rabies
- Syphilis
- Pneumonia
- Whooping cough
- Viral hepatitis

C. **Hospital –based surveillance of disease conditions on monthly basis**

D. **Surveillance for diseases under vertical control programmes**

- tuberculosis
- malaria
- leprosy
- vaccine preventable diseases
- HIV/AIDS

The reports of these diseases are prepared and submitted every month.

V. Reporting system:

A. Weekly reporting of cholera is done at the PHC and CHC levels and a separate reporting format is used for the disease and sent to the district office.

B. Monthly reporting other communicable diseases: The aggregate data are entered in uniform format at PHC level and submitted to the district office.

C. Hospital –based surveillance of disease conditions: A common report form is used in the whole district and submitted to the district office every month within a specified period.

Separate forms are used for reporting of vertical diseases for monthly submission to the district office. Besides these diseases, other diseases reported using separate forms are:-

- Japanese encephalitis
- Gastro-enteritis including cholera
- Sexually transmitted diseases
- Rabies
- Kala azar
- Acute respiratory infection in children
- Dog bites including other animal bites such as snakebite, rat bite, and
- Bite of any other animals.
- Monthly report of cancer is also done.

The disease reporting system and surveillance related activities carried out at different levels are summarized in table-1 and 2.

Table1. Disease reporting system Aizawl East District Health care set up, 2002

Level of reporting	Reporting personnel	Reporting period	Diseases covered in the reporting system
Sub-center	ANM Multipurpose Health Workers	16th -20th days of the month	- Vaccine Preventable Diseases (VPDs) - Acute Respiratory Infections including pneumonia in children up to 5 years - Acute diarrhoeal diseases in children up to 5 years - Malaria, Tuberculosis
PHC/CHC level	Health Supervisors, Pharmacists	21st -25th day of every month	- Weekly reporting of cholera - Monthly reporting of 16 communicable diseases -Monthly reporting of Japanese encephalitis, Gastro-enteritis with cholera, STDs, Rabies, Kala azar, - ARI in children, Animal bites, Cancer cases - Monthly epidemiological report of malaria - Monthly hospital report of 65 diseases conditions - Quarterly reporting of RNTCP to District Tuberculosis Center (DTC)
District Level	District Statistician	26th day of the month onwards	Compilation of the monthly and weekly reports from 5 PHCs and 2 CHCs

Table 2: Surveillance activities carried at different levels, Mizoram

Level	Surveillance activities
Peripheral level: (Sub-center, PHCs, CHCs)	▪ Clinical diagnosis ▪ Case management ▪ Reporting of cases
Intermediate level (District level)	▪ Compilation of data (no analysis or limited analysis) ▪ Investigation and Control of outbreaks ▪ Evaluation of peripheral (PHC) team- more of supervision
State level Directorate of Health Services	▪ Data analysis (not action oriented) ▪ Hardly any feedback to the periphery

VI. Existing situation of epidemic investigation:

There are no rumor registers in the PHCs or CHCs in the district. Suspected out break of any disease is mainly brought to the notice of the higher authorities prior to informing the concerned health officers except in special cases. The opinion of the health worker is hardly ever taken at times causing embarrassment on their part.

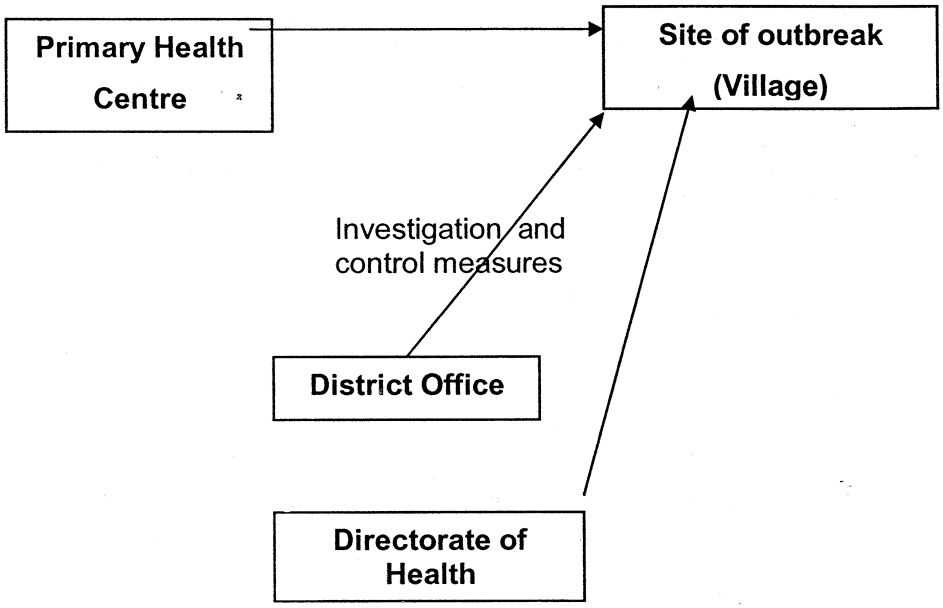
Rumors, once brought to the notice of the health or civil authorities, are often accepted as fact even before verification. An outbreak investigation team is usually sent to the reported site from the district and even at the level of the Directorate of Health Heath Services. At times, the rumour, usually baseless, is directly brought to the notice of the Minister Health and Family Welfare and resulted in prompt action from the office of the Directorate of Health Services or at the District level.

Laboratory support is usually lacking for most of the outbreak investigation to confirm the diagnosis. Exception could be peripheral blood smear examination

for malarial parasites at the field situation and no extra effort is generally spared for the laboratory confirmation of the confirmation of the causative organisms.

The aim of the investigation team is usually more of appeasing the public and dutiful fulfillment of instruction from the higher authorities as, sometimes, the outbreak report is perceived as politically motivated by the investigating team. Nevertheless, investigation had to be carried out even with discouraged mood.

Figure 1. : Epidemic monitoring system in Aizawl East, Mizoram, 2002



VII. Laboratory infrastructure:

Laboratories of the PHCs and CHCs play limited role in the investigation of outbreaks. No facilities are available for transport of laboratory specimens to the reference laboratories inside and outside the state. Table 3 gives the various laboratory tests available in the district:

Table 3. Availability of tests available in Aizawl East District, Mizoram

Category	Tests available
PHC	Hemoglobin, sputum for AFB, Blood for Malarial parasites
CHC	Hemoglobin, sputum for AFB, Blood for Malarial parasites
District	No district hospital or laboratory

VIII. Training facility:

There are no training facilities available in the District for development of manpower in the health sector. Most of the training activities are conducted in Aizawl, the state capital of Mizoram, at the Directorate of Health Services.

IX. Role of private health sector:

Being a rural district, there are no privately owned laboratories in the District. Also, there are no private hospitals or practitioners to participate in surveillance activity or outbreak investigations.

X. Results and discussion:

X.1 Core activities of the system: The core activities of the system in surveillance of diseases and the response are mentioned below :-

X.1.1 Case detection: Table 3 gives the activities in case detection.

Table 3.Surveillance activities in case detection, Aizawl East District.

Activity	Epidemic prone diseases	Other communicable disease	65 disease conditions	Diseases of National Programmes
Case definition	x	x	x	v
Use of case definition where present	_	_	-	X
Register for case detection	Indoor and out-door registers	Indoor and out-door registers	Indoor and out-door registers	v
Manual for case management	x	x	x	v
Whether reporting units are clearly defined	v	v	v	v

X.1.2 Case confirmation: Suspected cases are hardly ever confirmed except for malaria and tuberculosis. Diagnosis of cases usually ends at the stage of clinical examination due to non-availability of laboratory facility with manpower. Thus clinical diagnosis plays a vital role in counting of cases.

X.1.3 Recording of cases: Cases are recorded in the registers kept at the sub-centers, indoor and outdoor registers of the Primary Health Centers (PHCs) and Community Health Centers (CHCs) of the district usually without laboratory confirmation.

X.1.4 Reporting: The aggregated data prepared at the PHC and CHC levels are reported during a specified time period fixed for different levels of reporting. Failure to submit in time usually results in getting reminders from the district office . Further negligence may force the district office to withhold the salary of the staff of the defaulting center for the particular month.

Monthly reports are scrutinized at the district level for completeness and accuracy. Incomplete or faulty reports are either sent back to the reporting center for correction or the responsible staff asked to attend the district office.

X.1.5 Data analysis and interpretation: The reports are compiled at the district office by inspector of statistics who is deputed from the Department of Economics and Statistics. There is hardly any analysis at the district office except for malaria, which is also quite limited. Data interpretation is almost non-existent since it takes analysis for interpretation.

X.1.6 Feedback and dissemination : Regular feedback on data to the reporting units is not a custom at the district level. Feedback and dissemination of the outcome of the reports occasionally takes place when there is any striking event takes place or when there is quarterly review meeting at the district level.

X.1.7 Support functions: Training and supervision takes place as need arises due to resource constraint. Computers are installed at the district office.

Laboratories have negligible role in the surveillance system due to various shortcomings.

XI. Discussion :

The strengths of the surveillance system are: -

1. Availability of established disease surveillance system in the district
2. Availability of manpower, infrastructure and establishment of health centers
3. Communicable diseases are reported on monthly and weekly basis
4. Time period fixed for submission of reports for various levels during the month
5. Reporting channels are well-defined with responsibilities.

However, the system has several weaknesses, which need strengthening.

A. Reporting system:

1. Lack of uniformity in case definitions at different levels or lack of awareness even when present.

2. Dual reporting of different diseases in the surveillance system under different programme activities.

3. The weekly reports for cholera lacks data from the most peripheral part of reporting i.e., the sub-center. The data are collected at the Primary Health Center levels.

4. Transfer of information is by road only through the center staff. Delay in submission affects the integrity for early action.

5. The process of implementation of NSPCD and RNTCP are delayed owing to technical problems.

B. Analysis and interpretation:

1.The analysis of data is limited at the district level and no-existent at the PHC level.

2. Motivation, tools, knowledge and skills for analysis of data are not prominent among the various reporting centers.

C. Laboratory:

1. Only limited number of tests are available in the various center laboratories such as peripheral blood smear examination for malarial parasites,, sputum for AFB for detection of pulmonary tuberculosis.
2. Facility for transport of field specimens is lacking at all levels, which affects the confirmation of cases in outbreak investigations.

D. Response mechanism:

1. There are no rapid response team available at the moment (April 2003).This leaves no option but to select or detail members to investigate outbreaks after the occurrence with limited capacity in supplies relevant in the response . Man power development in outbreak investigation is also lacking at the moment .
2. Manuals and guidelines for response mechanism for various diseases conditions are few and under utilized even for the specific diseases.

XII. Recommendations:

The following recommendations are made in view of the strengths and weaknesses of the existing disease surveillance in the district :-

a. Establishment of clear and simple case definition which could easily be utilized even by the workers at the periphery.
b. Even nil report for weekly report of cholera should be included in the PHC reports.
c. Dual reporting of the same disease should be minimized as far as possible.
d. The laboratories at the PHC and CHC levels should be strengthened for immediate response to any outbreak for confirmation of the diagnosis. Availability of transport media and instruments would ease and change the present scenario of outbreak investigation and even for confirmation of isolated cases.
e. Clearly defined laboratory networking should be established for timely diagnosis and action.

f. Training and motivation of medical officers at PHCs and CHCs and senior officials at the district is recommended to get the surveillance data analyzed immediately for timely action when need arises.

g. Early and successful implementation of NSPCD and IDSP is mandatory for the surveillance system to be more effective and to function with better results.

h. Rapid response team should be formed with responsibilities defined and training imparted immediately. Periodic review meeting of the team members would strengthen the response mechanism in outbreak situation.

Secondary data analysis: Tuberculosis in Aizawl East District, Mizoram

1. Introduction

Tuberculosis remains a public health problem worldwide despite the discovery of the causative organism more than hundred years ago. Every year about eight million people develop tuberculosis. The global burden of the disease in terms of DALYs lost was about 35.79 million (1). The cases of tuberculosis in developing countries account for about 95% and the South East Asian Region accounts for 38% of the world's burden of tuberculosis (2). Eight out of 10 cases of TB in these countries in the economically- productive age group of 15-49 years and tuberculosis kills more adults than any other disease (2).

India accounts for nearly one-third of the global burden of tuberculosis (3). An estimated 2.2 million persons develop tuberculosis of which about one million are new smear positive cases. In addition, about 500,000 people die of tuberculosis in India each year (3). We analyzed the secondary data of Revised National Tuberculosis Control Programme (RNTCP) in Aizawl East District of the Health Department with following objectives:

Objectives:

The objectives of secondary data analysis were to

- analyse at the trends over time
- describe the capacity of the district health resources to address the public health problem due to tuberculosis and manage it in an effective way.

2. Methodology

2.1 Study design: A retrospective study of all available registered cases of tuberculosis in Aizawl District Tuberculosis Center, pertaining to patients from Aizawl East District area.

2.2 Study area: Aizawl East District area, which comprises of two Community Health Centers and five Primary Health Centers.

2.3 Study population: the population of Aizawl East District

2.4 Study period: July –August 2003.

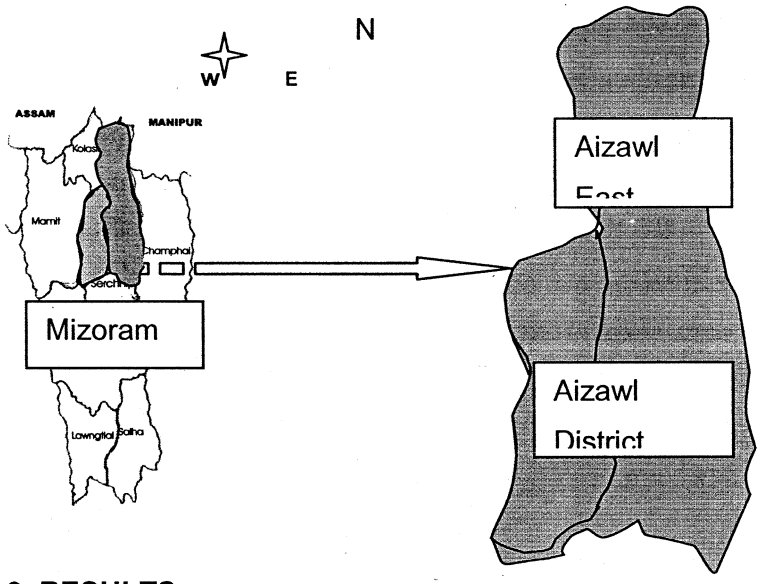
Source and quality of data: The secondary data from patient registers and out door registers were collected from the District Tuberculosis Center (DTC), Aizawl. The investigator faced no difficulty in access to the data source. However, prior verbal permission from the District Tuberculosis Officer, Aizawl District was obtained. The DTC caters to tuberculosis cases from all over the state besides those from within Aizawl District. This is attributable to the concentration of the largest number of Medicine specialists at Aizawl. The biggest referral center, Aizawl Civil Hospital, also has close proximity to DTC and TB hospital at Zemabawk, about nine kilometers from Aizawl. As all cases are recorded in the same register (no separate register maintained for Aizawl East District), the investigator had to pick up cases belonging to Aizawl East District from the addresses of the patients given in the registers. Many of the patients recorded in the register did not give their permanent address (no mention of the names of their own villages), the case recorders neither insisted nor attempted to extract the correct addresses to get reliable information. As such, it may be presumed that a good number of cases would be missed out in the course of collection of the cases for Aizawl East District in spite of taking utmost care to get all the cases.

The District Tuberculosis Center was shifted from Aizawl to Zemabawk near TB Hospital sometime before the collection of secondary data due to new construction works. A large number of valuable documents, including past registers and patient's cards were lost during the process This became a stumbling block to complete data analysis in an ideal and more proper manner.

In spite of the availability of the mid-year population of Aizawl East District in the Directorate of Health Services, age and sex population break up were not available or if al all unreliable as observed by the scholar. Therefore, the population break up by age and sex was determined by using the proportions presented by the Government of India (1998), Health Information of India, 1995 & 1996, Director General of Health Services, New Delhi. Also, the male: female sex

ratio for Mizoram, 51.67% for males and 48.33% for females, was derived from the latest census report for Mizoram, 2001 (Census of India 2001, Series 16: Mizoram, Final population totals, Director of Census operations, Mizoram, Aizawl). Hence, it is admitted that the figures projected in the results section of the analysis do not necessarily reflect the actual or accurate figures but the method adopted was the only way to get the results for want of information at any level of the establishments under study.

Figure 1. Map of Mizoram showing location of Aizawl District



3. RESULTS

The Aizawl East District population is not presented separately in the census or other population reports as such because the District still combined with Aizawl West District and both form one administrative area known as Aizawl District. The district is divided into East and West in the Health sector only for convenience and uniformity of administration for better delivery of the health services to the public. The characteristics of the population of the district are presented in Table 1.

Table 1. Mid-year population of Aizawl East District by age and sex, 1999-2002.

Year	0-4			5 – 14			15 – 44			45+		
	M	F	T	M	F	T	M	F	T	M	F	T
1999	15295	14818	30113	30578	28158	58736	54335	51312	105647	21398	19413	40881
2000	14914	14449	29363	29816	27456	57272	52981	50034	103015	20865	18929	39794
2001	11650	11286	22936	23290	21446	44736	41385	39082	80467	16298	14786	31084
20002	6139	5948	12087	12274	11303	23577	1811	20598	42409	8590	7793	16383

Table 2. Total cases of tuberculosis by sex, Aizawl East District (1999-2002)

Year	Male	Female	Total
1999	55	35	90
2000	47	28	75
2001	60	22	82
2002	32	36	68

Except for the year 2002, males seemed to be more affected than females in the district as evident from Table 2. In 2002, the case rate for the sexes took opposite turn. There was a 4.78 case rate / 1,00,000 population difference in favour of females. (Male :female =33.87:38.11) The yearly increase in the number of cases could possibly be due to comparatively peaceful political atmosphere of the district as well as the state. This seemed to result in the in-migration of population from the neighbouring states as well as from Myanmar and even Bangladesh. Explanation for the occurrence of large number of cases in 1999 could be made from the fact that there was an interracial clash in Assam and Manipur and people from these states entered Mizoram for security and shelter temporarily or otherwise. The decline in the number of cases the following year could be the result of return of many of the people from outside to their home states. This, however, is an explanation based on assumption and not documented.

The case-rate of tuberculosis in 1999 was 38.24 per 1,00,000 population in the district decreasing by 5.56 in 2000 from which it was increased to 45.74 in 2001 and became almost double the rate of 2000 in 2002 (Table 3)

Table 3. Case rate of tuberculosis per 1,00,000 population by sex in Aizawl East District, (1999-2002)

Year	Male	Female	Total
1999	23.37	14.87	38.24
2000	20.48	12.20	32.68
2001	33.47	12.27	45.74
2002	33.87	38.11	71.98

Table 4. Comparison of case rate of tuberculosis in Aizawl East District with Mizoram (1999-2002)

Year	Aizawl East	Mizoram
1999	38.24	150.3
2000	32.68	149.7
2001	45.74	N.A*
2002	71.98	N.A*

*N.A = Not available

From table 4, one can see the case rate of tuberculosis per 1,00,000 population in Aizawl East District was extremely low compared with that of the state level for the two years, 1999 and 2000. The case rate for 2001 and 2002 was not available at the state level. However, it is presumed that the case rate for these two years would not be any different judging from the rates of the previous two years, 1999 and 2000. The reason for the low case rate in the Aizawl East district may be attributed to the fact that many of the cases of the district were lost at the time of registration whereby the patients did not give address of their place of origin but those of the relatives or friends with whom they stayed. For this reason, the data analysis is likely to project lower case rate for the district for each year of the study period.

Table 5 shows the case rate per 1,00,000 population of tuberculosis in Aizawl District by year and type. Pulmonary tuberculosis formed the larger part of the total cases compared to extra-pulmonary tuberculosis cases through out the study period (1999-2002).

Table 5.Total cases of Tuberculosis by type and year, Aizawl East District, 1999-2002

Year	Pulmonary tuberculosis			Extra-pulmonary tuberculosis	Overall
	Sputum Positive	X-ray positive	Total		
1999	17	43	60	30	90
2000	14	34	48	27	75
2001	23	27	50	32	82
2002	26	20	16	22	68

Among the pulmonary tuberculosis cases, more number of cases were diagnosed with chest x-ray with the exception of the year 2002. After a drop by 1.2 case rate per 1,00,000 of sputum positive cases in 2000, the sputum positive cases showed increasing trend , more than a two-fold increase each year from 2000 to 2002. There was an overall increase of each category in an alarming proportion as demonstrated in table 6.

Table 6. Total case rate per1,00,000 population of tuberculosis in Aizawl East District by year and type, 1999-2002.

Year	Pulmonary tuberculosis			Extra-pulmonary tuberculosis	Overall
	Sputum Positive	X-ray positive	Total		
1999	7.30	13.32	20.62	18.48	39.10
2000	6.10	10.89	16.99	15.69	32.68
2001	12.83	17.29	30.12	15.62	45.74
2002	27.52	23.29	50.81	21.17	71.98

Table 7. Percentage of total reported cases of tuberculosis by sex and type in Aizawl East District, 1999-2002

Year	Pulmonary tuberculosis						Extra-pulmonary tuberculosis		
	Sputum Positive			X-ray Positive					
	Male	Female	Total	Male	Female	Total	Male	Female	Total
1999	13.0	5.6	18.6	20.0	13.3	33.3	27.8	20.0	47.8
2000	14.7	4.0	18.7	32.0	16.0	48.0	16.0	17.3	33.3
2001	24.4	4.0	27.4	20.7	13.4	34.1	28.0	9.8	37.8
2002	9.11	19.1	38.2	7.4	22.1	29.4	20.6	11.8	32.3

Figure 7 shows that there were more cases of tuberculosis diagnosed by sputum and x-ray for males than for females with the exception of the year 2002, where the percentage of diagnosis by sputum examination was equal for males and females. There was a drastic decrease in the number of case detected by x-ray of the chest for males while the same increased abruptly for females. The detection extra-pulmonary tuberculosis was rather haphazard for both the sexes through out the study period. Except for the year 2000, the percentage of total reported cases for extra-pulmonary tuberculosis was higher for males each year.

Table 8 shows that Sakawrdai CHC, Phuaibuang and Suangpuilawn PHCs have the lower case rate of tuberculosis in comparison with other areas which are situated closer to the location of District Tuberculosis Center at Aizawl. The workers in these centers could have lacked the zeal to detect cases, problems faced by the people to get access to better diagnostic facilities, lack of awareness of the disease and its complications could all contribute to the low number of cases detected from these centers.

Table 8. Case rate per 1,00,000 population by main center area, Aizawl East District, 1999-2002.

Main center	1999	2000	2001	2002
Thingsulthliah	170.7	144.5	140.7	109.3
Khawruhlian	88.5	86.3	129.5	181.4
Darlawn	142.0	106.8	229.9	136.5
Sakawrdai	63.3	30.9	63.9	108.3
Saitual	137.7	142.4	118.9	87.3
Phuaibuang	42.0	61.5	100.0	60.5
Suangpuilawn	37.6	49.4	24.3	48.0

Deaths due to tuberculosis occurred more in the vulnerable groups of 0-4 (n=3) and 65 and above (n=1). All deaths occurred in males. However, the reliability of the figures needs further scrutiny to really find out the reality in the field to see whether the extremely low death rate from tuberculosis in the district was due to non-reporting from the field . Carrying verbal autopsy for suspected deaths from tuberculosis in all the villages of Aizawl East District would be an ideal exercise in this case which was not done owing to financial constraint on the part of the analyst.

Discussion:

Tuberculosis affects both the sexes and all age groups primarily the productive age group of 15-44 years. It thus becomes a public health burden in terms of economic loss due to poor health and cost of treatment. Mizoram ranked third among the states with high annual cases (247) per 100000 population and annual sputum positive cases (76) per 100000 population (Source : National Tuberculosis Programme 26/1, Jan-Mar).The high rates could be attributed to the high literacy rate of the state population resulting in high level of awareness about the disease prompting them to seek diagnosis in the available health set up.

In spite of the level of consciousness about the disease, the factors that may contribute to the annual increase in the number of cases could be due to the habit of frequent social and religious gatherings which is common in every town and village, thus creating an atmosphere conducive for the spread of the disease. Non-compliance on the part of the patients due to the side effects of the treatment drugs and long duration of treatment course could also contribute to the stagnant large number of cases in the society.

Deaths were observed at the extreme ends of age groups , below 4 years and above 45 years, identified as 91 years of age to be exact. This demonstrated the vulnerable groups though seemingly less affected were at risk of dying once infected and without proper medical care.

Improvement in the overall economic condition is expected to bring about changes in the disease pattern as this would have significant effect in the standard of living, and bring about better nutrition and resistance for the disease. The average monthly per capita expenditure (1999-2000) showed Rupees 740.00 for rural areas and Rupees 1050.00 for urban areas (55^{th} Round NSS Quick Tabulation, Department of Economics and Statistics, Government of Mizoram, 2000-2001).

With the emergence of HIV/ AIDS and the high degree of susceptibility of these patients to all types of infection including tuberculosis. Surveillance system for tuberculosis is expected to gain momentum with the introduction of Revised National Tuberculosis Control Programme (RNTCP) in March 2003 in the state of Mizoram. The programme contents, if implemented in the right manner as intended , are expected to lower the incidence of tuberculosis in the District and the state as a whole, because of improvement in diagnostic facilities, man power training, creation of awareness through various media and the shorter duration of treatment under direct observation. This is expected to pave the way for easy tracing of the cases a large number of which were lost due to passive follow up in the former Tuberculosis Control Programme.

Recommendation:

In the light of the present data analysis, the following recommendations are made:-

1. All the available data should be preserved and kept at a safe place for future reference in scientific study of the disease trends and related issues concerned with tuberculosis in the district.
2. The entry of patient's particulars such as present and permanent addresses, age , caste/ tribe and occupation as well as history of tuberculosis in the family should be incorporated in the register for effective follow up for cure or other outcomes, e.g., death. Deaths from tuberculosis or suspected cases should be brought to the notice of the District Tuberculosis Officer and the Chief Medical Officer of the District by the concerned health workers to get actual and reliable information for evaluation of the effectiveness or otherwise of the treatment and also for scientific study of the disease in the district.
3. It is also recommended that a particular staff be assigned or appointed for following up of the cases which do not report to the District Tuberculosis Office at the appointed time and also to conduct verbal autopsy as and when need arises.

Conclusion:

Tuberculosis is curable and treatment made accessible for all. General awareness in this connection should be created on a massive scale so that persons with signs and symptoms of the disease will have determination to fight it by approaching the care centers without delay. Health education on the mode of transmission, the efficacy of the treatment regimes if complied with, and the dangers of incomplete treatment or non-compliance should be highlighted among the public. All the workers in the programme should work with determination and goal –oriented approached. Community has a vital role to play by accepting the patients without social stigma and assist the programme activities for the benefit of the community itself.

References

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SECTION – II

SECOND FIELD POSTING

De-addiction and rehabilitation center (DRC), Mizoram: Cost-effectiveness analysis

A. Introduction

Collection and analysis of data on programme costs can provide considerable useful information on health services of all kinds. In addition to indicating the amount of funds from all sources likely to be required to continue the services, they can be of help in assessing the use of personnel in delivering the health care and the efficiency of putting supplies, transport resources and other inputs to work. Economists define cost as 'the value of resources used to produce something, including a specific health service or a set of services'. The cost of a health service is defined as 'the value of the resource inputs used to produce that service'. Resource inputs include personnel, supplies and equipment.

Effectiveness is the measure of the extent to which the objectives are achieved. Costs and effectiveness can be combined to derive a measure of efficiency which is called 'cost-effectiveness analysis. Cost-effectiveness analysis (CEA) involves comparing at least two things – two ways of organizing the programme or activity or two different sets of inputs to the programme under study (1). Cost-effectiveness evaluations quantify both the costs of one or more interventions and the effects. These evaluations use one all-embracing measure of effect as a way of comparing alternatives – effects are often quantified in terms of number of lives saved , or life years or disability days which are gained or lost, or cases detected in a screening programme. Managers and policy makers increasingly need to know the likely costs of the expected effects of new programmes or proposed changes. They need the information to justify starting or withdrawing the programmes, to face their more sophisticated critics who often already have cost-effectiveness information for similar interventions (2). To require the health system to obtain the greatest possible level of health from the resources devoted to it, is to ask that it be cost-effective as it can be. This is the basis for emphasizing those interventions that give the most value for money and giving less priority to those that contribute little per unit of currency spent to the improvement of the populations health (3). Thus, the unique feature of cost-

effectiveness analysis is that costs are calculated and alternatives ways are compared for achieving a specific set of objectives. The aim is not just to use funds efficiently; but a defined outcome must be realized as well (4)

Measures of effectiveness specified in terms of cases of a disease prevented tend to limit the application of CEA to the choice between different methods of controlling that disease, and preclude its use to evaluate the choice between interventions directed at different diseases. This is because different diseases have different effects on the duration and extent of morbidity and also mortality, which are not captured by measures of cases prevented or cured. A more useful measure which would permit comparison of the morbidity effects of the prevention of different types of diseases is the number of days of disability prevented.

As is the case with morbidity, mortality reduction can be quantified in different ways. The simplest measure, the number of deaths prevented , has the advantage of not being disease-specific and therefore can be used to compare interventions against different diseases (5).

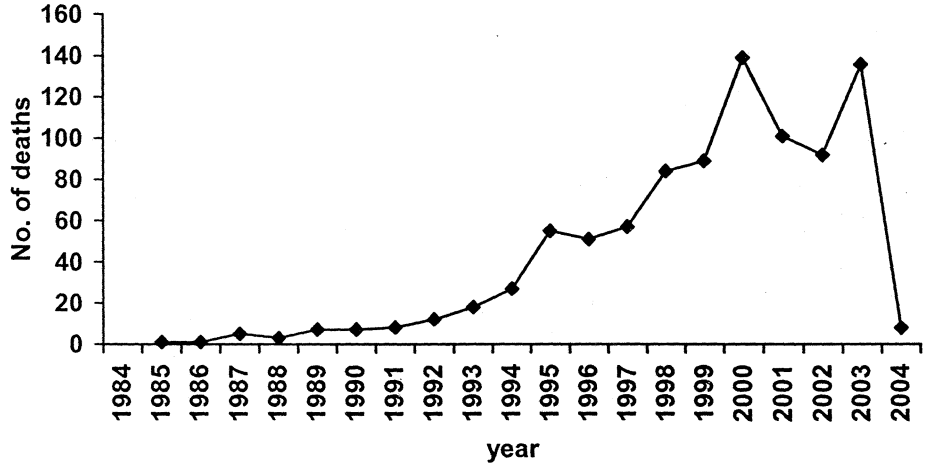
B. Background

Drug abuse has reached an alarming proportion in recent years and drug culture is fast making inroads into the lives of young people from all walks of life. Drug addiction is defined as 'a state of periodic or chronic intoxication detrimental to the individual and the society produced by the repeated intake of habit-forming drugs' (6).The incidence of drug abuse varies from place to place. Estimated 12-20 million people smoke marijuana in the US and 30-50 percent of high school students had made marijuana an accepted part of life (7) Experience in Sweden indicates that drug dependence reached a peak in the age-group 12-20 years and the problem is less among girls. The problem of drug dependence has reached an epidemic proportion in many countries (8). Drug addiction surfaced as a problem in the 1980s (9).The prevalence of psycho-active substance is 6.9 per 1000 of major category of mental disorders in India. In north-east regions of

the country, around 1% of the population is suffering from injecting drug abuse (9)

In Mizoram, the total number of drugs-related deaths during 1984-2004 (till 21st January, 2004) became 901, of which 846 are due to injection of spasmo-proxyvon, 46 due to heroin while 9 are not specified (10).

Figure 1. Drug related deaths, Mizoram, 1984-Jan 2004



Results of survey conducted among 225 drug users during their stay in De-addiction centers are given in Table1.

Table – 1.: Age – group distribution of drug users in Mizoram

Age group (in years)	No.of drug users	Percentage
15-20	74	32.9
21-25	98	43.5
26-30	40	17.8
31-35	7	3.1
36-40	4	1.8
41-45	2	0.9
Total	225	100

The table shows that as age-group advances, the number of addicts becomes smaller while the largest number belong to the age groups of 15-20 and 21-25. Thus valuable productive years are wasted whereas few started addiction later , or many of them gave up the addiction or most of the addicts died due to the menace. The study showed that family income has no role to play in the circumstances of their addiction to drugs. 61.35% of the addicts have surviving parents whereas the rest of them were either with single parents or with none indicating that drug addiction does not necessarily arise from broken homes (11).

To provide treatment services included preventive and after care and de-addiction of an addict. The Ministry of Health and Family Welfare started Drug De-addiction Programme in 1987-1988.The first 30-bedded center was established at All India Institute of Medical Sciences, New Delhi (9). There are 111 centers in different states/UTs of which 33 are located in the North-Eastern States. These centers provide not only de-addiction services but also training to medical/paramedical professional , preparing health education materials and render community out-reach services. The central assistance to these states are provided in the form of construction grant, equipments, training of trainers, mainly doctors/ paramedics, etc. To the North-Eastern states, recurring grant for medicines, linen, diet, etc. are also provided (9).

Many voluntary organizations initiated programmes to deal with addiction and each center developed its own programme based on its on understanding and the resources available. Gradually others followed suit. In 1987, there were only 36 centers in the country, whereas 480 centers are functioning today. The beneficiaries have also increased from 12,000 patients in 1987 to about three lakhs in the recent years. The tremendous growth in the availability of services have been made possible with the active support and financial assistance from the Ministry of Social Justice and Empowerment, Government of India under the Scheme for Prevention of Alcoholism and Substance [Drugs] Abuse. The Ministry substantially funds the following services : -

- Drug awareness and counseling centers
- Treatment –cum-rehabilitation centers
- De-addiction camps
- Workplace drug prevention programme

As of 2000, there are 13 homes/centers established for drug abusers by different NGOs in northern Mizoram while six are located in the southern Mizoram.

While the availability of services have increased, in the absence of specific criteria to implement services or maintain quality, programmes are being developed and implemented in an unplanned, haphazard manner. The time has now come to look beyond just the number of programmes conducted or clients served, and focus on the quality of service delivery. Ensuring the response that is efficient and effective is imperative (12).

Objectives of the study :

The objectives of the study were to

- Assess the cost-effectiveness of DRC, Sethawn, Mizoram:
- Assess the cost-effectiveness of alternative de-addiction and rehabilitation centers
- Compare the cost-effectiveness of the alternative centers with that of DRC.

Study site:

- De-addiction and Rehabilitation Center (DRC), Mizoram :

To cope with drug problems, the state Government of Mizoram had established a 30-bedded center at the old Aizawl District Jail building in the year 1990. The center was initially run by the Department of Health and Family Welfare. It was handed over to Social Welfare Department in 1992 and the capacity was raised to 75 in 1995-1996.

Recently, the state government constructed DRC buildings at donated land at Sethawn, 75 kilometers away from Aizawl. The expenditure was estimated at Rupees 333 lakhs. He center has been functioning in full swing since

October,1998. Due to financial constraint, the capacity is still maintained at 75 only whereas it was originally planned to accommodate 300 persons at a time. Treatment at the center broadly consists of detoxification, rehabilitation and follow-up.

Detoxification is to be carried out under the supervision of medical staff. Rehabilitation is mainly in the form of physical, vocational, spiritual, social work. Follow-up – after rendering all possible forms of rehabilitation available in the Center, some of the successful inmates are sent for professional training in various fields such as shoe-mending, tailoring, carpentry, theological studies, etc. The expenses are to be borne by their families or benefactors. Follow-up is done in the form of telephone calls, letters , if not in person (Record of Directorate of Social Welfare Department, Government of Mizoram, 2003, unpublished.)

Home of Social Guidance Agency (SGA) :

This home for drug abusers is one of the most well-established homes run by the NGO with its headquarters situated at Aizawl. Due to restraint of time, this home would serve as the alternative and its cost-effectiveness compared with that of DRC.

Reference period : April 2003 to March 2004

Methods:

Definition of the operational problem and objectives

- Identification and measurement of the costs of the alternative
- Identification and measurement of the effectiveness of the alternative
- Analysis of the costs, effectiveness, and cost-effectiveness of the alternative

Activities:

1. Field visit to DRC, Sethawn, and SGA home

2. Key informant interviews on :-

- Center Director

- Medical Officer
- Inmates

3.Scrutiny of available secondary data

4.Inspection of the area and observation of activities in the Center

5.Computation of costs, effectiveness of DRC

Indicators

The objective of the study is to assess the ability of DRC in Mizoram in treating and rehabilitating substance abusers .The strength of the intervention is measured by the size of funds made available to the DRC. The strength of DRC has supply and demand sides. That is, intervention variable and outcome variables. The outcome variables can be divided into control (supply side) and target (demand side) variables. The target variables are achieved through control variables with the help of intervention variable. Any de-addiction and rehabilitation center can be cost-effective only when it achieves the desired levels of both control and target variables. This forms the conceptual framework of the present study (12).

The control variables (facilities) for this study are facilities in the DRC and their efficient functioning. The facilities are classified into the following categories :-

- Basic skeleton,
- Access and quality of the infrastructure
- Availability of machinery and equipment
- Availability of drugs, supplies and staff

The effectiveness measure considered by this study is the patient load, duration of stay with respect to the prescribed period and mode and means of rehabilitation in the center.

For the purpose of estimating the cost of the DRC, various components were considered such as buildings, investment, salary, furniture, equipment and patient care including diet. The information pertaining to cost estimation was collected through facility checklist and key informant interview.

Indicators for target variables

1.Access:

- services materials received by the patients from DRC ,
- regularity of medicine supply,
- number of patients rehabilitated by the center,
- patient satisfaction about the staff and facilities.

2.Quality of care:

- residential distance of the patients from DRC
- time spent by DRC with the patients
- quality of interaction
- treatment seeking behaviour of the inmates

Results

Control variable -1 : Facilities

The basic skeleton of DRC and SGA Home such as building area, number of rooms and surrounding land area owned by them are given in the table.

Table- 2. Basic skeleton of De-addiction and Rehabilitation Center (DRC) and Social Guidance Home (SGA) for De-addiction and Rehabilitation

Centre	Building area (square feet)	Land area (Bighas)	No. of rooms
DRC	36	200	6
SGA	24	56	4

Table-3. Availability of physical facilities

Facility	DRC		SGA	
	Available	Functioning*	Available	Functioning*
1.Compound wall	1	1 (concrete) (500)	1	1 (bamboo) (333)
2. Beds	70	70 (4677)	35	35 (1050)
3. Staff quarters	39	39 (7504)	4	4 (8000)
4.Dressing room	1	1 (333)	1	1 (333)
5.Clinic room	1	1 (333)	1	1 (333)
6.Examination table	1	1 (80)	0	0
7.Refrigerator	1	1 (1100)	1	1 (100)
8. Computer	0	0	1	1 (4000)
9. Sterilizer	1	1 (167)	0	0
10.BP apparatus	1	1 (50)	1	1 (50)
11.Stethoscope	2	2 (60)	1	1 (30)
12.Weighing scale	1	1 (50)	1	1 (50)
13.Tables	6	6 (280)	3	3 (467)
14.Chairs	6	6 (180)	30	30 (900)
15.Cupboards	1	1 (533)	3	3 (1599)
16.Stool	1	1 (21)	10	3 (64)
17.Benches	3	3(86)	10	10 (288)
18.Lecturn	0	0	1	1 (50)
19.Water tank	2	2 (667)	1	1 (267)
20.Handloom	0	0	1	1 (350)
21.Sewing machine	0	0	1	1 (175)
22.Type writer	1	1 (583)	1	1 (583)
	Annualised cost	(17204)		(19832)

*Figures in brackets indicate annualized value in rupees

Table-4. Availability of manpower and materials

Facility	DRC		SGA	
	Provision	Available*	Provision	Available
1. Average no. of drug categories	39	30	NA	As need arises
2.Average value of drugs /year		Rs.2,01,000/		Rs 60,500/-
3.Center Director	1	1 (15300)	1	1
4.Doctor	1	1 (15300)	0	0
5.a. Sister	1	1 (12000)	1	1
b. Nurses	4	4 (54000)		
6.Pharmacist	1	1 (8500)	0	0
7.Healthworker	1	1 (9000)	0	0
8.Lab.Technician	1	1 (7500)	0	0
9.Psychologist	1	1 (10000)	0	0
10.Case worker	1	1 (10000)	0	0
11.Vocational Training Instructor	1	1 (8000)	0	0
12.Physical instructor	1	1 (8000)	1	1
13.Security Officer	1	1 (7500)	0	0
14.Driver	1	1 (6000)	1	1
15.Peon,Sweeper	2	2 (6000)	1	1
	DRC Annual salary :	Rs 177,100x12		Rs ,68,000/-
	Total :	= Rs 2,125,200/-		
Grand total	Rs 5, Rs 2,326,200/-		Rs 5, 28,500/-	

* Figures in brackets indicates monthly salary of the staff in rupees. Compare the staff strength as given in APPENDIX

Table-4. Availability of manpower and materials

Facility	DRC		SGA	
	Provision	Available*	Provision	Available
1. Average no. of drug categories	39	30	NA	As need arises
2.Average value of drugs /year		Rs.2,01,000/		Rs 60,500/-
3.Center Director	1	1 (15300)	1	1
4.Doctor	1	1 (15300)	0	0
5.a. Sister	1	1 (12000)	1	1
b. Nurses	4	4 (54000)		
6.Pharmacist	1	1 (8500)	0	0
7.Healthworker	1	1 (9000)	0	0
8.Lab.Technician	1	1 (7500)	0	0
9.Psychologist	1	1 (10000)	0	0
10.Case worker	1	1 (10000)	0	0
11.Vocational Training Instructor	1	1 (8000)	0	0
12.Physical instructor	1	1 (8000)	1	1
13.Security Officer	1	1 (7500)	0	0
14.Driver	1	1 (6000)	1	1
15.Peon,Sweeper	2	2 (6000)	1	1
	DRC Annual salary :	Rs 177,100x12		Rs ,68,000/-
	Total :	= Rs 2,125,200/-		
Grand total	Rs 5, Rs 2,326,200/-		Rs 5, 28,500/-	

* Figures in brackets indicates monthly salary of the staff in rupees. Compare the staff strength as given in APPENDIX

Table 5. Annual expenditure (in rupees) in DRC and SGA home during 2003-2004

Items	DRC	SGA
Annualized cost	17,204	19,832
Average value of drugs	2,01,000	60,500
Diet	10,00,000	1,22,654
Dressing items	71,000	20,000
Maintenance of buildings	1,00,000	10,000
Maintenance of vehicle	1,00,000	5,000
Salary	2,125,200	4,68,000
Stationery	65,000	30,000
Others* (Electricity bills, Phone bills, Aftercare services)	7,00,000	90,000
POL	45,000	31,000
Total	44,24,404	8,56,986
Average cost per patient	68,067.80	57,132.40

Control variable -2 : Efficiency

The estimation of cost and outcome variables formed the criteria. The load of inmates, de-addiction and mode of rehabilitation were considered as the outcome variables. The major components of costs like salary, investment, maintenance, patient care, building , furniture and equipment were included in the estimation of costs. The annualized cost for DRC was Rs 17,204.00 and that of SGA home was Rs19,832.00.

The level of efficiency at which the centers were functioning can be judged from two angles- cost composition and per patient cost. The proportionate allocation of cost to its various components also serve as an indicator of efficiency. The share of staff salary for DRC was 48% of the total cost and that of SGA home was 55% . The average daily expenditure on drugs per patient was Rs 100.00. The total expenditure thus saved during their stay in the centers amounted to more than Rs 2,79,000.00 (Rs 100x31x 90)

The cost of cost per patient for DRC was 1.5% while that of SGA home was 6.67%. The cost of maintenance for DRC was 4.52% while it was 1.75% for SGA home. The state Government's contribution was higher in the case of DRC.

Target variable-1: Access

Survey on the inmates was conducted in both the centers in order to assess the access and quality of care. Every second inmate was chosen for the purpose in the case of DRC and all the inmates in the case of SGA home. The group consisted of 20 males from DRC and 11 (9 males and 3 females) from SGA home both totaling 31. While 51.61% of those interviewed belong to 15-24 years age group, the remaining 48.39% belong to 24-39 years age group. 67.74% did not complete matriculation whereas 32.25% studied matriculation and above. Only 5 out of 31 interviewed used to earn their living part time or otherwise.22.58% of them belong to poor socio-economic group (monthly family income less than Rupees 2000/-), 41.19 % belong to middle income category (monthly income between Rupees 2000/- to Rupees 10,000/-) while the remaining 35.48% are in the high income group (monthly family income above Rupees 10,000/-).

All (100%) of the patients get access to available medical care in the respective centers but stated that the medicine supplies were good but short in supply and variety. They all said that relevant information and education pertaining to their problems.80% of them expressed their satisfaction with the DRC environment and facilities provided while 20% of them said it was not so . 10% in DRC were not too happy about the care provided .All except 10% in SGA home were happy with the power supply , water supply, and diet. 54.54% expressed lack of facilities in SGA home. All the inmates in DRC were happy about the power supply, water and diet provided by the center.

Target variable -2 : Quality of care

The quality of care is determined by residential distance of the patients from the center, quality of treatment, treatment – seeking behaviour of the patients. The residential distance from the center for its utility is given in the table -6.

Table-6. Residential distance of the inmates from the centers

Distance (in Km)	DRC	SGA	Total
0-29	2	11	13
30-49	0	0	0
50-79	1	0	1
80 and above	18	0	18

The utilization of DRC was 85.71% whereas it is 31.42% as assessed from the seat occupancy. The proportion of patients seeking admission in DRC were from far off places whereas those who were admitted in the SGA were from the nearby places The problems in drug abuse encountered by all are same. 10% of those admitted in DRC stated they were brought to the center by their families, 30% decided with their families whereas 60% decided to stay themselves. In the case of SGA home, all of them willingly stayed on their own. All of them said they benefited from the care provided at the centers.

Table 7. Results of Key Informant Interview (1): Center Directors

Items	DRC	SGA home
Responsibilities	Overall administration, drawing and disbursing	Administration, care and guidance of the patients for recovery from addiction
Total budget for 2003-2004	Rs 64,00,000.00	Rs 8,80,954.00
Sources of revenue	State Government	Central Government through the State Government
Good aspects	Discipline, counseling, medical care, games and sports, spiritual guidance	Dedication of the staff
Bad aspects	Problem in the implementation of rehabilitation concerned with income generation	Financial insufficiency
Best criterion to judge the efficiency	Discipline	Work capacity, staff dedication, administration
Measures to improve the center	Reconstruction of the existing function for rehabilitative and after care services	Honorarium for voluntary workers, improvement of handloom and handicraft workshops for imparting skills to the patients.
Interactive mechanism with the Director of Social Welfare Department (SWD)	During submission of quarterly expenditure and follow up	During training organized by the Department
Frequency of interaction	Quarterly	Occasional
Agenda	Review of programmes and problems faced by the center	Discussion on on-going projects
Level of co-operation from Director , SWD	Excellent	Good
Relationship with Director, SWD	Very good	So far so good
Adequacy of fund received	Adequate	Adequate
Need for extra help from the Director , SWD	Yes, his advice and guidance for further improvement	Yes, for further projects
Total revenue collected during 2003-2004	Nil	Rs 12,000.00
Seat occupancy	92.85%	80%
Drop-out rate	20%	50%
Reason for dropping out	Lack of will-power	Lack of determination and perseverance
Prescribed duration of stay	3-6 months	3-6 months
Person responsible for de-addiction, whether trained	Medical staff , trained	Center Director, trained
Persons responsible for rehabilitation	Non-medical staff, psychologist, case worker, counselor, Center Director	Minimum standard of care provided by Center Director
Method of follow-up of patients after discharge	Occasional home visits as convenient	Work arrangement made as convenient
Measurement of success rate	Period of staying in the center, duration of staying clean of substance abused	Rate of recovery, abandonment of addiction

Results of Key informant interview (2) : Medical Officer, DRC.

- The good aspect of DRC is the de-addiction service and this serves as the best criterion to judge the efficiency, but it needs improvement in the rehabilitative aspect.
- The strength of staff should be increased for effective rehabilitation.
- The frequency of interaction with the Center Director is three times a week and is concerned with events in the center and for improvement.
- Relationship the Center Director is good.
- Duration of patients staying in the center is 3 months on account of limitation of seats.
- De-addiction is conducted by the Medical Officer and staff nurses.
- The only method of rehabilitation is physical activity by trainer, services of case worker and psychologist in the center at the moment. Vocational training instructor is attached at the Directorate of Social Welfare Department , Aizawl.
- Case follow up is done only on few patients after discharge.

Discussion

The objective of the study was to assess the cost-effectiveness of De-addiction and Rehabilitation Center (DRC) at Sethawn, Aizawl District, Mizoram and seek an alternative. The financial support to the Center was the main intervention variable which was found to be sufficient for the present services as reported by both the study sites, DRC and Social Guidance Agency home near Aizawl . Al the workers are trained in their respective fields in DRC which is well-equipped in infrastructure and staff but with deficiency of certain sections of the staff (Table 4) which requires careful scrutiny and reconstruction with justification as need arises. Certain posts were lying vacant whereas others are attached elsewhere including vocational training instructor. The seat occupancy in DRC, Sethawn is satisfactory as evident from the admission record (87.71%) considering the distant location , 75 kilometers from Aizawl from which the majority (81%) of the patients hailed. Incidentally, all except 10% of the inmates expressed their satisfaction with the care and environment of the center. In spite

of their dedication, the SGA home is run by non-medical staff except one retired sister and the Center Director does not reside in the area in addition to difficulty in access, there is a chance of availing timely treatment on the part of the patients when emergency situation arises. The de-addiction (detoxification) is reportedly performed by the Center Director who is a non-medico. Fortunately, no untoward incident has so far happened .Ideally, the detoxification should be conducted by or under the supervision of a qualified doctor who is trained in the procedure.

All the patients get access to medical care for minor ailments. A number of patients were referred by the author on the day of study of SGA home for specialized treatment at Civil Hospital, Aizawl indicating the need for strengthening medical staff while none need referral from DRC, Sethawn, indicating better medical care in the center. However, there is no break up of the fund for different heads of expenditure as for the mess, dressing materials, maintenance of buildings and vehicles and others. The fund allocated is utilized according to need and urgency of the requirement. Hence, it is advisable to plan the future expenditure and submit accordingly as the expenditure learned from the past few years giving allowance for dearness of commodities and service apart from expenditure projected for additional schemes, if any, especially for vocational training and income generating activities according to felt needs and relevance. On the other hand, the average saving during the patients' stay amounted to more than Rs2,79,000.00 as a result of deprivation the patients of drugs .

The amount of time spent by the staff on the patients vary considerably. This aspect needs assessment for uniform treatment as far as practical so that none of the patients feel neglected or is deprived of the basic services and facilities available in the center. All the patients interviewed stated they benefited from the on-going treatment available at the center. The need for harmless group entertainment and talent building was focused during the interview as well. Priority may be placed on this issue with care as majority of the patients (81%)

were from the state capital and also those from the sub-urban areas were reportedly deprived of home entertainment in the form of media and musical instruments.

The after-care service is limited in both the centers, DRC and SGA home and carried out as found convenient. After-care and rehabilitation are the necessary components of addiction treatment . The outcome of therapy depends largely on the effectiveness of the after-care or follow-up efforts towards the patient's re-integration into the community to attain whole person recovery. Rehabilitation through vocational training to facilitate income generation should form part of the services by the DRC. It is advisable to start after-care or follow- up services immediately upon discharge of the patients from the center on out-patient basis. A clearly defined after-care programme (counseling, relapse prevention programme, self-help programme, reaching out to patients through home visits) should be made available on the whole person recovery of the individual. After-care plans of alternative methods for patients who have not recovered have to be explored and ensuring support to their family members should form critical component. The co-operation of various NGOs should be sought in this regard for the support to further the patient's re-integration in the community. Maintenance of directory and networking with specialized services , for example, vocational training , job placement, are essential. Education, skills and previous work experience of each patient need assessment prior to initiating him into vocational training in the center and outside.

Recommendations

The following recommendations emerged from the present study:-

1. Allocation of fund should be need-based under different heads of expenditure as learned from the experience of the last few years giving some allowance for unforeseen extra expenditure .
2. The role of the medical and non-medical staff should be more clearly defined proportionate to the patient load and strengthening the staff where found necessary especially in the after – care component.

3. Maintenance of directory and networking with various NGOs including the churches for meaningful after care activities
4. Successful implementation of relevant and practical training schemes concerned with income generation in the center and networking with such related services in the community for self-help and job placement of the patients who have recovered from the addiction.
5. It is advisable to follow, as far as possible, the guidelines laid down by the Ministry of Social Justice and Empowerment, Government of India as found in the 'Manual on Minimum Standards of Services for the Programmes under the schemes for Prevention of Alcoholism and Substance (Drugs) Abuse'.

This is truly essential particularly in connection with the job distribution of the staff, the amount of time spent and the frequency of regular interaction between the staff and the patients in the center and during the after-care period.

6. Formation of Narcotics Anonymous (NA) for the ex-addicts as a forum for fellowship, sharing and encouragement of one another with the support of NGOs in the community to help them lead a normal life.

Conclusion

The results of the study supported the conclusion that the government undertaken DRC fared better in terms of patient load, professionalism in imparting the treatment due to better staff position in various categories especially in the medical services, satisfactory availability of basic amenities and facilities including buildings and compound area. The fund provided at the moment was directed towards recurrent items such as staff salary, patient care and maintenance thus contributing to the efficient functioning of the DRC. The support has led to efficient utilization of internal resources already established, increase in patient load and thus reduction in the cost of the center. The effectiveness of the DRC is indicated by the ever increasing patient load and its attraction of patients from distant places. Patients received the required timely

medical care and attention on demand. All the inmates said they would not mind repeating their stay in case of possible relapse during the after care period and they were all inclined to have their dear ones admitted in the center if need arises indicating the effectiveness of DRC.

In spite of these, the DRC is not without scope for improvement. Various lacunae that may draw attention are the possible existence of certain irrelevant posts, while some vital posts like case workers for center and after-care services remain vacant, or even when filled up, the person responsible for vocational training was attached elsewhere. This is a lost and one of the sources of inefficiency for DRC as culturally relevant vocational training in forms an integral part of rehabilitation in any established de- addiction and rehabilitation center . The good news was that both the centers under study have vision for long-term rehabilitative schemes of income generation underway .The success of each center , however, depends largely on the personal interest of the patients in the schemes for long-term benefit even after discharge from the centers.

There is a need to streamline the allocated fund under different heads of expenditure so that the effectiveness of the center could be more easily assessed with respect to the cost of running the center.

The limitations of this study :

- Patient exit survey could not be carried out on account of time constraint.
- Failure in obtaining certain items of information, which were necessary in the final analysis to make accurate assessment, for unknown reasons.

Reference

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APPENDIX

Staff position at DRC, Sethawn as on 28th May, 2003

Sl.No.	Designation	Number	Remarks
1.	Center Director	1	
2.	Medical Officer	1	
3.	Psychologist	1	
4.	Case Worker	1	One post vacant
5.	Sister	1	
6.	Staff Nurse	6	
7.	Pharmacist	1	
8.	Health Worker	2	
9.	Laboratory technician	1	
10.	Vocational training instructor	1	Attached to Directorate, SWD, Aizawl
11.	Security officer	3	
12.	Physical instructor	2	
13.	Driver	2	
14.	IV Grade	5	One Sweeper and one Peon attached to Directorate of SWD.

FORM I : Facility Check List – DRC, Sethawn

Name of the respondent: Designation :

I. Infrastructure

Building area (in square feet) : **own/rented :** **Land area (in acres) :**

No. of rooms :

1. Structure of the building : a. Serious repairs required
   b. Minor repairs required
   c. Good – no immediate repairs required

2. Toilet

a. No toilet
b. One toilet for both staff land patients
c. Separate toilet for staff and patients

3. Clean running water

a. None or daily problems with supply
b. Weekly supply problem (3-6 times a month)
c. Seasonal or monthly supply problem (6-12 times a year)
d. Fully reliable supply

4. Electricity

a. None
b. Power fails often (more than 6 times a year) and no backup
c. Power fails often (up to 6 times a year0 and no backup
d. Power fails but there is backup system
e. Reliable power supply

5. Wash basin

a. None
b. Available outside the consultation room
c. Available inside the consultation room

6. Communication

a. None

b. Telephone : functioning locally

c. Telephone :functioning on site

II. <u>Patient environment</u>

7. Facility hours

a. Less than 8 hours a day

b. 8 hours a day

c. More than 8 hours a day

8. Patient records

a. Not maintained

b. Maintained at the center

FORM II : CHECKLIST OF FACILITIES

No.	Facility	Available (no.)	Functional	Remarks
1.	Compound wall			
2.	Beds			
3.	Operation theatre			
4.	Staff quarters			
5.	Clinic room			
6.	Dressing room			
7.	Routine services			
8.	Examination table			
9.	Refrigerators			
10.	Computer(s)			
11.	Sterilisers			
12.	BP Apparatus			
13.	Stethoscope			
14.	Weighing scale			
15.	Tables			
16.	Chairs			
17.	Cup boards			
18.	Stool			
19.	Bench(es)			
20.	Other facilities			
	-			
21.	Categories of drugs			
22.	(Antibiotics etc.)			
23.	Categories of injections			
24.	Dressing materials			
25	Total stock of supplies			
	(in rupees)			
26	Vehicle(s)			
	LMV			
25.	Two wheelers			
26.	Maintenance/POL			
	Man-power			

Form III : Key Informant Interview : Center Director,

Name of the informant :

1. Can you explain what your responsibilities are ?
2. What was the total budget of your Center last year ?
   a. For patient care – diet
      - medicine
      - dressing materials
   b. Maintenance of – buildings etc.
      - vehicles
   c. Salary of DRC staff
   d. POL
   e. Stationeries, etc.
   f. Others (Specify)
3. What are the sources of revenue for DRC ?
   a. Patient care
   b. Others (Specify)
4. What do you think is good about DRC ?
5. What do you think is bad about DRC ?
6. What , in your opinion, is the best criterion to judge the performance of DRC?
7. Elaborate the steps to be taken to improve the efficiency of performance of DRC ?
8. What is the interactive mechanism you have with the Directorate of SWD ?
9. What is the frequency of interaction with the Directorate of SWD during 2003-2004?
10. What is/are the usual agenda during the meeting with superiors of the Department ?
11. Is the Director co-operative with you ? If no, give reasons.
12. What is your opinion about the Center Director –Director of SWD relation ?
13. Do you, in your opinion, get adequate help in running DRC from the Director?
14. Do you expect anything else from the Director of SWD for improvement of DRC ?

15. Where from the Directorate of SWD generate the resources required for DRC ? (Sources of funding)

16. What is the value of resources generated by DRC for patient care during last year ?

17. What is the total revenue collected by DRC from patients (if collected) last year ?

18. What is the seat occupancy rate of your Center during the last five years ?

19. What is the drop out rate for the same period (year-wise) ?

20. What are the reasons behind the inmates leaving the Center ?

21. What is the scheduled duration of stay for de-addiction and rehabilitation ?

22. Who carries out the process of de-addiction ?
Is he/she specially trained for the procedure?

23. What process is followed for rehabilitation ?
Who are the persons responsible for rehabilitation ?

24. Is there provision for follow-up of the patients after discharge at their homes?

25. If yes, how is done ?

26. How do you measure the success rate of the treatment and rehabilitation ?

FORM IV : INTERVIEW SCHEDULE FOR PATIENTS : DRC / SGA.

Name : Age : ☐ Sex : ☐

Occupation :

Average monthly income of the family :

How far is the DRC from your house :

Illness for which treatment was sought :

Services received from the center :

Materials received from the center:

a. Drugs

b. Injections :

c. Information :

d. Others (Specify)

1. What was the reason behind seeking help at DRC ?
2. Have you ever been treated at other centers previously ?
3. How long have you been at the center?
4.
5. Were you satisfied with –

   a. Power supply : ++, +, -

   b. Water supply : ++, +, -

   c. Diet : ++, +, -

   d. Environment in the center : ++, +, -

   e. Treatment : ++, +, -

   f. Facilities : ++, +, -

6. If no (-), state reason(s) against each.
7. What is the kind of treatment you are receiving at the center ?
8.
9. How much time has been devoted to you by the following personnels so far ?

   a. Center Director

   b. Doctor

   c. Counsellor

d. Nurses

e. Others (specify)

Also, give the frequency of interaction, their behaviour during your stay.

10. How useful has been your stay at at DRC ? ++,+, -
11. Behaviour of other staff : ++, +, -
12. What other facilities , if provided, would be helpful in your opinion.
13. Overall, do you think the DRC is functioning efficiently ?
14. If no, what are the measures necessary to make it more efficient ?
15. Do you advise relatives /friends to approach DRC for help for problem like yours?

FORM V : Key Informant Interview : Medical Officer,DRC / SGA

Name of the informant :

Age : ☐ Sex : ☐

1. Can you explain what your responsibilities are ?
2. What are the sources of revenue for DRC ?
3. What do you think is good about DRC ?
4. What do you think is bad about DRC ?
6. What , in your opinion , is the best criterion to judge the performance of DRC?
7. Elaborate the steps to be taken to improve the efficiency of performance of DRC ?
8. What is the interactive mechanism you have with the Center Director ?
9. What is the frequency of interaction with the Center Director?
10. What is/are the usual agenda during the meeting with the Center Director?
11. Is the Director co-operative with you ? If no, give reasons.
12. What is your opinion about theDoctor- Center Director relation ?
13. Do you, in your opinion, get adequate help in running patient care from the Center Director ?
14. Do you expect anything else from the Center Director of DRC for improvement of DRC ?
14. What are the reasons behind the inmates leaving the Center ?
15. What is the scheduled duration of stay for de-addiction and rehabilitation ?
16. Who carries out the process of de-addiction ? Is he/she specially trained for the procedure?
17. What is the method of de-addiction adopted at your center ?
18. What process is followed for rehabilitation ? Who are the persons responsible for rehabilitation ?
19. Is there provision for follow-up of the patients after discharge at their homes?
20. If yes, how is is done ?
21. How do you measure the success rate of the treatment and rehabilitation ?

Evaluation of HIV sentinel surveillance in Mizoram, 2003

Background

An estimated 34-46 million people are living with HIV / AIDS currently and the death toll due to AIDS has been more than 20 million, three million in 2003 alone (1). The year 2003 saw 4.9 million people infected with the virus of which about 0.7 million were children, almost entirely as result of transmission during pregnancy and childbirth or from breast feeding (2). The global of AIDS epidemic by the end of December, 2004 is summarized in Table 1.

Table 1. Global summary of the AIDS epidemic, December 2004.

Number of people living with HIV in 2004	Total	39.4 million (35.9 - 44.3)
	Adults	37.2 million (33.8 - 41.7)
	Children under 15 years	2.2 million (2.0 - 2.6)
People newly infected with HIV in 2004	Total	4.9 million (4.3 - 6.4)
	Adults	4.3 million (3.7 - 5.7)
	Children under 15 years	640 000 (570 000-750 000)
AIDS deaths in 2004	Total	3.1 million (2.8 - 3.5)
	Adults	2.6 million (2.3 - 2.9)
	Children under 15 years	510 000 (460 000-600 000)

Source: UNAIDS /WHO (2004), AIDS epidemic update, December 2004.

WHO South-East Asia Region: The number of HIV/AIDS reported cases continue to increase and is likely to do so (Table2). In most counties of the region, HIV infection was not diagnosed till 1986. The first case of AIDS in the region was reported by Thailand in 1984.

Table 2. HIV/AIDS statistics and features, WHO South East Asia Region, 2002 and 2004.

Year	Adults and children living with HIV/AIDS	Adults and children newly infected with HIV	Adult prevalence rate *	% of positive adults who are women	Deaths due to AIDS
2004	8.2 million [5.4-11.8]	2.3 million [1.5-3.3]	1.2 million [720000-2.4million]	0.4 [0.3-0.6]	540 000 [350000-810000]
2002	7.2 million [4.6-10.5]	1.9 million [1.2-2.8]	1.1 million [540000-2.5 million]	0.4 [0.2-0.5]	470 000 [3000000-690 000]

Source: UNAIDS / WHO, AIDS epidemic update, December 2004.

Indian scenario: About 5.1 million (2.5-8.5 million) people were estimated as living with HIV in India in 2003. Serious epidemics are underway in several states. In Tamil Nadu, the HIV prevalence of 50% was among commercial sex workers, while in Andhra Pradesh, Karnataka, Maharashtra and Nagaland, HIV prevalence has crossed the one percent mark among pregnant women. In Manipur, epidemic driven by injecting drug use has evolved for more than a decade while HIV is present in the wider population (3). HIV prevalence measured at antenatal clinics in the Manipur cities of Imphal and Churachandpur has risen from below one percent to over five percent. Many of the women testing positive for HIV were partners of male injection drug users. There are signs that injecting drug use is playing a bigger role in India's epidemics than previously thought. 26% of injection drug users (IDUs) in Chennai were already infected with HIV when a sentinel site was established there way back in 2000 and by 2003, 64% of the same population (IDUs) were infected with HIV. Surveys conducted in most cities of India indicated that at least one quarter of injecting drug users were living with their wives or regular sex partners (MAP, 2004). Sentinel surveillance indicated no significant drop in HIV prevalence

among female commercial sex workers in Mumbai despite a decade old safer-sex programmes among sex workers (4). In India, HIV/AIDS is mostly prevalent among productive age groups (Table3.).

Table 3.. Age-wise distribution of HIV/AIDS cases in India, 2004

Age group (in years)	Male	Female	Total (%)
0-14	1,606	1,007	2,613 (3.79)
15-29	15,053	8,428	23,481 (34.12)
30-44	29,881	8,088	37,969 (55.18)
45+	3,802	944	4,746 (6.89)
Total	50,342	18,467	68,809

Source: National AIDS Control Organization report, as on 31st March, 2004.

HIV/ AIDS in Northeast India: The maximum number of HIV/AIDS cases (1,238) are reported in Manipur where injection drug use is prevalent. No case was reported from Arunachal (Table 4).

Table 4. The AIDS scenario in North-East India, January, 2003

Name of State	Number of HIV/ AIDS cases (%)
Manipur	1,238 (71.2)
Nagaland	298 (17.2)
Assam	149 (8.6)
Mizoram	40 (2.3)
Meghalaya	8 (0.5)
Tripura	5 (0.3)
Arunachal	0 (0.0)
Total	1,738

Source : National AIDS Control Organization, 2004.

Mizoram scenario : In Mizoram , results of screening for HIV status in hospital, including blood banks, and public health centers between October 1990 and

February 2004 indicated that 729 (5.19%) among a total of 14,037 blood samples tested. While 46.5% of the cases were likely to have acquired the infection through sexual contact, 44% of the cases reported were injection drug users (Table5).

Table 5. Risk transmission categrories with sex-wise distribution among HIV positive persons, Mizoram, 2004.

Route of transmission	Male	Female	Total
Sexual contact	160	179	339
Injection drug users	259	60	319
Perinatal transmission	13	10	23
Relatives of cases	0	6	06
Others	23	19	42
Total	455	274	729

Source: Mizoram State AIDS Control Society, 2004

Importance of HIV surveillance:

Sentinel surveillance for HIV allows better characterization of the nature and magnitude of the epidemic of HIV/AIDS. HIV surveillance studies in India, Myanmar and Thailand documented a substantial increase in HIV infections among female commercial sex workers, injecting drug users (IDUs) and other population groups. Such data are needed for advocacy and planning purposes. Good surveillance data can be used to estimate the magnitude of the problem and make future projections of HIV/AIDS. In addition, they assist decision makers in instituting appropriate and rational intervention programmes.

HIV sentinel surveillance is based upon HIV prevalence studies at regular intervals among selected groups in the population known as 'sentinel groups' [SEA/AIDS/68 Carrying out HIV Sentinel Surveillance, A Guide for Programme Managers, World Health Organization, Regional Office for South East Asia, New Delhi) . In other words, with sentinel surveillance, trends in HIV infection are monitored over time, by group and place. Sentinel HIV surveillance can

theoretically be community-based or clinic/health facility-based; the latter is more convenient and logistically preferable.

Sentinel surveillance set up in Mizoram: Inclusion of data from high risk population collected in targeted intervention sites were the key features of HIV sentinel surveillance. There is a state level Governing Body under the banner of Mizoram State AIDS Control Society (MSACS). The Minister of Health and Family Welfare is the chairperson of the Governing body. The Executive Committee functions under the Governing Body and is chaired by the Commissioner of the Health and Family Welfare Department. There are four Deputy Directors in the Society as well as finance officer, procurement officer, NGO advisor, and District Nodal Officers, one from each of the eight districts of the state (Organizational chart, figure 1). MSACS conducts HIV sentinel surveillance at six sentinel sites and three subsets (Table 6; Figure2).

Table 6. HIV Sentinel sites and subsets under MSACS, Mizoram, 2003

Sentinel sites:

1. Skin & STD Clinic, Civil Hospital, Aizawl
2. Antenatal Clinic, Civil Hospital, Aizawl,
3. Antenatal Clinic, Civil Hospital, Lunglei
4. Antenatal Clinic, Civil Hospital, Champhai
5. STD Clinic, Civil Hospital, Saiha
6. De-addiction and Rehabilitation Center
7. Social Welfare Department, Sethawn
   - Subsets*:
     1. SHALOM IDU Clinic
     2. Antenatal Clinic, Hnahthial CHC,
     3. Antenatal Clinic, Khawzawl PHC.

*Subsets are additional HIV surveillance sites meant to complement the data of sentinel sites and are selected taking into account their geographical location.

Figure2. Location of sentinel sites and subsets of HIV sentinel surveillance in Mizoram

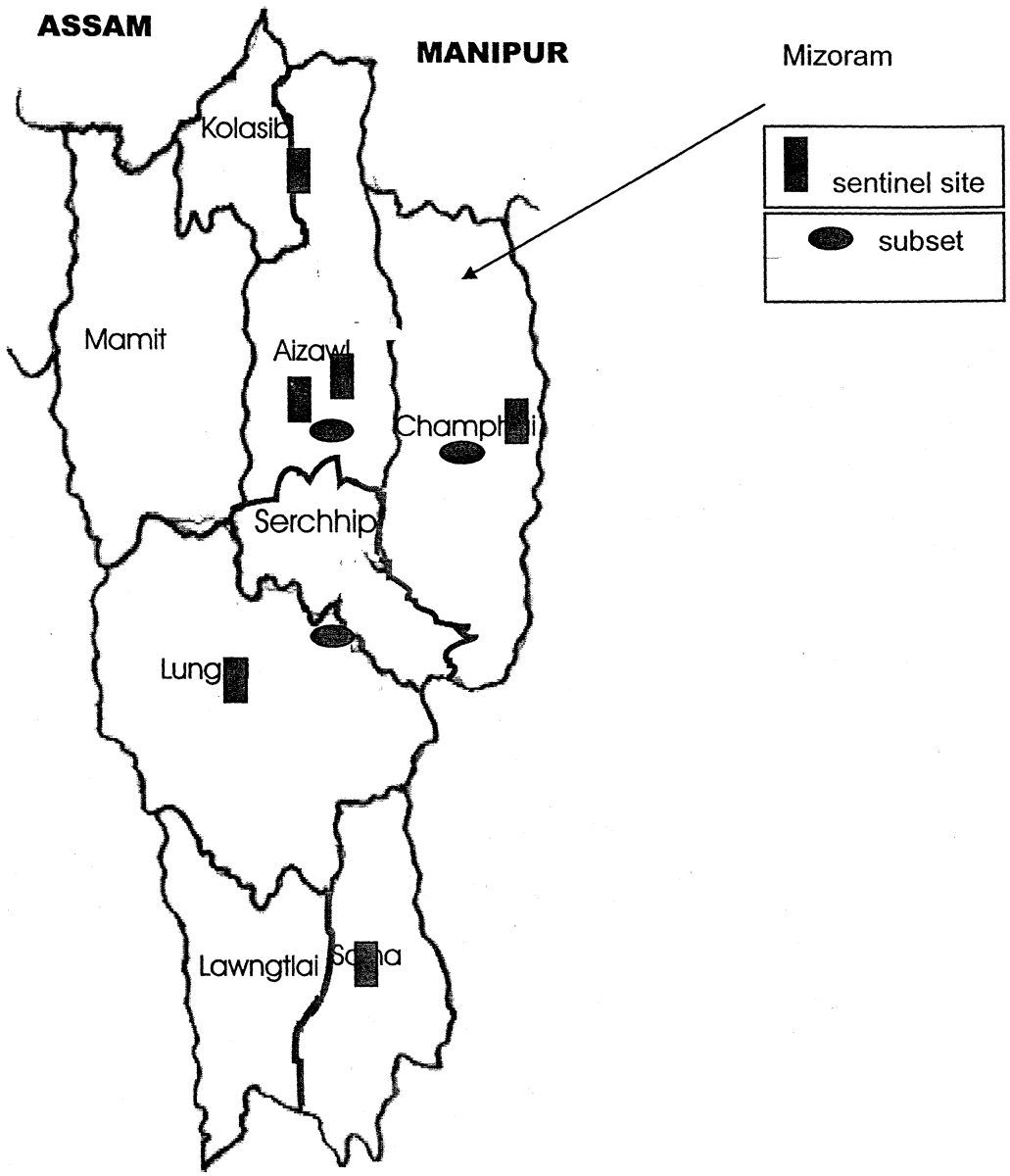
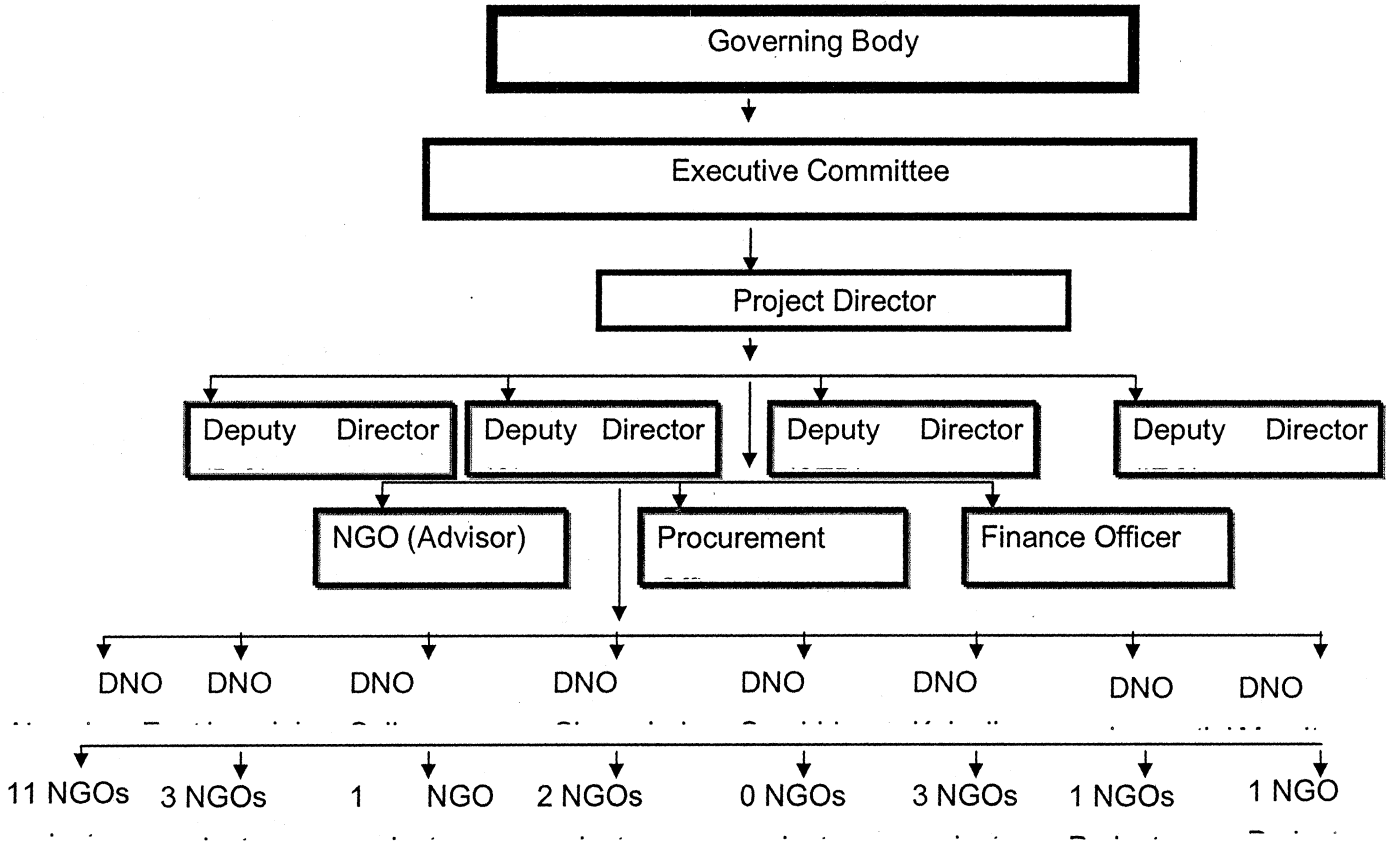


Figure 1 . Organization chart of Mizoram State AIDS Control Society, 2003



Abbreviations: - **B.S**=Blood Safety **S**=Surveillance **S.T.D**=Sexually Transmitted Disease

Justification for evaluation:

Although the HIV sentinel surveillance in Mizoram has been in place since 1998, there was no report of systematic and independent evaluation conducted by an external agency not concerned with the system at the state or national level as there was no provision for the same. The geographical location of the state bears significance since it has a long international boundary with Myanmar in the east and south, and Bangladesh in the west. In the northern part, it is adjacent to Manipur state that has the highest number of HIV/AIDS cases (1,238 as on January, 2003) in the region. There is a constant intermingling of population between the two northeast states especially after the emergence of civil unrest leading population to seek refuge in Mizoram. As a consequence, HIV is gradually penetrating into the general population as documented in Table 8.

Objectives:

The objectives of the evaluation were to

1. Identify determinants of successful implementation of HIV surveillance system and
2. Formulate recommendations to the concerned personnel for improvement of the HIV sentinel surveillance system in the state.

Methods

Study design: We used a cross-sectional survey design for conducting this evaluation.

Sample frame and study areas: We selected three sentinel sites and one subset at random from the six sentinel sites and three subsets. They were:-

1. Antenatal clinic at Civil Hospital, Aizawl,
2. STD (Sexually Transmitted Diseases) clinic at Civil Hospital, Aizawl,
3. De-addiction and Rehabilitation Center (DRC) at Sethawn, and
4. IDU (Injection Drug User) clinic, SHALOM (NGO), Aizawl.

The Reference period for evaluation was for one year, between April, 2003 and March, 2004.The study was conducted during the period of May-June 2004.

Planning and preparation

Evaluation team: FETP-MAE scholar (author) and two health workers formed the evaluation team.

Tools for collection of data: We collected Secondary data from records of the office of the Mizoram State AIDS Control Society (MSACS) and primary data from in-depth interviews using pre-tested questionnaires.

Indicators: We used the input, process and output indicators of the surveillance system during the evaluation. They were:-

1. *Inputs*: staff position, number of staff trained, availability of buildings, logistics and supplies, number of units with communication.
2. *Process*: number of reporting units using forms and registers, status of HIV testing laboratory, number of reporting units supervised, availability of external quality control measure
3. *Out put*: completeness of report forms submitted, timeliness of reports
4. *Outcome*: change in the trend of the disease

Standards: Standards laid down for measuring the indicators were:-

90-100 %: good 80-90 %: satisfactory

70-80 %: fair <70 %: poor

Data collection:

We held discussions on the proposed evaluation with the Project Director and Deputy Director (Surveillance) of Mizoram State Aids Control Society (MSACS) during preparation of the questionnaires. MSACS granted permission for evaluation of the system. We pre- tested the questionnaires and modified them accordingly.

We interviewed the following personnel during the evaluation:-

- Project Director of MSACS ii) Statistician of MSACS
- Officer in charge of the HIV testing laboratory
- Laboratory technician of the testing laboratory, and
- Reporting officers of the sentinel sites and subset

Results

Structural input:

(i) There was no deficiency in the strength of the staff at all levels as all the allocated posts were filled (Table 7.)

(ii) All the staff personnel were trained and there is scope for conducting training each year just before HIV sentinel surveillance period. The pre-sentinel surveillance training has been conducted every year since the commencement of HIV sentinel surveillance in 1998.

(iii) Each center has a building of its own and it was in good condition at the time of evaluation.

(iv) Logistics and supplies: We observed no shortage in logistics and supplies at all the centers.

(v) All the sites and subsets have telephones as a means of communication.

(vi) Budget allocation was perceived as sufficient but further discussions on the allocation and expenditure were avoided as the same was considered a sensitive issue.

Table 7. Manpower availability at HIV sentinel sites and subsets in Mizoram, 2003

Setup	Director of project / center		Medical officer		Laboratory technician		Nurses		Peons		Total posts
	No. of posts	Filled	*No. of posts*	Filled	*No. of posts*	Filled	*No. of posts*	Filled	*No. of posts*	Filled	
MSACS[1]	1	1	2*	2	-	NA**	-	NA	1	1	4
DRC[2]	1	1	1	1	1	1	4	4	4	4	11
ANC [A][3]	-	NA	1	1	-	NA	1	1	1	1	3
STD [A][4]	-	NA	1	1	-	NA	1	1	1	1	3
ANC [CH][5]	-	NA	1	1	-	NA	1	1	1	1	3
ANC [LL][6]	-	NA	1	1	-	NA	1	1	1	1	3
STD [SH][7]	-	NA	1	1	-	NA	1	1	1	1	3
ANC [KZ][8]	-	NA	1	1	-	NA	1	1	1	1	3
ANC [HT][9]	-	NA	1	1	-	NA	1	1	1	1	3
SHALOM[10]	1	1	1	1	-	NA	1	1	1	1	4

1- Mizoram State AIDS Control Society

2- De-addiction and Rehabilitation Center, Social Welfare Department, Sethawn, Kolasib District

3- Antenatal clinic, Civil Hospital, Aizawl

4- Sexually Transmitted Diseaes clinic, Civil Hospital, Aizawl

5- Antenatal clinic, Civil Hospital, Aizawl

6- Antenatal clinic, Civiil Hospital, Lunglei

7- Sexually Transmitted Diseases clinic, Saiha

8- Antenatal clinic, Primary Health Center, Khawzawl 9- Antenatal clinic, Community Health Center, Hnahthial

10- NGO clinic for injection drug users (IDUs)

* - Deputy Director

** - Not applicable

Process indicators

(i) HIV blood testing:

A fully equipped testing laboratory was available at the Microbiology Department of the Aizawl Civil Hospital. The laboratory personnel were trained in the process of detection of HIV status using ELISA test. The various sentinel sites collected serum specimen for HIV and handed over to the laboratory. The laboratory technician tested these samples under the supervision of the microbiologist in charge of the laboratory. The samples were tested one week after arrival from the sites as the laboratory catered to the Out Patient Department of the Hospital which was normally crowded and admitted patients as well as those referred from other parts of the state. When a sample tests positive, second HIV test is done at the same laboratory before reporting the HIV status.

(ii) Supervision:

The Mizoram State AIDS Control Society conducted supervisory visits at the sentinel sites and subsets as well as the testing laboratory once a year.

(iii) **Quality control of HIV testing:** The Regional Institute of Medical Sciences, Imphal exercised external quality control annually. In addition,, the laboratory developed its internal quality control measure with blood samples tested positive earlier.

(iv) **Reports and registers:** The reports and registers at all the reporting sites and subset under study were checked and found satisfactory in terms of consistency and credibility.

(v) The interview of the statistician at the office of the Mizoram State AIDS Control Society and inspection of data management indicated that data were stored in paper file, processed and analyzed manually.

(vi) Feedback on reports:

The feedback on the reports were sent to all reporting sites and subsets by the MSACS at the end of the HIV sentinel surveillance after completion of final reports.

Out put

(i) The report forms received from the sites and subsets were completely filled by all the sites and subsets (9/9) with the information required by the system.

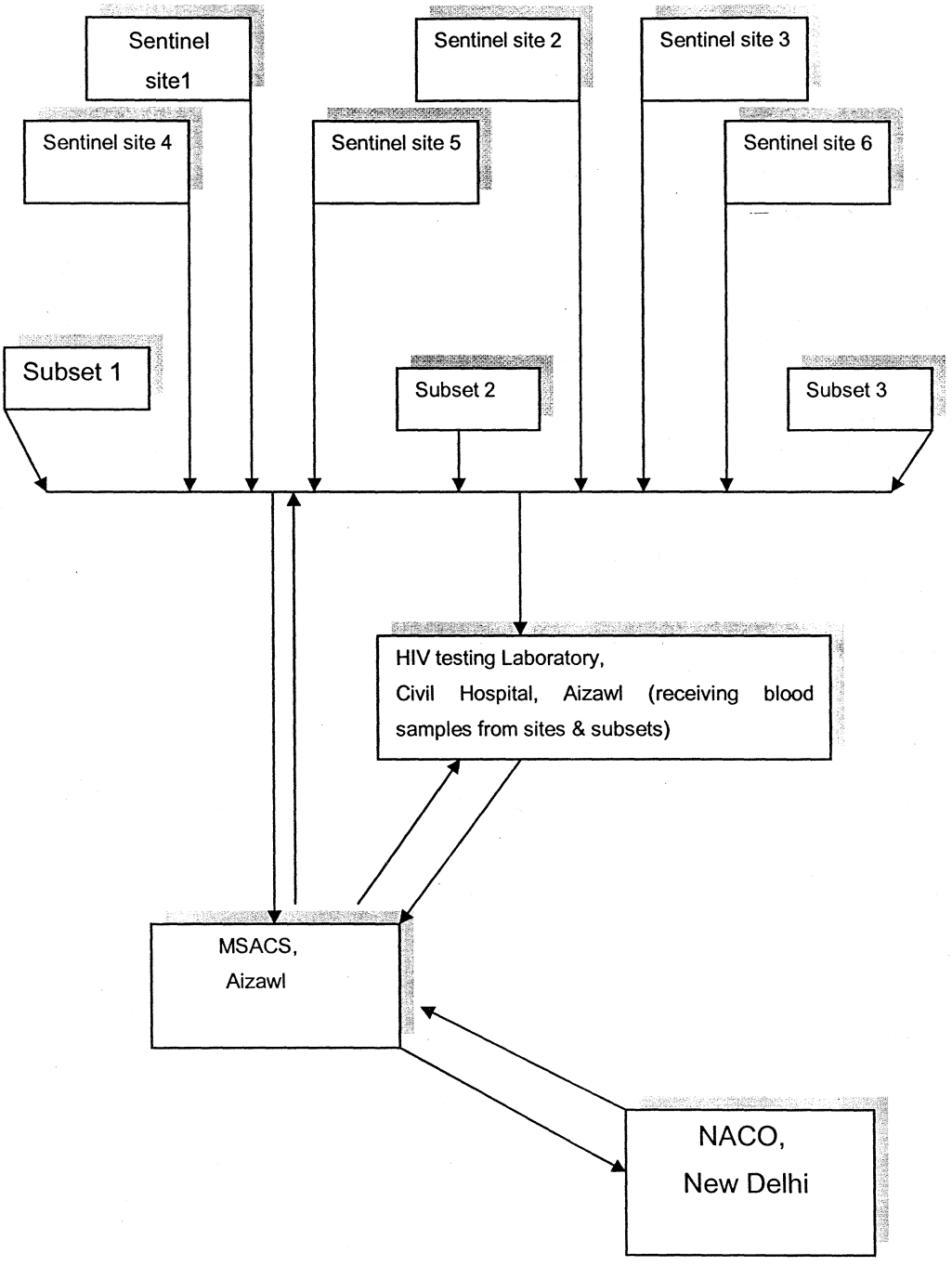
(ii) The two antenatal clinics at Hnahthial Community Health Center and Khawzawl Primary Health Center could not meet the prescribed number (400) of blood samples reducing the performance level to 7/9 (78%)

(iii) The interview of the statistician and the Project Director of MSACS indicated that the reports from the reporting centers were received without delay (9/9).This indicated that the center personnel followed the timeline fixed for submission of the blood samples and reports (Figure 3). This was confirmed through checking the records available in the office of the Society.

Outcome :

An increase in the number of HIV positive cases was detected by the system at the antenatal clinic of Champhai District Hospital, one of the sentinel sites for HIV sentinel surveillance. In 2002, 12 HIV positive cases were detected out of 400 blood samples examined while only two samples tested positive for HIV among the pregnant women at antenatal clinic in the previous year (Table 8).

Figure 3. Flow of information in HIV sentinel surveillance, Mizoram State AIDS Control Society, 2003.



System attributes

Proper case definition was not available in the system and the laboratory result was the only criterion for labeling the HIV status. There were two levels of reporting under the system - from sentinel sites or subset to the Mizoram State AIDS Control Society (MSACS), Aizawl, and from MSACS to National AIDS Control Organization (NACO), New Delhi.

The average time taken from collection of blood samples and data and their subsequent submission to the MSACS was two months. The participation rate was 6/6 since 1998, the year in which sentinel surveillance started in Mizoram becoming 9/9 in 2003 after the introduction of subsets in the system indicating total acceptance.The HIV sentinel surveillance in Mizoram covered the majority of the high risk groups like injection drug users (IDUs), patients of sexually transmitted diseases (STDs) and pregnant women. Serum samples from donated blood for transfusion purpose were not included for the purpose of HIV sentinel surveillance.

The predictive value positive of the test was claimed as 99.9% as indicated by the results available at the testing laboratory.

The reporting forms contained rather too many items and time- consuming and complex. It was no wonder the system required two months for receipt of the reports from the peripheral reporting centers.

Table 8. HIV positive cases detected at the sentinel sites of Mizoram during 2002 and 2003.

Site	Population	2002			2003		
		+ve	Total	%	+ve	Total	%
STD clinic, Civil Hospital, Aizawl	STD patients	13	250	5.2	15	250	6.00
Antenatal clinic, Civil Hospital, Aizawl	Pregnant women	4	400	1.0	3	250	0.75
De-addiction and Rehabilitation Center, Social Welfare Department, Sethawn	Injection Drug Users	4	250	1.6	10	250	4.00
Antenatal clinic, Civil Hospital, Champhai	Pregnant women	4	400	1.0	3	250	0.75
Antanatal clinic, Civil Hospital, Lunglei Subset	Pregnant women	2	400	0.5	8	400	2.00
SHALOM IDU clinic, Aizawl	Injection Drug Users	-	-	-	22	250	8.80
Antenatal clinic, Primary Health Center, Hnahthial, Lunglei District	Pregnant women	-	-	-	3	310	0.96
Antenatal clinic, Primary Health Center, Khawzawl, Champhai District	Pregnant women	-	-	-	2	256	0.78

Two subsets were not able to meet the required number of serum samples from pregnant women in their respective antenatal clinics during the HIV sentinel surveillance. As the prevalence of HIV is likely to be lower and change more slowly than in STD patients or IDUs, a large sample size (400) was required over an eight – week period.

The data were stored in paper file, processed and analyzed manually by the statistician of Mizoram State AIDS Control Society.

Discussion

The HIV sentinel surveillance in Mizoram conducted by the Mizoram State AIDS Control Society (MSACS) through the sentinel sites and subsets is accepted and in place. There wereadequate staff in the office of Mizoram State AIDS Control Society, the testing laboratory, the sentinel sites and subsets. All the staff were trained before the sentinel surveillance commences each year. The infrastructures and logistics, including communication system, were adequately available in all the sites.

The HIV testing laboratory was fully equipped to deal with the HIV sentinel surveillance and suitably gained recognition the State Reference Laboratory for the consistency and reliability of its HIV test results. Quality control was maintained both externally and internally. Periodic supervision was conducted by the MSACS at all levels of the sentinel surveillance.

The high acceptance of the system by the reporting centers was indicated by the zero-refusal from the target groups, the immediate 100% participation rate of the sentinel sites and subsets, completeness of the report forms and timeliness of report submission.

The system was able to detect an increase of HIV positive cases at one of the antenatal clinics. However, the change within a period of just two years is limited to conclude it as the change in trend of the disease under surveillance. The surveillance system covered majority of the high risk population groups. The surveillance system was flexible and could accommodate other disease such as

syphilis although data was not collected for the same which was the lapse committed on the part of the evaluation team.

However, the system has a number of weaknesses. Although it looks simple externally, the process of filling out the reporting forms is quite a laborious and time consuming and the system requires two months for receipt of the reports from the peripheral reporting centers.The data were stored in paper file, processed and analyzed manually by the statistician.

Recommendation

The recommendation made to strengthen the HIV sentinel surveillance system: Simplify and minimize the reporting forms that are rather too complex for storage, process and analysis of the data. Extending the surveillance to cover patients attending tuberculosis clinic is recommended. Although it is not expected to give pure trend data per se, it is likely to give important information on HIV-related disease morbidity such as tuberculosis.

Evaluation of integrated child development services in Tlangnuam rural block area, Mizoram, 2003

A.Introduction

A.1. The World Summit for Children 1990 agreed on a series of specific social goals to improve the lives of the children which included measurable progress against malnutrition, illiteracy and preventable diseases[1]. However, millions of children in the developing world today still live in poverty amidst a hostile environment with no access for the overall development of their childhood [2].

A.2. There are about 158 million children below the age of six years in India that constitute15 % of its population[3].A majority of them live in poor social and economic conditions that could adversely affect their physical and mental development. Developmental schemes aimed at alleviating poverty do not necessarily reach children or bring about positive change in the environment in which they live. The National Policy for Children, 1974, is founded on the conviction that child development programmes are necessary to ensure equal opportunities to these children. Integrated Child Development Services (ICDS) is India's response to the challenge of meeting holistic needs of the child. ICDS scheme was launched initially in 33 blocks on October 2,1975 and by March 1995, it covered 3,663 of a total of 5,239 community development blocks in the country through 3,907 projects. ICDS scheme became one of the world's largest and most unique outreach programmes for early childhood care and development today[4]. As of July 2003, there were 21 ICDS projects in the state of Mizoram with 1,341 operational Anganwadi centers. These 21 ICDS projects in the state cater to 1,21,071 children between zero and six years of age and 25,994 pregnant and lactating mothers[5].

A.3. Academicians, planners, administrators and those responsible for the implementation of the programme conducted a large number of evaluation and research studies to assess and evaluate the impact of ICDS scheme[4]. However, a majority of these evaluations and research studies focused mainly on the

health and nutrition components of the scheme. We decided to conduct a comprehensive evaluation of the ICDS scheme with a scope that addressed all the various components of the programme in a rural project of ICDS scheme in of Mizoram.

A.4. We conducted the evaluation of ICDS programme implemented in a rural block of Mizoram to (1) to assess the achievement of the stated objectives of the ICDS scheme per se through a review of the structure, process and outcome indicators (2) identify the gaps in the implementation of the programme and (2) suggest appropriate measures to bridge these gaps.

A.5. We expected improvement in the effectiveness of the scheme, increased community participation and development of the spirit of ownership, initiation of better co-ordination among the government departments concerned with ICDS scheme and various non-governmental organizations. In addition, we expected improvement of organizational, technical and administrative inputs in the implementation of the programme in the area of evaluation.

B. Methods

B.1. We reviewed the documents and interviewed the stakeholders of the programme at project, district and state levels for description of the programme.

B.2. We prepared, pre-tested and administered questionnaires to the implementing officers, Anganwadi workers, health workers, community leaders and household beneficiaries of the area under evaluation. In addition, we used checklists to observe the availability of supplies and logistics. We checked the records and registers at the centers to evaluate the performance of the Anganwadi center.

B.3. We made recommendations from the results emerging from the evaluation for improvement of the programme to the implementing agency at the project, district and state levels.

Indicators: We measured the input, process and output indicators of the programme (Figure1.)

Input indicators

Infrastructure

- average distance between beneficiary households and Anganwadis
- type of building
- availability of space for conducting pre-school education and playing
- availability of proper storage of nutrition
- toilet facilities at Anganwadis for the beneficiaries

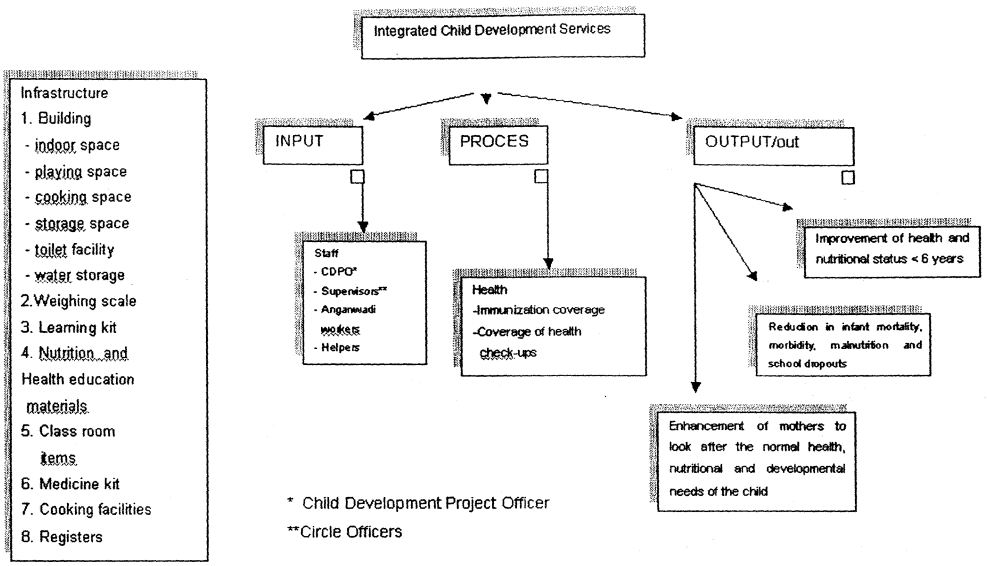
Inventories

- availability of weighing scales at Anganwadi center and their conditions
- availability of learning kits/toys for the pre-school children
- availability of nutrition and health education materials
- availability of medicine kit to treat minor ailments

Staff

- proportion of Anganwadi workers in position
- proportion of Anganwadi helpers in position
- proportion of Anganwadi workers with educational level of matriculationor beyond
- proportion of Anganwadi workers residing within the village
- proportion of Anganwadi workers assigned other works beyond ICDS scheme duties
- proportion of Anganwadi Workers trained in the scheme
- proportion of helpers trained

Figure1. Logic model of Integrated Child Development Services



Process indicators

(d) We measured the indicators of the functioning of Anganwadi centers by:-

- proportion of children enrolled
- proportion of women enrolled
- average duration (in minutes) for which Anganwadi centers were open per day
- average number of days Anganwadi centers remained closed in the last one year
- proportion of Angawadi centers maintaining growth charts
- proportion of Anganwadi centers maintaining weight register
- average number of meetings with health workers and medical officer of Primary Health Centers in the last one year.
- number of visits by supervisors in the last one year
- number of visit by Child Development Project Officer in the last one year

(e) We evaluated the utilization of services provided at AWC using the following indicators:-

- proportion of Anganwadi centers providing supplementary food for > 21 days during last month
- quality of food supplied at AWC as perceived by Anganwadi workers
- regularity of food supply as perceived by Anganwadi workers
- quality of food supply as perceived by households
- regularity of health check-up of children in Anganwadi centers
- proportion of pregnant women fully immunized for tetanus
- proportion of children receiving full immunization for vaccine preventable diseases
- proportion of children availing referral services
- proportion of women covered under Nutrition and Health Education
- proportion of mothers reported Antenatal clinic at Anganwadi centers
- frequency of growth monitoring in children < 36months old
- frequency of growth monitoring in children > 36 months old
- proportion of Anganwadi centers providing pre-school education for >21 days in a month

(f) Community participation: We used the following indicators to measure community participation in the programme:-

- number of Anganwadis reporting community support in the form of donations or labour
- proportion of Anganwadi centers reporting support from village council for maintenance of building
- proportion of Anganwadi centers reporting support from women's group or committee and mothers of children in center activities
- proportion of Anganwadis reporting support from other members of the society
- proportion of households reporting existence of women's committee.

Out put indicators: The output indicators were measured by:-

(g) Perception of households

- proportion of households receiving supplementary food supply for >21 days
- proportion of households receiving immunization as schedule
- proportion of households reporting growth monitoring of children at Anganwadi center
- proportion of households reporting periodic health check-up every 3-6 months for the beneficiaries in the family
- proportion of households reporting referral of seriously ill beneficiaries of the family
- proportion of households reporting provision of pre-school education at Anganwadi center
- proportion of households reporting provision of nutrition and health education
- proportion of households reporting satisfaction with behaviour or attitude of Anganwadi worker
- mean duration of time spent on child care everyday by mother (in minutes)

Evaluation team : The evaluation team consisted an MAE-FETP scholar and two fresh unemployed male health workers trained in the interview method and structured observation. We pre-tested the questionnaires.

We used a cross-sectional study design for the evaluation of ICDS programme in Tlangnuam Rural Block area (Figure2).

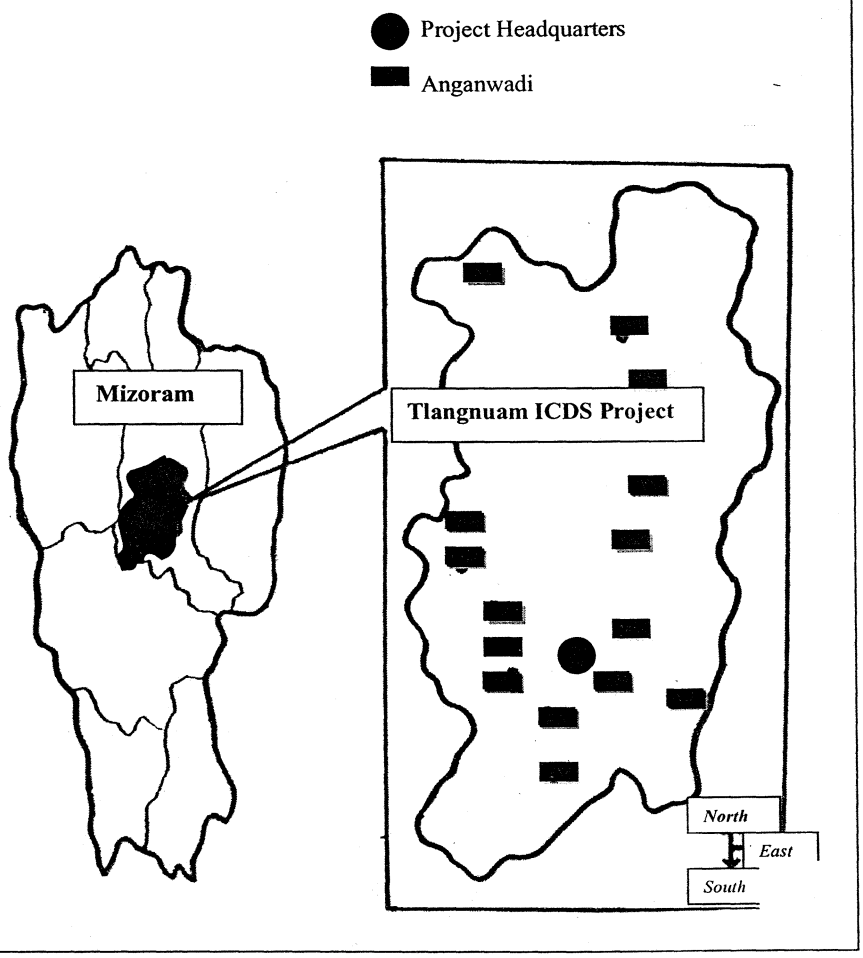
We conducted the evaluation during January- March,

Reference period : January2003 – December, 2003 was the reference period for the evaluation.

Evaluation area: We chose Tlangnuam ICDS Project in Tlangnuam R.D block for the evaluation for feasibility. The Block has 47 villages with a total population size of 2,52,667 in July, 2003[5]. There are 47 Anganwadi Centers. The Child Development Project Officer is the administrative head of the project which has five Circle Officers (supervisors) to look after five Supervisory Circles. The headquarters of the ICDS Project is situated in the southern part of Aizawl, the state capital of Mizoram.

Sampling frame and sample size: Of the 47 Anganwadi Centers in five supervisory circles covering 47 villages, three Anganwadi centers were selected at random from each circle.

Figure 2. Map of Mizoram showing Tlangnuam ICDS Project



We enumerated all the houses in the selected Anganwadi center villages to identify the target population. From each AWC area, we included (1) four households in which there were 0-35 months and 36-72 months old children and (2) three households in which there were women lactating for less than three months. In addition, we selected three households in which there were female adolescents between 11 and 15 years and between 16and-17 years to collect data with respect to the utilization of services provided at the Anganwadi centers.

The Director of Social Welfare Department of the Government of Mizoram issued a letter of permission for the evaluation in December 2003after considering the benefits which were likely to emerge from the evaluation. We discussed the needs and methods of the evaluation with the Child Development Project Officer of Tlangnuam Integrated Child Development Project who later instructed all the Anganwadi workers of the concerned Anganwadi centers to assist and cooperate with us during the evaluation. We were accompanied by the officers of the circles during the entire period of evaluation.

We collected information at different levels by interviewing the Child Development Project Officer of Tlangnuam ICDS Project, Medical Officers of Primary Health Centers at block levels, Circle Officers, Health workers, Anganwadi workers beneficiaries at households, community leaders at village level. We entered, processed and analyzed the data using Epi Info 3.3 version.

C. Results

C.1. Description of the programme

The ICDS scheme provides intervention in nutrition, health and education for children under six years of age, adolescents, pegnantand nursing mothers in the country. It aims to integrate all related government departments in providing the supportive services for the programme. The Department of Women and Child Development has the primary responsibility to implement the programme at the Center. The primary implementing agency in the states may be Social Welfare, Rural Development, Tribal Welfare, Health and Family Welfare or Women and Child Development department. In Mizoram, the Department of Social Welfare implements the programme in co-ordination with related departments. Of the 21 ICDS projects in Mizoram, five projects are located in Aizawl District. The total number of Anganwadi centers in Aizawl District is 317.There were 26464 nutrition beneficiaries among women and children in Aizawl District in 2001-2002 [5].

The general objectives of the ICDS Scheme are to(1) improve the nutritional and health status of children in the age group 0-6 years, (2)lay foundation for proper psychological, physical and social development of the child, (3) reduce the mortality and morbidity, malnutrition and school drop-outs, (4) achieve an effective co-ordination of policy and implementation among the various departments working for the promotion of child development, and (5) enhance the capability of the mother and nutritional needs of the child through proper nutrition and health education.

Package of services

To achieve the above objectives, the ICDS aims at providing the following g package of services (Table1): -

Table1. Package of services of ICDS scheme

Beneficiary	Services
Pregnant women	- Antenatal health checkups - Immunization against tetanus
Nursing mothers	- Post-natal care (health check-up) - Supplementary nutrition - Nutrition and health education
Other women 15-45 years	- Nutrition and health education
Children less than 3 years	- Supplementary nutrition - Provision of supplementary nutrition - Nutrition and health education - Immunization - General health check-up and treatment - Deworming - Referral of serious cases to hospitals
Children 3-6 years	- Supplementary nutrition - Periodic health check-up every 3-6 - months to detect disease and - malnutrition and treatment, if any.

- Immunization
- Deworming
- Referral of serious cases to hospitals
- Non-formal pre-school education

Scheme for adolescent girls:

The Department of Women and Child Development, Ministry of Human Resource Development launched the scheme for adolescent girls in 1991.This age group which was not covered by any health and social welfare programme while girls in this crucial age groups need special attention with regard to menarche, immunization, general health check-up once in every six months including de-worming, training for treatment of minor ailments, prophylactic measures against micronutrient deficiency and referral to Primary Health Center or District hospital when need arises.

Delivery of services

The aim of the ICDS scheme is to supplement nutritional intake by about 200 Calories and 8-10 grams of protein for children below one year ; and about 300 Calories and 15 grams of protein for children between one and six years of age; and about 500 Calories and 25 grams of protein for pregnant women and nursing mothers. Supplementary nutrition is expected to be given for 300 days in a year.

The scheme envisages monthly weighing of children, giving Nutrition and Health Education to mothers of children suffering from grade I malnutrition, provision of supplementary nutrition food to children suffering from grade II and grade III malnutrition. Children suffering from malnutrition grade IV are to be hospitalized. The grading of malnutrition were based on weight for age using growth charts designed for the programme on the line of Gomez classification. The scheme expects Anganwadi workers to impart Nutrition and Health Education to the target women between 15 and 45 years of age giving priorities to nursing and expectant mothers. The target children are to be immunized against six vaccine

preventable diseases while expectant mothers should receive immunization against tetanus under the programme.

The ICDS scheme also aims at antenatal visits for pregnant women, post-natal care of nursing mothers, care of newborn infants and care of children below six years of age. Besides immunization, expectant mothers are to receive iron and folic acid tablets along with protein supplements. In addition, the pregnant women should get at least three physical examinations before delivery while those with severe anaemia, diabetes, hypertension and other complications should be referred to appropriate institutions for special care.

The health care of children under six years of age include recording of weight and height of children at periodical intervals and watching over their milestones, immunization, general check-up every 3-6 months to detect disease, malnutrition, treatment of diseases like diarrhoea, dysentery, respiratory tract infections, de-worming, prophylaxis against vitamin A deficiency and anemia and referral of serious cases to hospital

Health records of the children, antenatal care and delivery cards are to be maintained and the mother keeps a card containing the health records of the child. The programme aims at imparting non-formal pre-school education to children between the ages of three and six years in the Anganwadi village. Locally produced inexpensive toys and materials are used in organizing play and creative activity.

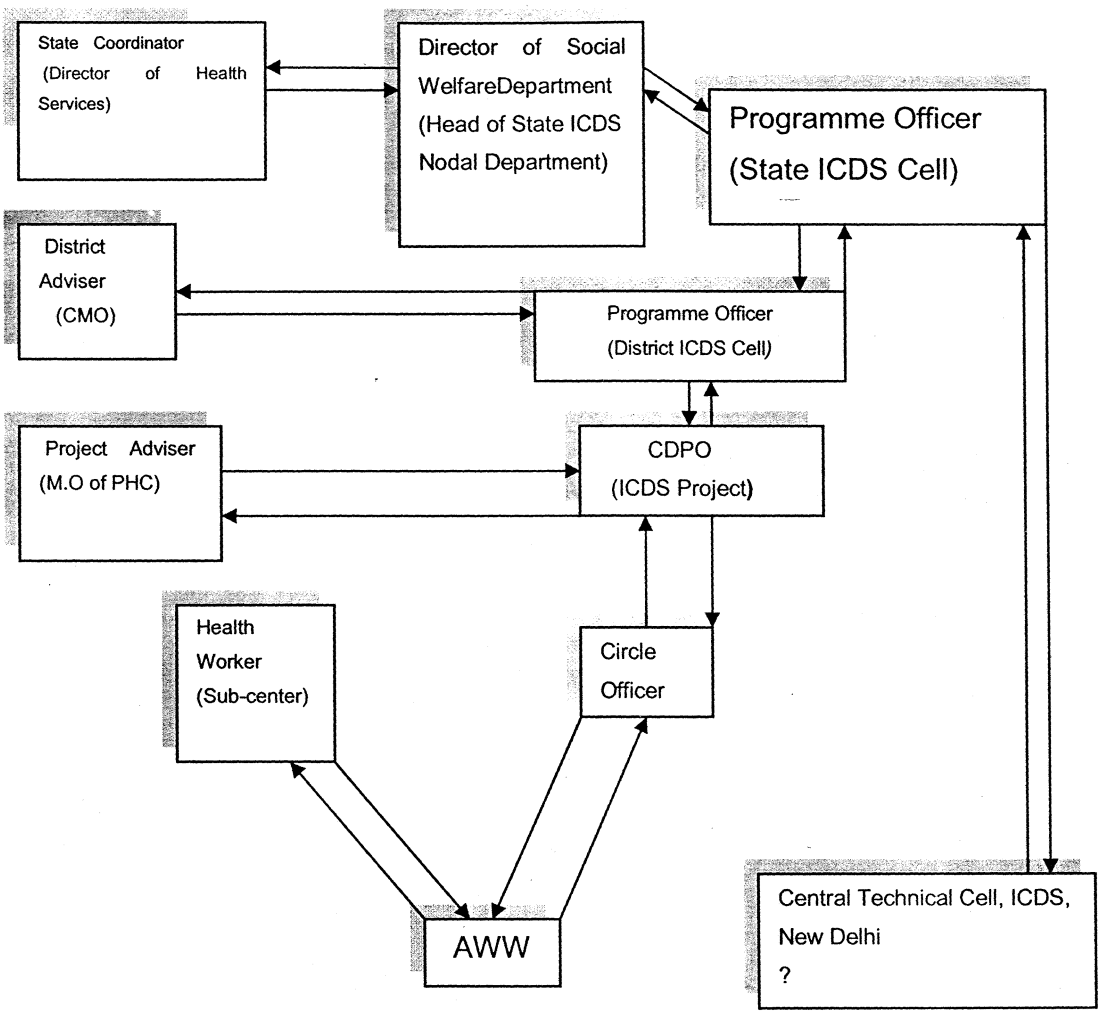
Role of the Health Department:

The health sector provides services including health check-up, handling the referred cases from the Anganwadis, immunization, health and nutrition education, continuing education of ICDS staff and monitoring of the health components of the scheme. These services are to be provided at the sub-center, primary health center and community health center levels.

Organizational structure of ICDS in Mizoram

The Child development project officer is the administrative head at the office of each ICDS project. A group of Anganwadi centers numbering about 25 constitute a circle and each ICDS Project has a number of circles depending upon the number of Angawadi centers in the project area. Each circle is kept under one Supervisor and each Anganwadi is looked after by Anganwadi worker assisted by a helper.

Figure 3. Organizational structure and flow of information of ICDS scheme, Mizoram



Acronyms: -

ICDS - Integrated Child Development Services
MO- Medical Officer
PHC - Primary Health Center
CMO- Chief Medical Officer of a district
CDPO- Child Development Project Officer
C.O - Mukhya Sevikas/ Supervisor/ Circle Officer (in Mizoram)
AWW- Anganwadi Worker

Feed back and flow of information (Figure 3.)

The Anganwadi workers prepare and submit monthly reports to the Child Development Project Officer of the Project through their respective Circle Officers (Supervisors / Mukhia Sevikas (Figure 1). Statistician of the Project compiles the reports and submits the compiled reports to the District Programme Officer .After compilation of the project reports, the District Programme Officer submits the district report to the State Programme Officer at the Directorate of Social Welfare Department, who, in turn, submits the compiled state reports to the Central ICDS Office at New Delhi.

Evaluation results of input

The evaluation outcome of input of the scheme in terms of infrastructure, facilities and inventories were presented and compared with those of the national evaluation (Table 2.).

Table 2.Input of Integrated Child Development Services scheme in Tlangnuam Project compared with input at national level evaluation.[6]

Infrastructure facilities / inventories	**Number (%)** *(n=15)*	**Input(% nationa level**
Anganwadis functioning from own building	13 (87)	NA
With concrete Building	4 (27)	43
With indoor space	15 (100)	54
With playing space	14 (93)	62
With cooking space	15 (100)	54
With storage space for nutrition	12 (86)	61
With toilets	6 (40)	17
With weighing scales in good condition	12 (93)	76
With learning kit for pre-school children such as plastic blocks, toys	15 (100)	32
With nutrition and health educationmaterials or messages	14 (93)	30
With medicine kit	15 (100)	27
With class-room facilities such as chalks, blackboard, duster, wooden pointer	13 (87)	NA
With cooking facilities such as pressure cooker, frying pan, kerosene stove with kerosene, spoons.	13 (87)	NA

With all necessary registers	15 (100)	NA

The proportion of Anganwadi centers functioning from concrete buildings (27%) fell short of the national average of 43%. Almost all the Anganwadi centers (87%) functioned from their own buildings .The number of Anganwadi centers with pucca (concrete) structure were less than the national average of 43%. The availability of space for pre-school, playing, cooking, nutrition storage was satisfactory. Toilet and water storage were also available in good number especially compared to the national level.

The inventories: Supply of necessary facilities or inventories such as weighing scale, class room materials, play materials, medicine kits, cooking items and registers which were required for the effective functioning of the centers were satisfactory. One of the centers reported defective weighing scale, which, however, was being replaced or repaired at the project office.

Results of process evaluation

The results of evaluation of the functionaries of Anganwadi centers as process indicators are presented in Table 3. compared with results at national level.

Table 3. Functionaries of Integrated Child Development Services, Tlangnuam ICDS Project,

Functionaries	**Number (%)** *(n=15)*	**(%) national level**
Anganwadi workers in position	15 (100)	97%
Anganwadi helpers in position	15 (100)	91%
Workers educated at least matriculation (passed)	4 (27)	50%
Anganwadi helpers illiterate	0 (0)	35%
Workers residing within the village where the center is located	14 (93)	78%
Workers assigned works beyond ICDS	15 (100)	22%
Anganwadi workers trained in ICDS	15 (100)	84%
Helpers trained in ICDS	8 (53)	46%
Workers receiving monthly honorarium with regularity	7 (47)	Not Available

Staff: All the posts available in the 15 Anganwadi centers were filled and all the Anganwadi workers were trained for their job responsibilities. Also, more than half of the helpers received training. 27% of the Anganwadi workers were educated beyond matriculation and 73.3% of them studied up to high school. and 14% of them had passed their matriculation which could be advantageous for the concerned Anganwadi centers as they are in a better position to assist the Anganwadi workers. All the Anganwadi workers , except one, function from the same locality as that of the Anganwadi centers which is another important feature for smooth functioning of the centers.

Table 4. Process indicators related to functioning of Anganwadi centers in Tlangnuam ICDS Project, Mizoram, compared with national levels

Functioning of Anganwadi centers (n=15)	**Median at Project level**	**National level**
- Average duration for which Anganwadi centers were open each day (in minutes)	135	263
- Average duration of time spent by Anganwadi workers in ICDS scheme activities each month (in hours)	60	Not available
- Average number of days Anganwadi centers remained closed during the last one year	42	31
- Average duration of time spent by Anganwadi workers in activities not concerned with ICDS each month (in hours)	13	Not available
- Number of meetings with health workers and medical officers during last month	2	2
- Average number of visits by supervisors during last month	3	1
- Average no. of visits to AWCs as reported by health workers (n=10) in the sub-centers of the ICDS Project area	4	Not available

- Proportion of Anganwadi centers with frequent closure due to monsoon during last year	3/15 (20%)	Not available

The number of days the Anganwadi centers remained closed during the reference period (1 year) was 41 days against the national average of 30days.

Table 5. Functioning of Anganwadi centers in record keeping and enrolment, Tlangnuam Integrated Child Development Services, Mizoram, 2003

Functioning of Anganwadi centers	Proportion at project	National
Proportion of Anganwadi workers maintaining growth charts up-to-date	10/15(67%)	40%
Proportion of Anganwadi workers maintaining prescribed registers up-to-date	10/15 (47%)	Not available
Proportion of children enrolled	82%	65%
Proportion of women enrolled	67%	62%

More than half of the centers did not maintain or complete the charts

Enrolment: 82% of the target children were enrolled in the project area.

Table 6. Level of utilization of supply and services provided at Anganwadi centers in Tlangnuam Integrated Child Development Services, Mizoram,2003, compared with National levels

Services and supply	Proportion	Proportion at national level
Anganwadi centers providing food Supplements for		
≥ 21 days in a month	10/15 (67%)	67%
= 21 days	3/15 (20%)	Not available
15-20 days	1/15 (7%)	Not available
< 15 days	1/15 (7%)	Not available
Supply of poor quality nutrition as perceived by Anganwadi workers	0/15 (0.0%)	63%

Irregular supply of nutrition as perceived by Anganwadi workers	1/15 (7%)	67%
Households reporting nutrition supply as good (n=150)	148/150 (99%)	42%

Table 7. Level of utilization of services at Anganwadi centers, Tlangnuam Integrated Child Development Services Project, Mizoram, 2003

Services and utilization	Proportion	Proportion at national level
Proportion of children availing regular Health check up during last year	32%	44%
Proportion of children immunized as schedule 0-36 months	72%	NA
Proportion of pregnant women immunized as schedule	91%	NA
Proportion of growth monitored children	45%	62%
Proportion of women receiving supplementary nutrition	7%	NA
Proportion of children availing referral Service	11%	10%
Proportion of women covered under Nutrition and Health Education (NHE) services	77%	72%
Proportion of adolescents receiving regular health check up during last year	26%	NA
Proportion of Anganwadi centers providing pre-school education for >21 days	67%	68%

Immunization: Majority of the pregnant women (92%) were immunized against tetanus and 72% of the 0-36 months children were fully immunized against vaccine preventable diseases.
Only 11 % of the households reported their children referred to hospitals or health centers for further treatment from the Anganwadi center.

Pre-school education: Pre-school education was regularly provided as reported by 90% of representatives of the households (n=150) interviewed.
Service to adolescent girls: Health care to adolescent girls was deficient as only 26% received health check up during the year.
Nutrition and Health Education: Nutrition and Health Education is an important component of the ICDS programme and the performance of the Anganwadi centers in this project area was satisfactory even in view of the national average.

Attitude of the Anganwadi workers: All the households were satisfied with the attitude or behaviour of the AWWs in their respective centers.

Role of village level coordination committee: The village level ICDS coordination committee was actively involved for the welfare of the centers in more than three-fourths of the centers.

Non-ICDS activities: All the workers were assigned non-ICDS works and in spite of this extra duty, none of them reported the interference with the normal ICDS activities, which is commendable as most of these extra works were indirectly linked to child development.

Reporting system : Regular and timely submission of the monthly reports was observed and seen as the strength of the ICDS programme in the area and in the whole of the state of Mizoram (Executive Summary, Concurrent Nationwide Evaluation of ICDS, National Council of Applied Economic Research, New Delhi, July, 2001). All the Anganwadi workers prepared the immunization component part of the report form in consultation with the health workers of their respective

health sub-centers. This opened an opportunity to interact with the health care providers at least once a month.

Supervision: The monthly supervisory visit from the project office was satisfactory even when compared with the national average.

Table 8. Level of community support received by Anganwadi centers under Tlangnuam ICDS Project, Mizoram, 2003

Type of community support	Proportion	National level
Anganwadi centers reporting community support	100%	54%
Anganwadi centers reporting support from village council and village leaders	73%	34%
Anganwadi centers reporting support from women's groups and mothers of children	73%	57%
Anganwadi centers reporting support from family members of AWC functionaries	60%	41%
Anganwadi centers reporting support from other members of the community such as non-governmental organizations	53%	35%

Supplementary nutrition: The regularity and quality of the nutrition supplied to the Anganwadi centers in the project were perceived as good from all corners where the study was conducted. 67% of the centers could provide nutrition for 21 days or more per month on an average.

Table 9. Health workers' awareness and perception of Tlangnuam Integrated Child Development Services Project, Mizoram, 2003

Functioning of the project	Number (%) (n=10)
Health workers reporting attendance of ICDS review meetings during last year	6 (60%)
Health workers reporting awareness / the existence of village level ICDS coordination committee in their village of residence	7 (70%)
Health workers reporting the existence of village level ICDS coordination committee in all the villages covered by their sub-center	6 (60%)
Health workers reporting membership in the village level ICDS coordination committee	5 (50%)
Health workers reporting interaction with the circle officers (supervisors) of the ICDS Project during last month	0 (0.0%)
Health workers reporting interaction with AWWs of their area during last month	10 (100%)
Health workers reporting at least monthly interaction with AWWs during last year	10 (100%)
Health workers reporting immunization of ICDS beneficiaries given at the sub-centers	10 (100%)
Health workers reporting treatment of ICDS beneficiaries for illness	10 (100%)

Health workers giving priority for treatment to referred children from AWCs	6 (60%)
Health workers reporting the AWWs as able to provide treatment to children with medicine kit contents	7 (70%)
Health workers reporting receipt of monthly ICDS report	3 (30%)
Health workers reporting satisfaction with the coordination with ICDS staff in their area	9 (90%)
Health workers satisfied with community participation for the welfare of AWCs	9 (90%)
Health workers' perception of the need for further improvement in the functioning of ICDS and better coordination	10 (100%)

40% of the health workers were not aware of the existence of village level coordination committee in their areas and only 5 out of 10 health workers interviewed indicated their involvement in the committee.

Table 10. Perception of the Community leaders of the functioning of Anganwadi centers in Tlangnuam Integrated Child Development Services Project, Mizoram

Perception of village community leaders	Number (%) (n=10)
Anganwadi center of the village functioning regularly	14 (93%)
ICDS benefited by the target population	15 (100%)
Proportion of village leaders satisfied with the performance of Anganwadi centers	14 (93%)
Community leaders reporting frequent closure of Anganwadi centers due to heavy rain during monsoon	14 (93%)
Leaders satisfied with the quality of pre-school education at Anganwadi centers	14 (93%)
Perception of the quality of nutrition supplied to Anganwadi centers as good	15 (100%)

Health check up for ICDS scheme beneficiaries perceived as good	14 (93%)
Perception of referral service provided as satisfactory	14 (93%)

The average number of village level coordination committee sittings during last year as reported by community leaders was only four times.

Results of evaluation of outcome indicators

Client satisfaction:

All the respondents of households interviewed were satisfied with the behaviour and attitude of the Anganwadi centers and the community leaders (n=15) interviewed in all the villages covered during the evaluation expressed their satisfaction with the functioning of the Anganwadis. The quality of nutrition supply was perceived as good by the health workers, the household interviewees, the workers themselves and the community leaders during the interviews.

There was decrease in malnutrition of all grades in ten Anganwadi centers out of 15 (67%) compared to the year before evaluation. However, four Anganwadi centers out of 15 (27%) reported increase in the number of malnourished children.

The evaluation indicated decrease in childhood illnesses in 7 of the 15 Anganwadi centers (47%). There was decrease in deaths below one- year old children in eight out of 15 (53%) Anganwadi centers of the Anganwadi centers compared to the previous year. There were no school drop outs reported from any of the primary schools in the project area.

Discussion

The overall performance and achievement of ICDS scheme in the study area was remarkable. Adequate infrastructure and inventories with good quality nutrition, the strength of staff and dedication of the ICDS project staff and community participation were satisfactory and these factors, being the backbone of any successful ICDS scheme, contributed to the good performance.

Despite deficiency in certain parameters compared to the national average and some of the service components, like referral service below expectation, there is scope for improvement with re-orientation course and result oriented supervisory visits. In fact, the performance of the programme in the state of Mizoram for which the contribution of Tlangnuam ICDS project was notable, emerged as one of the top five achievers among the states in India[6].

We evaluated the ICDS programme in Tlangnuam ICDS project with respect to the input, process and out put indicators. The strengths and weaknesses were assessed. Our findings indicated remarkable and significant strengths in the delivery service components of ICDS scheme as discussed below.

Despite the functioning of majority of the Anganwadi centers from their own buildings, the number of pucca (concrete) buildings were less than the national average and the evaluators noticed three of the centers which were rather in a bad shape requiring immediate repair.

Physical proximity of the anganwadi center was satisfactory and the perentage of households (n=150) reporting approach to the Anganwadi centers as not difficult was 92.0%. This is remarkable in hilly areas such as Mizoram and indicated that due consideration had been given while allocating the AWCs in the villages of the area.

All the helpers were literate (all India[4]: 36%)

Community participation:

The community was involved in all the centers in one way or another. Participation from the other members of the community such as village council, non-governmental organizations were reportedly satisfactory which constitute an important element in the ICDS scheme.

Strengths:

The strengths of the ICDS project under evaluation were indicated by the following indicators:-

Enrolment: 82% of the target children were enrolled in the project area which is much higher than the national average. The percentage of women enrolled was, however, did not show significant difference (67% vs. 62%).

Weaknesses:

Duration of Anganwadi centers:

The average duration for which the Anganwadi centers function per day in minute was shorter than the national average (135 minutes vs. 263). However, the quality of services provided should be weighed against the duration and whether the data at the national level contained out layers also need to be scrutinized.

Closure of Anganwadi centers:

The average number of days the Anganwadi centers remained non-functional was much higher than the national average of 31 days during a year. This was mainly because the Anganwadi centers in Mizoram remain closed during primary school vacation whereas it was not the case elsewhere in the country. The explanation given was that the primary school children used to join these Anganwadi centers during vacation and causing inconvenience in the smooth running of the centers as the Anganwadi centers were also hesitant in avoiding them while nutrition items were being served to the beneficiaries.

Growth monitoring:

Growth monitoring is an important channel, which provides opportunities for face –to-face communication with mothers. Although the average level of maintenance of the growth charts were higher than that of the national level, more than half of the centers did not maintain or complete the charts which suggests the failure of the workers in performing their duties or they were not well-versed in the method. This finding is also supported by the result of evaluation conducted in the tribal district of Dhar, Madhya Pradesh where on an

average, only around 50% of Anganwadi workers were found to be capable of the task of weighing and plotting on the growth charts[8] .The adequacy of training received by the Anganwadi workers and the identification of 'weak areas' in which further training was required was highlighted by an evaluation conducted by the Nutrition Foundation of India.[9] The Foundation even suggested apart from the major reliance on the three month pre-service training, more emphasis may need to be given to refresher oriented courses and in-service training, especially in the case of areas from which Anganwadi workers with requisite minimal educational qualification could not be recruited.

Maintenance of records and registers:

The prescribed registers were supplied to all but maintained up to date by less than half of the centers. This also suggests the need for a more function-oriented supervisory visits and emphasis on training for the improvement of routine works related to Anganwadi centers.

Referral services:

An extremely low level of referral was reported in the national evaluation where only 10% of the children availed of the service. The weakness in the referral system was also noticed by National Consultation to Review the Existing Guidelines in ICDS scheme in the Field of Health and Nutrition (Indian Pediatrics 2001, 38: 721-731). Placement of an effective system of referrals from Anganwadi centers is necessary and the same may be worked out through the joint consultations and arrangements between the health system and the ICDS nodal department.

Coordination between health and ICDS functionaries:

A functional gap was observed between the ICDS functioning and the health sector in the present evaluation. Involvement of the health workers was far from satisfactory. While this is the case, the coordination committee for Anganwadi center may be made aware of the key role played by the health care providers and necessary steps taken for their inclusion in the committee. Similarly, involvement of the medical officers of the ICDS project area would further

improve the coordination between the two major players, ICDS and Health department in the improvement of the service components of ICDS. There was no interaction between the health workers and the supervisors from the project during the entire year of 2003 and feed back of any form was not received by the staff of the sub-centers in the project area.

D. Recommendations

The evaluation of the performance of the ICDS in Tlangnuam ICDS Project projected the strengths of the programme in terms of several input, process and output indicators. In spite of the several achievements of the scheme in the project area through the Anganwadi centers, we made recommendations in the light of the weaknesses identified:-

Building:

It is recommended that steps be taken to make target oriented achievement at least to enjoy the national level despite observance of initiatives being taken in the project area in connection to construction of center buildings. Over ambition on the part of the community could also result in failure to complete the building construction as observed during the evaluation. This should be prevented by goal-oriented supervisory activity while keeping the objectives of ICDS scheme from the project and district level officers.

Duration of functioning of Anganwadi center:

We recommend that uniformity be observed in the duration of the functioning of the Anganwadi centers of the project. The range observed was 90 to 180 minutes on the days of functioning with the average duration calculated as135 minutes (national average: 263 minutes).

Closure of Anganwadi centers:

The number of days the Anganwadi centers remained closed during the reference period (1 year) was 41 days against the national average of 30days. The feasibility of functioning even during school holidays should be sought. The

reason behind the closure or non-functioning of the Anganwadi centers during school vacation is hardly justifiable and beyond the scope of the ICDS scheme even if the same is practiced in the whole state.

Growth monitoring and record maintenance:

More than 50% of the Anganwadi centers were not interested or not capable of correctly weighing and plotting the growth charts to monitor the progress of the beneficiaries. A re-orientation short training should be conducted to make the Anganwadi workers feel at home in the growth monitoring of the target children. Also, standardization of the workers as well as the weighing machines at all the Anganwadi centers should be done simultaneously to get the most accurate results. The current manner in which growth monitoring is being implemented serves no useful purpose. Strong linkages need to be developed in growth monitoring activities for Nutrition and Health Education for behavioural change.[7] It is true that the Anganwadi workers were burdened with numerous registers to be maintained and kept up-to-date in spite of the voluntary nature of work. Solution should be sought to keep the number of registers at the minimum and the proformae made as simple as possible. Our evaluation indicated that only less than 50% of the Anganwadi workers could maintain their registers up-to-date with reliability. Re-orientation on this aspect should be considered in order to get the true picture of the benefits of ICDS in the area.

Referral service:

In spite of the seriousness of the issue where the ICDS beneficiaries were bestowed with provision for referral when their health problems could not be solved at the local Anganwadi center level, the referral service remains one of the most neglected components of ICDS scheme. The same holds true in the case of the project under evaluation. The referral service was not effective as indicated by the fact that 51% of the household respondents (n=150) were not aware of the existence of the system, 38.7% of the respondents who were aware of its existence considered it bad and only 11% of them were satisfied with

the system. Referral services for children were reported to be almost negligible by the evaluation at national level.

We recommended that an implementation framework be developed for the promotion of referral system to make its effective impact visible .Political and administrative will is critical in this regard to produce the desired result.

Coordination between Health and ICDS functioning:

The objectives of the ICDS and health sector are overlapping to a great extent except for the components of supplementary nutrition programme and non-formal pre-school education. Yet, it is undeniably agreeable that the coordination between the two functionaries is far from satisfactory. The gap was reflected in the present evaluation, too, as evident from the picture of referral services, amount of involvement or awareness of the multi-purpose workers in ICDS activities in spite of the monthly assistance provided to the Anganwadi workers in the preparation of the reports. The amount of involvement of the Anganwadi workers in the provision of the health components was also questionable. Political and administrative interference is recommended as a remedy and to bridge the gap in the coordination of the two vital and key functionaries of ICDS scheme.

Limitations of the evaluation

The study was limited to 15 Anganwadi centers. This was, however, reasonable considering the uniformity of the geographical, economic and demographic characteristics of the population and the villages in which the Anganwadi centers were located.

The present study is limited as the financial input component was not included in the evaluation. It would be interesting to conduct a cost-effectiveness study of the project and also the impact of ICDS among the target groups in villages with Anganwadi centers and those without Anganwadi centers.

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FORM I :

EVALUATION OF ICDS SCHEME IN MIZORAM

Questionnaire for Anganwadi worker (AWW)

(Chhanna chungah **Tick mark (v)** dah zel la, a tulna hmunah i **chhanna ziah** tur)

Anganwadi Worker hming : Kum zat :

Anganwadi center hming : Khaw hming :

Anganwadi Center (AWC)-a thawktute chung chang :

1. Lehkha eng chen nge i zir ?

[Matric chung/Matric passed] [High school]

[Middle school] [Primaryschool]

2. I thawhna Anganwadi Center awmna-ah in chhungkua in cheng em ?

[AW] [AIH]

3. Anganwadi Worker tana buatsaih training neih tawh zat :-

a. Training puitling : vawi _____

b. Training tenau : vawi _____

4. Anganwadi Worker i nih anga i mawhphurhna piah lamah hna dang pek belh thin I ni em ?

[AW] [AIH]

5. (Pek belh I nih chuan) Chung mawhphurhna an pek belh che chuan dangte chuan ICDS atana I hna thawh a tithuanawp em ?

[AW] [AIH]

6. A tlangpui thu a thla khat chhunga ICDS tana I hun (a darkar in) hman zat :

[darkar_____vel]

7. Thla khat chhunga , ICDS ni lo, mawhphurhna pek belh atana hun (a darkar in) chawh ruala i sen thin zat han sawi teh .

[darkar _____vel]

8. I thawhna Anganwadi Center-a thawhpui tur helper I nei em ?

[AW] [AIH]

9. I Helper in eng chen nge lehkha a zir ?

[Matric chung lam/ matric passed]

[High school] [Middle school]

[Primary school]

10. Helper I neih chuan ICDS lamah training pek tawh a ni em ?

[AW] AIH]

Hnathawhna lam pang :

11. Eng tia rei (minute zat) nge Anganwadi center I hawn thin ?

[Minute 60 aia rei lo] [minute 60-atanga 90 inkar]

[minute 90-120] [minute120-150] [minute150-180]

[180 aia rei]

12. A hnuaia tarlanahte hian Anganwadi center hawn ni a hun hman dan tar lan ni se :-

a. Pre-school Education pek rei zawng: Minute_____vel

b. Anganwadi a kal naupang Supplementary Nutrition pek nana hun hman :

Minute_____vel

c. Naupang infiam/ inkhualtelem pui nana hun hman pui zat :

Minute_____vel

d. Register leh record vawn leh ziah fel nana hun hmanzat :

Minute _____vel

13. Nikum ,April 2003- March 2004 , chhungin Anganwadi center ni eng zat nge in khar ?

[Ni _____]

14. Fur khaw chhiat vanga AW Cente khar ni a tam em ?

[AW] [AIH]

15. School chawlh laiin Anganwadi center in chawl ve em ?

[AW] [AIH]

16. Naupang ho 'Growth Chart' i vawng (up to date) tha em ?

[AW] [AIH]

17. Thla hnih kal ta (April leh May 2004) chhunga in Anganwadi center tlawhtute leh an rawn kal zat han sawi teh.

Sl No.	Tlawhtu nihna (Designation)	Tlawh zat
1.	Bialtu Doctor (Medical Officer)	vawi _____
2.	Bialtu Health worker	vawi _____
3.	CDPO	vawi _____
4.	Bialtu Circle Officer	vawi _____
5.	Co-ordination committee memberte atangin	vawi _____
6.	Tlawhtu dang_____	_____

18. Thla hnih kalta chhunga a hnuaia mite va hmuh zat (mahni office / thawhna hmunah)

ICDS thawktute	Hmuh zat
a. CDPO :	Vawi _____
b. Circle Officer :	Vawi _____
c. Bialtu Medical Officer :	Vawi _____

d. Sub-center Health workers : Vawi _____

19. Kum kalta , April 2003-March 2004 , chhung khan Village level Co-ordination committee vawi engzat nge in neih ?

[Vawi : _____]

20. Kum kalta chhunga ICDS lama Review meeting/ seminar/ training a hnuaia tar lan a neih zat han sawi teh .

Project level : vawi: _____

Circle level : vawi : _____

Enrolment :

21. Kum 2003-2004 a

AW Center huam chhunga naupang Anganwadi center-a

a). Thla 6 – 12 inkar awm zat: _____ Ziah luh zat : _____

b). Thla 13- 36 inkar awm zat : _____ Ziah luh zat : _____

c). Thla 36 – 72 inkar awm zat: _____ Ziah luh zat : _____

d). Kum 3- 6 (Pre- school)

naupang rual awm zat : [Mipa naupang ____ [Hmeichhe naupang _____

Ziah luh zat: [Mipa naupang _____[Hmeichhe naupang _____

e). Nu naupai awm zat : _____ Ziah luh zat : _____

f). Nu naute hnute pelai awm zat : _____ Ziah luh zat : _____

f). Hmeichhia kum 15-45 inkar awm zat:_____ Ziah luh zat : _ ___

g). Adolescent girls kum 11-18 awm zat :_____ Ziah luh zat : _____

h). Chawh rual (average) a naupang Pre-school kal thin zat :

Mipa_____

Hmeichhia: _____

ICDS Service pek chung chang:

22. Thla kalta (May 2004) chhung khan In AW center-ah nutrition supplement ni engzat nge in sem ?

[ni 15 aia tlem] [ni 15-20] [ni 21 , ni 21 aia rei]

23. I ngaih danin nutrition in dawn ho 'quality' hi engnge ang i tih ?

[a chhia] [a tha tawk]

24. Kum 2003-2004 chhungin Nutrition supply in dawng regular em ? [AW] [AIH]

25. Engtinnge nutrition lak/ dah a nih thin ?

[mahni (AW Worker)-in] [Office atanga rawn dah] [Khawtlang mi tlawmngaite lak]

26. In center mamawh zat nutrition in dawng thin em ? [AW] [AIH]

27. Kum 2003-2004 chhunga i AWC bial chhunga naupang regular taka health check-up

pek thin zat han sawi teh. [_____]

28. ICDS target women (AW Center-a nu, nau pai leh hnute pe lai ziah luh ho) regulara taka health check-up pek zat han sawi teh.

[Nau pai :_____] [Hnute pe lai : _____]

29. Hmeichhe tleirawl, adolescent girls, regular taka health check-up pek zat : [_____]

30. Medicine kit hmanga naupang damlo enkawl zat : [_____]

31. AW center atanga naupang damlo PHC/ damdawi in pan tura refer zat han sawi teh.

[_____]

32. Kum 2003-2004 chhunga immunization pek dan tur anga dawng kim zat :

a. Naupang thla 36 hnuai lam chin : [_____]

b. Naupang thla 36 chung lam : [_____]

c. Nu naupai immunization (injection Tetanus toxoid) dawng zat : [_____]

d. Nu Supplementary Nutrition dawng mek zat : _____

33. Naupang than dan regular taka en zui (Growth Monitor) zat : [_____]

34. Naupang 'Iron &Folic Acid' AW Center-a pek zat : [_____]

35. Naupang 'Vitamin A' pek thin zat : [vawi _____]6

36. Thla kal ta , May 2004, chhunga center-a naupang pre- school education regular

taka pek thin zat :

[__ _____]

37. In Center-ah thla kal ta chhung khan Nutrition and Health Education (NHE) vawi eng zat

nge pek a— nih ?

[_____]

38. Tunge NHE chu pe thin ?

[AW Worker] [Health Worker] [Petu dang (nihna):

_____]

AW center-a Khawtlang tel ve dan :

39. AW center atan khawtlang puihna dawn a ni tawh thin em ? [AW] [AIH]

40. MHIP leh nuho ten an pui thin che em ? [AW] [AIH]

41. Anganwadi a kal naupang nute emaw, chhungte emaw atanga puihna in dawng thin em ?

[AW]

[AIH]

42. V.C lama tanga puihna AW Center –in a dawn tawh thin em ? [AW] [AIH]

43. Tlawm ngai pawl YMA leh tlawmngai pawl dang atangin puihna Anganwadi center-in a dawng em ?

[AW] [AIH]

Thil dangte :

44. Honorarium regular takin I dawng thin em ? [AW] [AIH]

45. Co-ordination committee nen in thawh hona a tha tawkin I hria em ? [AW] [AIH]

46. I Helper nen in thawh hona a tha tawk em ? [AW] [AIH]

ICDS scheme hnu hma :

47. Kum hnih (2) kal ta , (2001-2002) leh (2003-2004),chhunga a hnuaia tarlanah I bial chhung

din hmun han tar lang ang che.

(A)	Kum 2001-2002 chhunga	Kum 2003-2004 chhunga

35. Naupang 'Vitamin A' pek thin zat : [vawi _____]6

36. Thla kal ta , May 2004, chhunga center-a naupang pre- school education regular

taka pek thin zat :

[__ _____]

37. In Center-ah thla kal ta chhung khan Nutrition and Health Education (NHE) vawi eng zat

nge pek a– nih ?

[_____]

38. Tunge NHE chu pe thin ?

[AW Worker] [Health Worker] [Petu dang (nihna):

_____]

AW center-a Khawtlang tel ve dan :

39. AW center atan khawtlang puihna dawn a ni tawh thin em ? [AW] [AIH]

40. MHIP leh nuho ten an pui thin che em ? [AW] [AIH]

41. Anganwadi a kal naupang nute emaw, chhungte emaw atanga puihna in dawng thin em ?

[AW]

[AIH]

42. V.C lama tanga puihna AW Center –in a dawn tawh thin em ? [AW] [AIH]

43. Tlawm ngai pawl YMA leh tlawmngai pawl dang atangin puihna Anganwadi center-in a dawng em ? [AW] [AIH]

Thil dangte :

44. Honorarium regular takin I dawng thin em ? [AW] [AIH]

45. Co-ordination committee nen in thawh hona a tha tawkin I hria em ? [AW] [AIH]

46. I Helper nen in thawh hona a tha tawk em ? [AW] [AIH]

ICDS scheme hnu hma :

47. Kum hnih (2) kal ta , (2001-2002) leh (2003-2004),chhunga a hnuaia tarlanah I bial chhung

din hmun han tar lang ang che.

(A)	Kum 2001-2002 chhunga	Kum 2003-2004 chhunga

Naupang? ?	Malnourished neih zat GRADE				Damlo zat	Thi zat	Malnourished neih zat GRADE				Damlo zat	Thi zat
	I	II	III	IV			I	II	III	IV		
Kum 1 hnuai lam												
Kum 1-3												
Kum 3-6												
(B)	Kum 2001-2002 chhunga I bial a						Kum 2002-2003 chhunga i bial a					
Naupang ?	Primary School ban san zat_____						Primary School ban san zat _____					
(C)	Kum 2001-2002 a Anganwadi Center bial chhunga						Kum 2002-2003 a Anganwadi Center bial chhunga					
	Damdawi in (Hospital or PHC)a nau piang zat: _____				In lama nau piang zat _____	Belh khawm zat : _____	Damdawi in (Hospital or PHC)a Nau piang zat _____				In lama nau piang Zat ___	Belh khawm zat _____

FORM II HOUSEHOLD SURVEY OF ICDS BENEFICIARIES

Chhangtu hming : _____ Kum zat : _____

House No. : ____

Anganwadi center :_____ Khaw hming :_____

1. ICDS zar zo (beneficiaries) chhungkua a cheng zat :-
   a). Kum 3 hnuai lam awm zat : _____
   b). Kum 3 leh kum 6 in kar zat : _____
   c). Hmeichhia kum 11-18 zat : _____
   d). Nu nau pai mek (rai) awm zat: _____
   e). Nu nau pawm lai awm zat : _____
2. Thla tin a nutrition dawn dan : [ni 15-20] [ni 21] [ni 21 aia tam]
3. Nutrition dawnte chu a quality a tha em ? [Tha] [Tha lo]
4. In 'Nutrition' dawn dan a regular em ?

   [Regular] [Regular lo]
5. Immunization , natna laka venna beneficiaries-te lak dan :
   a) Kum 3 hnuai lam awmte :La kim/ kim lot zat_____
   b) Kum 3 - 6 inkar awmte : La kim/ kim lozat _____
   c) Nau pai (rai lai) mekte : La kim/ kim lot zat _____
   d) Nau nei hlimte : La kim/ kim lo zat _____
6. In chhungkua a ICDS beneficiaries- ten health check-up an dawng regular em ?

   [Regular] [Regular lo]
7. ICDS beneficiaries-te tan dam lo Referral Service a awm tha em ?

   [Awm] [Awm lo] [Hre lo]
8. Naupangte'n Pre-school Education, zirtirna, Anganwadi-ah regular takin an dawng em ?

   [AW] [AIH]
9. Nutrition and Health Education (chaw tha leh hriselna lam zirtirna) Anganwadi-ah nuho tan pek thin a ni em ?

   [AW] [AIH] [Hre lo le]
10. Hmeichhe tleirawl (kum 11-18) tan hriselna hawizawng a counseling (zirtirna) neih thin a ni em ?

    [AW] [AIH] [Hre lo le]
11. In in atangin Anganwadi center pan a buaithlak em ?

    [AW] [AIH]

2. In Veng a Anganwadi worker hi fel I ti em ?

   [AW] [AIH]

13. In chhngkua- a hmeichhiate'n a tul anga hriselna lama hma an lak leh an inenkawlna-ah zalenna an nei em ?

    [AW] [AIH]

14. Naupang hriselna lama enkawlnaah nuhote'n sawi theih an nei ve em ?

[AW] [AIH]

15. In chhungkua a nu awmte'n nitina fa enkawlnan hun an sen zat :

[Nitin minute_____ vel]

16. Chhungkaw sum lak luh hman dan turahah chhungkuaa nute'n sawi theih an nei ve em ?

[Nei e] [Nei ve lo]

17. In Vengah Village Women's Committeé a awm em ?

[Awm] [Awm lo] [Hre lo le]

18. Anganwadi center hmasawn nan khawtlangin thawh leh tangkaina (Community contribution) a nei thin em ?

[Nei][Neih ka hre lo]

19. Anganwadi Co-ordination committee an active em ?

[AW] [AIH] [Hre lo]

FORM III **KEY INFORMANT INTERVIEW**

Questionnaire for Community Leader

(V.C.P or Chairman, Co-ordination Committee chhan tur*)

*(Chhanna chungah TICK ' v ' thai zel ni se)

Chhangtu hming : _____ Kum zat : _____
Khawtlanga nihna chelh mek : _____
Anganwadi center :_____
Khaw hming : _____

1. In veng/ khua a Anganwadi Center hi 'regular' takin hawn leh kal pui a ni em ?
[AW] [AIH]

2. ICDS programme Anganwadi center hmang a kal pui mek hi khawtlangin a hlawk pui in l hria em ?
[AW] [AIH]

3. In venga Anganwadi Co-ordination Committee engtia zing nge an kawmiti (committee) thin ?
[Thla tin] [Thla 2 danah] [Thla 3 danah]
[Kum 1-ah vawi 3] [Kum 1 –ah vawi 2]

4. Anganwadi Center tana khawtlang a thawh leh tangkainate (community contribution) a awmchuan a hnuaia mite chungah hian 'tick' ni se :-

[A hmun hma pek] [Center building sak hnatlang]
[Building repair] [Nutrition lak sak]
[Center- a thawktute puih]
[Center hnathawh dan a changa endik (supervision)]

5. Anganwadi center-a thawktute (Anganwadi worker leh a helper) hian i mit an tlungin khawtlang nen thawhhona in nei tha em ?
[AW] [AIH]

6. Fur khaw chhiat laiin Anganwadi center hi khar chang a tamin l hria em ?
[AW] [AIH]

7. A hnuaia ICDS service tarlanahte hian Anganwadi center-in a mawhphurhna hlen chhuak tawkin l hria em ?

a. Pre-school education : [AW] [AIH]
b. Nutrition pek danah : [AW] [AIH]
c. Naupang hriselna endik (health check-up)-ah : [AW] [AIH]
d. Nu leh naupang damlo hmunpui a 'refer'-ah : [AW] [AIH]

FORM IV : **KEY INFORMANT INTERVIEW**

QUESTIONNAIRE FOR PROJECT ADVISER (MO i/c PHC)

1. How many Anganwadi Centers (AWCs) are there in your PHC area ?
2. Have you attended training / review meeting concerned with ICDS scheme ?
   If yes, number attended with contents/ components of the training/review meeting ?
3. What are your responsibilities as the ICDS Project Adviser in your area ?
4. Do you feel your service is utilized as Project Adviser of the concerned ICDS project
5. Is project level ICDS Co-ordination Committee in existence ?
6. Have you attended the Committee at Project level ?If yes, how many during 2003-'04 ?
7. Are village level ICDS Co-ordination committees in existence all the villages with AWCs in the PHC area?
8. Have you been invited to attend the meetings ? If yes, number of meetings attended during the past year.
9. How many times have you met with the following ICDS personnel during 2003-04 :
   - CDPO
   - Circle Offficer(s)
   - Anganwadi Workers.
10. Is any arrangement made for transport/ POL to visit AWCs in your area ?
11. How many AWCs were visited by you during 2003-'04 ? State the activities during visit, if any.
12. How are health check-ups for the following categories of ICDS beneficiaries conducted:
    Pre-school children
    ANC for pregnant women
    Adolescent girls (11-18years)
13. Is arrangement made for giving priority to referral cases from AWCs ?
14. What activities are carried out by AWWs in the implementation of the health components of ICDS Scheme in your jurisdiction?

15. Do you receive copies of monthly AWC reports and feed back from the ICDS Project office ?

16. What are your recommendations for the improvement in the performance or Implementation of ICDS the PHC area ?

FORM V :

KEY INFORMANT INTERVIEW

QUESTIONNAIRE FOR HEALTH WORKERS (Sub-Centers)

1. How many Anganwadi Centers (AWCs) are there in your Sub-Center area ?
2. Have you attended training / review meeting concerned with ICDS scheme ?
   If yes, number attended with contents/ components of the training/review meeting ?
3. What are your responsibilities in the implementation of ICDS scheme in your area ?
4. Do you feel your service is utilized as the health personnel of the concerned ICDS project ?
5. Is village level ICDS Co-ordination Committee in existence ?
6. If yes, are you a member of the committee ?
   How many meetings were held during last year (2003-04) ?
7. Are village level ICDS Co-ordination committees in existence in all the villages with AWCs in your Sub-Center area ?
8. How many times have you met with the following ICDS personnel during 2003-04:
   - Circle Offficer(s)
   - Anganwadi Workers.
9. How many AWCs were visited by you during 2003-'04 ?
   State the activities during visit, if any.
10. How are health check-ups for the following categories of ICDS beneficiaries conducted:
    Pre-school children
    ANC for pregnant women
    Adolescent girls (11-18years)
11. Where is immunization given for 0-6 year-old children ?
12. Do you attend to sick children of 0-6 year-olds ?
13. Is arrangement made for giving priority to referral cases from AWCs ?
14. What activities are carried out by AWWs in the implementation of the health components of ICDS Scheme in your jurisdiction?
15. Are you aware of the contents of medicine kit received by Anganwadi Workers ?
16. Do you think AWWs are able to treat minor ailments with the medicine kit ?
17. How do AWWs prepare the monthly reports concerned with the health components of ICDS in your area ?
18. Do you receive copies of monthly AWC reports and feed back from the ICDS Project office ?
19. Are you satisfied with the level of co-ordination with ICDS staff in your area ?
20. Do you think the level of community participation in running the AWCs is satisfactory ?
21. What are your recommendations for the improvement in the performance or

Implementation the health components of ICDS in your Sub-Center area ?

FORM VI :

QUESTIONNAIRE FOR C.D.P.O : TLANGNUAM ICDS PROJECT

Name : Date_____

Are the ICDS staff in the project sufficient in number to run the project?
[1-Yes] [2-No]

2. Are you satisfied with the roles played by other ICDS concerned departments in the Project area ? [1-Yes] [2-No]

3. Do you feel the need to improve the roles being played by the following personnel in the Project area :

- Project Advisors [1-Yes] [2-No]
- Health Workers [1-Yes] [2-No]

4. Are you satisfied with the roles being played by NGOs, community in the Project ?
[1-Yes] [2-No]

5. Are you satisfied with the nutrition items and quantity supplied to Anganwadis?
[1-Yes] [1-No]

6. Is quality control of nutrition supply being done? [1-Yes] [2-No]

7. How many days in a month AWCs are expected to function ? [No. of days : ____]

8. What is the duration , in minutes, AWCs are expected to function on working days?
[_____ minutes]

9.

10. Is arrangement for health check-up of the scheme beneficiaries made?
[1-Yes] [2-No]

11. Is arrangement for referral services made ? [1-Yes] [2-No]

12. Is it effective [1-Yes] [2-No]

13. Are the reports from the AWCs regularly submitted in time ? [1-Yes] [2-No]
Is analysis of monthly data/reports done at your Project Headquarters ?
[1-Yes] [2-No]

15. Is feed back on reports given to the AWWs, Health Workers, Project Advisors at PHCs [1-Yes] [2-No]

16. Is Project level Coordination Committee actively functioning ? [1-Yes] [2-No]
How often meetings were held in the past year (2003-2004) ?
[_____]
How often are project level review meetings held in a year ?
[_____]

19. Who supervises the functioning of AWCs ? [_____]
How often are they expected to visit AWCs ?
[1-Monthly] [2-Quarterly] [3- Occasionally]

21. Is feed back given during monitoring and supervision ? [1-Yes] [2-No]

22. Do you receive feed back on your reports from the state or district Officers ?
[1-Yes] [2-No]

23. Is there any administrative and technical problems encountered in the smooth running of ICDS scheme in the Project ? [1-Yes] [2-No]

FORM VII : QUESTIONNAIRE FOR CIRCLE OFFICERS (M.S)

Name : _____

1. How many AWCs are there in your Supervisory Circle ? [_____]

2. Is village level Coordination Committee existing for every AWC in your Circle ? [1-Yes] [2-No]
3. Is survey of households conducted by AWWs ? [1- Yes] [2-No]

4. How many records/ registers are maintained by AWWs ? [_____]

5. Are you satisfied with their performances in maintaining the records / registers ? [1-Yes] [2-No]

6. Are monthly reports usually submitted in time ? [1-Yes] [2-No]

Are you satisfied with the completeness of the reports submitted ?
[1-Yes] [2-No]

8. Is there any instance where you are compelled to take actions on any AWW ? [1-Yes] [2-No]

9. What is the means of transport used to visit AWCs in your Circle?
1-[Bicycle] [2-Motor cycle] [3-On foot] [4-Others- specify]

10 When was your last supervisory visit to AWCs ? [_____]

11. Is feed back from monthly reports given on your supervisory visits ?
[1-Yes] [2-No]

12. What is the average duration (in minutes) AWCs in your Circle function on working days from your routine observation ? [_____ minutes]

13. Is referral service effectively functioning in your Circle ? 1-[Yes] [2-No]

How do you rate the quality of nutrition supply to AWCs ?
[1-Poor] [2-Good]

15. Is it acceptable to the beneficiaries, from your observation ? [1-Yes] [2-No]

16. Are there occasions of shortage of nutrition supply ? [1-Yes] [2-No]

17. Were AWCs closed due to the shortage of nutrition ? [1-Yes] [2-No]

18. Are you satisfied with the level of community participation ? [1-Yes] [2-No]

19. Do you encounter major obstacles in the smooth running of ICDS scheme

in the Circle ? [1-Yes] [2-No]

Critical Review of a Case Control Study of Screening Sigmoidoscopy and Mortality from Colorectal Cancer

Abstract

1. The study is significant and worth knowing about as it was intended to examine the efficacy of screening by sigmoidoscopy in reducing mortality from colorectal cancer as the same appeared to have reduced though not documented.

2. It was justifiable for the investigators to conduct the study with case – control design as a randomized trial was rather difficult in this case.

3. Data on 261 members of Kaiser Permanente Medical care program who died of cancer of the rectum or distal colon from 1971-1988 were used to examine the use of screening by rigid sigmoidoscopy during the ten year before the diagnosis and compared it with the use of screening in 868 control subjects matched with the case subject for age and sex.

The method adopted is reasonable for the results to be statistically significant.

4. The study results indicate that the risk of developing colorectal cancer was markedly lower for at least 10 years after a single sigmoidoscopic examination . The observation was consistent with the data suggesting the length of time from a clean bowelto the development of adenomatous polyps and progression to carcinomata is at least 10 years on average.

1. Introduction section :

1.1. The research question and purpose of the study was clearly stated – to examine the efficacy of sigmoidoscopic screening in reducing mortality from colorectal cancer.

1.2. The study is significant in that although there was an apparent benefit of screening by sigmoidoscopy in reducing the occurrence of colorectal cancer, no study had been conducted to document the hypothesis.

2. Methods section :

2.1. *Study design* : A case-control study design was used which is justifiable , although a randomized trial would have been more appropriate but found too difficult for the study.

2.2. The study population :

a) The case subjects were the members of the program who were 45 years of age or older and found to have adeno-carcinoma of the colon or rectum between 1971 and 1987 and who died of the cancer by the end of 1988.Persons with less than one year of membership before diagnosis were excluded. Potential case subjects were identified from files provided by the Bay Area Resource for Cancer Epidemiology, which collects and reviews all diagnosis of cancer from area facilities. Death was ascertained either directly from registry information or by automated linkage to California sate death certificates through 1988.

b) Two chart reviewers examined the medical records of each of the patients. The primary analyses include all 261 cases of fatal adenocarcinoma that could have been detected by rigid sigmoidoscopy. A random sample of 268 fatal cancers that were above the point of visibility by rigid sigmoidoscopy or described as within 20 centimeters of the anus in pathological or surgical reports was selected from the remaining cases of fatal colon cancer for separate analysis.

2.3. *Representativeness* : 261 cases of fatal adenocarcinoma from the medical record of 1712 patients which constitute 15.24 % of the patients who were identified from files provided by the Bay Area Resource for Cancer Epidemiology, which collects and reviews all diagnoses of cancer from area facilities. Hence, the sample is representative for the study case population.

2.4. *Criteria for selection of cases* : The case subjects included plan members45 years or older who were found to have adenocarcinoma of the colon or rectum between 1971 and 1987 and who died of the cancer by the end of 1988.

2.5. *Exclusion criterion for cases* : Persons with less than one year of membership before diagnosis were excluded.

2.6. *Selection of control group* : Four control subjects per case subject were drawn from the Kaiser Permanente Medical Care Program membership lists and matched with the case subjects according to age (within one year), sex and date of entry into the health plan(within one year).

Among the final 261 case-control sets, there were 136 with four controls, 81 with three, 37 with two, and seven with one. One control selected for each of the 268 patients with fatal cancer that was that was above the reach of the sigmoidoscope.

The first reviewer masked the medical records of eligible cases subjects and their controls at a later date immediately before the onset of symptoms or the screening tests that led to the diagnosis in the case subject. The second reviewer , who was then unaware of the subject's case-control status, then reviewed the subject's out patient medical records for the previous ten years, recording all instances of sigmoidoscopy, digital rectal examination, fecal occult blood testing, barium enema examination and colonoscopy. The date, indication and findings were recorded for each test.

2.7. *Exclusion criterion for control group:* Each control subject had to be alive and a member of the health plan when the case subject died. Control subjects with a history of adenomatous polyps or non-fatal colorectal cancer were not excluded.

2.8. *Sample size for control group* : The sample size for control group was 868 which is adequate.

2.8. *Description of study methods / instruments used including blinding for data collection* : The study methods were adequately addressed as indicated in the method section. The medical records of eligible case subjects were masked by the first reviewer and those of the controls were masked at a later date

immediately before the onset of symptoms or the screening tests that led to the diagnosis of in the case subject. The second reviewer then n reviewed the subject's out patient medical records unaware of the patient-control status. The process was followed to minimize or avoid bias that may interfere the results or outcome.

2.9. *Operational definition of variables* : Screening sigmoidoscope, digital rectal examination, occult blood tests and health check ups were the variables used. However, definition of these variables are not satisfactorily addressed.

2.10. *Quality control of data* : Quality of data was ensured throughout the study from selection of cases and controls, masking of the medical records of eligible candidates. The same ten year period was also examined for the matched control subjects.

3.Results section :

1. The results were presented directly in relation to the research questions.

The section states that only 8.8 percent of the case subjects had undergone screening by sigmoidoscopy as compared with 24.2 percent of the controls (matched odds ratio 0.30.,95 % confidence interval, 0.19 to 0.48).

Adjustment for potential confounding factors increased the odds ratio to 0.41(95 % confidence interval, 0.25 to 0.69). The negative association was as strong when the most recent sigmoidoscopy was nine to ten years before diagnosis as it was when examinations were more recent. By contrast, for the 268 subjects with fatal colon cancer above the reach of the sigmoidoscope and for the 268 controls, the adjusted odds ratio was 0.96 (95 % confidence interval , 0.61 to 1.50). The specificity of the negative association for cancer within the reach of the sigmiodoscope is consistent with a true efficacy of screening rather than a confounding by unmeasured selection factors.

2. Summary data like mean were presented besides statistical test results.

3. Similarity of groups on baseline characteristics were not examined before making comparisons.

4. Bias : The study considered several potential confounding factors.

4.1. A person or family history of colorectal cancer or polyps could lead to both more frequent screening and to a higher risk of colorectal cancer. The estimate of risk dropped to 0.25 (data not shown) after adjustment for these factors.

4.2. Symptoms not mentioned in the medical records might also lead to increased screening. If such symptoms were due to undiagnosed cancer, this could have shifted the estimate of the odds ratio upward, leading to an underestimate of the true efficacy, particularly in the most recent two year period.

4.3. However, selection factors such as healthy lifestyle or greater compliance with medical treatment among persons who undergo sigmoidoscopy could seriously affect the result in exaggerating estimates of efficacy.

Adjustment for the number of periodic health examinations increased the estimate of the odds ratio for having undergone screening to 0.41.

4.4 Information about more specific features of lifestyle such as diet and exercise or level of physical activity was not available in the medical records. However, these factors are unlikely to differ sufficiently between those who underwent sigmoidoscopy and those who did not.

4.5. The low frequency of repeat screening in both the case subjects and controls made it (3) Selection factors such as healthy lifestyle or greater compliance with medical treatment among persons who undergo sigmoidoscopy could seriously affect the result in exaggerating estimates of efficacy.

Adjustment for the number of periodic health examinations increased the estimate of the odds ratio for having undergone screening to 0.41.

(4) Information about more specific features of lifestyle such as diet and exercise or level of physical activity was not available in the medical records. However, these factors are unlikely to differ sufficiently between those who underwent sigmoidoscopy and those who did not.

(5) The low frequency of repeat screening in both the case subjects and controls made it impossible to compare the various screening intervals directly.

impossible to compare the various screening intervals directly.

3. Discussion and conclusion section :

1. The research questions posed in the study are adequately addressed .The apparent benefit of screening by sigmoidoscopy was confined exclusively to the part of the colon and rectum that can be seen with the rigid sigmoidoscope. The anatomical specificity of the effect of screening on these parts is beyond conceivable on the part of the researchers as admitted by them.

2. The conclusions made in the section from the data are justified and statistically based.
Their data indicate that the risk was markedly lower for at least 10 years after a single sigmoidoscopic examination .

3. The observation was consistent with data suggesting that the length of time from a "clean" bowel to the development of adenomatous polyps and progression to carcinoma is at least 10 years on an average.
4. *Dose response :* The data from the control group in the study indicate that screening sigmoidoscopy led to the removal of polyps in the population under study. Of the 210 control subjects who had at least one screening sigmoidoscopic examination during the ten year period, 12 had adenomatous polyps detected and removed as a result of screening.

5. *External validity* : The results of the study ca be extrapolated to similar environmental set up provided the quality and consistency of the screening technique by sigmoidoscopy is controlled.

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

Abstract

Most neonates lack proper care in developing countries since hospitals are inaccessible. The study group developed a package of home-based neonatal care, including management of sepsis and tested it in the field hypothesizing that it would reduce neonatal mortality by at least 25% in 3 years.

They selected 39 intervention and 47 control villages in the Gadchiroli district in India and they collected baseline data for two years followed by the introduction of neonatal care in the intervention villages during 1995-1998. Trained village health workers made home visits and managed birth asphyxia, premature birth or low birth weight, hypothermia and breast feeding problems. Trained traditional birth attendants, health education , and forth- nightly supervisory visits were provided as assistance. Births and deaths in the intervention and control areas during 1993-1998 were recorded to estimate the mortality rates.

The study indicated similarity of population characteristics in the intervention and control areas and the baseline mortality rates. Baseline (1993-1995) neonatal mortality in the intervention and control areas was 62 and 58 per 1000 live births respectively. In the third year of intervention, 93 % of neonates received home-based care. Neonatal, infant and perinatal mortality rates in the intervention area indicated net 5% reduction compared with that of the control area which were 25.5 (62.2%), 38.8 (45.7%), and 47.8 (71.0%) respectively ($p<0.001$). Case

fatality in neonatal sepsis declined from 16.6%(163 cases) before treatment to 2.8% (71 cases) after treatment by village health workers ($p< 0.01$).
This is a well-designed study with adequate sample size and properly planned intervention worth reviewing critically.

Introduction

The purpose of the study was to reduce neonatal mortality using home-based neonatal care and sepsis on neonatal mortality and the research question was clearly stated in that a field trial of the package of neonatal care management procedures used as the intervention would reduce the neonatal mortality rate by at least 25 % in the rural study area in three years. The study is justifiable and necessary as suggested by the literatures their reviewed literature which indicates the variation of neonatal mortality rate per 1000 live births from 5 in developed countries to 53 in the least developed countries and the reduction of post neonatal component of the infant mortality rate with the administration of oral rehydration, immunization and control of acute respiratory infections. Their viewed literatures also indicated neonatal mortality as 61% of infant mortality and nearly half of child mortality in developing countries, 83% of neonates in rural India and 63% in developing countries delivered at home. Hence, study of this type is significant and necessary.

The main causes of neonatal deaths are pre-maturity, birth asphyxia or injury or infections. Attempts to reduce neonatal mortality by management of birth asphyxia, preterm births and low birth weight have had varied success. However, pneumonia, septicemia and meningitis (collectively, sepsis) have not been addressed. Several child survival programmes and integrated management of childhood illness programme focus on management of childhood illnesses. Their strategies have never been used for management of sepsis in neonates. The group's earlier work in management of pneumonia in neonates with oral cotrimoxazole given by village health workers resulted in 20 % reduction in neonatal mortality which led them to believe that management of neonatal sepsis

at home may be possible. This indicates that their present research question was already addressed by their earlier work which only lacked a case-control study design.

Study design: The case-control study design used was appropriate for the purpose of the study.

Study population :

39 intervention and 47 control villages were chosen in the Gadchiroli district of Maharashtra state , about 1000 kilometers from the state capital. The district is extremely underdeveloped with poor education and health services.

Initially, 53 intervention villages were chosen out of which 14 were later dropped either due to the small size of the population (>300) or a suitable woman to act as a village health worker could not be located. The criteria for inclusion and exclusion were stated clearly and satisfactory and the sample size was adequate.

Intervention :

The intervention methods were described adequately and information on data collecting tools/instruments were given in detail. The group used the simplified diagnostic criteria for various neonatal disorders by using the recommendations of the National Neonatology Forum of India and the advisory group. The village health workers were issued a care kit (panel) and trained to diagnose and manage the cases. Birth asphyxia was diagnosed at one minute after birth and managed by clearing mucus with an oral mucus sucker with mucus trap, tactile stimulation and if necessary by giving artificial respiration by mouth to mask or by tube and mask. Birth weight was assessed within six hours of birth by handheld spring weighing balance with a range of 0-5 kilograms and a discriminating power of 25 grams.

Neonates with gestational age of less than 37 completed weeks (calculated from the last date of menstruation), or those with birth weight below 2000 grams were

taken as high risk babies to be managed by warmth, frequent breastfeeding and 12 hourly home visits. Maintenance of temperature was ensured by keeping the room warm in winter, by drying the baby immediately after bath and covering in multi-layered cloth, by use of head cover and baby clothes and by wrapping the baby in a blanket in winter.

The village health workers measured neonate's skin temperature in the axilla by digital thermometer with a temperature range from 89° F to 105°F (31.7° C to 40.6° C) High risk babies or those babies with hypothermia (<95° For 35°C) were kept in sleeping bags after initial warming with heated cloth. Fever (>99° F or 37.2° C) was treated with oral paracetamol (acetaminophen).

Health workers and birth attendants encouraged the mothers to start breastfeeding in the first hour after birth and to continue exclusive breastfeeding on demand. The baby was to be fed with expressed breast milk by a spoon. The health workers also managed inverted nipples or painful breasts. When breast milk was inadequate, it was supplemented by cow's milk and fed by spoon. Measures advised to prevent superficial infections - hand washing, cord cutting with a clean blade and tying with clean thread (by traditional birth attendants, and applying gention violet to the umbilical cord.

Mothers were advised to put breast milk in the eyes of the babies (local practice). Traditional birth attendants and village health workers put tetracycline eye ointment in the eyes of all babies, encouraged skin hygiene, and applied gention violet for pyoderma or intertrigo. Village heath workers gave an injection of 1 mg vitamin K to each baby.

Sepsis (septicemia, meningitis or severe pneumonia – diagnosed clinically) was managed by village workers. First, parents were advised to agree hospital admission for their child. If they were not willing, treatment was offered at home after obtaining written consent. Gentamicin (5 mg. twice daily for 10 days for pre-term babies with birth weight <2500gms., 7.5 mg. twice daily for full term babies or those babies with birth weight >2500gms. was administered by intramuscular injection with disposable insulin syringes (40 units/ml). Since the strength of gentamicin was 40mg/ml, 1 unit of insulin syringe was equal to 1 mg.

of gentamicin. 1.25ml of syrup cotrimoxazole was also given twice a day for 7 days. The health workers supported temperature maintenance and breastfeeding, treated superficial infections and undertook a twice daily follow up for seven to ten days.

The health workers were assessed after training and upon reaching a satisfactory level of competence, they started treating sepsis at home from September, 1996.

Health education of pregnant women and grand mothers was actively introduced in the third year of the intervention. The education addressed care and nutrition during pregnancy, initiation of early and exclusive breastfeeding, prevention of infection, maintenance of temperature, the importance of weight gain, recognition of the danger signs or symptoms in neonates, and seeking immediate help from health workers.

The quality of data was ensured through out the study. A physician visited each village once in two weeks. He verified the data recorded by the village health workers and corrected and educated them. He independently recorded parallel observations on a sample of 119 consecutive neonates without providing any treatment. If he found a seriously ill neonate, he advised hospital admission while leaving the final decision to the family.

Records of the neonates in the intervention area, who were attended by the female health workers were reviewed by an independent neonatologist. The neonatologist assigned the cause of death by use of criteria similar to used by the expert group of the National Neonatology Forum of India.

Recording of birth and death was done during 1993 to 1998 by an independent set of workers in the intervention and control areas. A house-to-house survey was under taken in both the areas besides prospective reporting once every six months to detect any missed events. Births and deaths were counted in the village where actually occurred. Any hospital –borne neonate brought home was also included. Similarly, any ill neonate from the area admitted to the hospital but diet there was also included.

Results :

As stated earlier, the baseline (1993-1995) neonatal mortality rate in the intervention and control areas was 62 and 58 per 1000 live births respectively. Neonatal, infant and perinatal mortality rates in the in the intervention area (net percentage reduction) compared with that of the control area were 25.5 (62.2%), 38.8 (45.7%) and 47.8 (71%) respectively ($p<0.001$). Case fatality in neonatal sepsis declined from 16.6% (163 cases) before the treatment to 2.8% (71 cases) after treatment by village health workers($p<0.01$).

The results were presented directly in relation to the research questions posed in the beginning and presented appropriate tables. Potential sources of bias were considered and examined but not in details as indicated by the following :-

Selection bias : The study was done in an extremely underdeveloped district where roads, communication, education and health care facilities were poor. There was no specialized neonatal care facility in the district. Rural private medical practitioners (?quacks), herbalists and magic healers formed the main sources of curative care.

The study did not mention how and why this particular district was chosen. This constitutes bias in the selection of the study area and the poses the problem of extrapolation of the findings to the rest of the rural set up in the country.

Information bias : There could be systematic difference in recording information from study participants.

Bias in study design : 14 villages were excluded on account of non-availability of a suitable woman for village health worker or the population was too small (<300).This needs reexamination as failure to find at least one suitable woman in these villages is rather doubtful.

Time sequencing : The study has time sequencing as there was no prior intervention with the package of neonatal sepsis management in none of the

study areas and the exposure (intervention) preceded the decline in neonatal mortality in the study areas.

Dose-response : An association between dose and response was observed in the field trial .

Table. Home-based management of suspected neonatal sepsis and outcome (1995-1998)

Management	Cases	Deaths	Case fatality (%)
Before training in sepsis management	163	27	16.6
After training :			
Treated by village health workers (VHW)	71	2	2.8
Not treated (missed by VHW)	19	5	26.3
Parents refused treatment	14	2	14.3
Hospital treatment	7	1	14.3

Specificity :

A sensitive, simplified clinical criteria was used to diagnose sepsis. The group admitted that many false positive cases might have been detected since the criteria were presumptive. All neonates who met the criteria were treated due to lack of laboratory facilities in the villages and as there was need for urgent treatment. Hence, the specificity of the identification criteria was doubtful.

External validity :

The generalizability or the possibility of extrapolating the intervention methods with similar results in the reduction of neonatal mortality in other areas of the country is doubtful for the following reasons:-

(1) This intervention study chose a district with poor health care facilities and low level of education and communication. The district was adopted by SEARCH, the study conducting group, which had already trained and supported male village health workers and traditional birth attendants in the action area in case management of pneumonia in children. 2) Also, the field work was supervised by the physicians who visited, supervised and corrected any errors in the case management. (3) A long list of items was made available to the village health workers.

The feasibility of providing similar training, facilities and supervision in other parts of the country should be looked at as it has financial and man-power implications which pose a problem for a developing country like India.

SECTION - III

OUTBREAK INVESTIGATIONS

Outbreak of bloody diarrhoea at Mauchar village, Northern Mizoram, 2003

Introduction

Nearly two billion episodes of diarrheoa are estimated to occur and three million children under the age of five years dying of diarrhoea each year (Health Situation in the South East Asia Region 1994-1997, Regional Office of SEAR, New Delhi, WHO,1999). A large outbreak of acute diarrhea caused by Shigella dysenteria type1 was reported for the first time in West Africa in November, 1999 where a total of 4218 cases were reported in Kenema district, in the south eastern part of Sierra Leone. The case fatality rate was 3.1% (Guerin PJ et al, Shigella dysenteriae serotype 1 in West Africa: intervention strategy for an outbreak in Sierra Leone, 1: Lancet 2003 Aug 30; 362(9385):705-6).

Shigellae are a major cause of diarrhea in India. Shigella dysenteriae type 1 is the most severe among the various types of shigellosis and often occurs in epidemic form. The first half of 1984 saw a severe epidemic of bacillary dysentery predominantly caused by multi-drug resistant strains of S. dysenteriae type1 sweeping through West Bengal and a few eastern Indian states affecting 350,000 people leaving about 3,5000 people, mostly children, dead.(Pal, S.C. [1986] World Health, April P.14). The strains were resistant to streptomycin, tetracycline and chloramphenicol. Changes in the worldwide epidemiology of shigella species have been documented in the last two decades although bacteriologically confirmed childhood shigellosis cases varied from 4% to 6%, a change in serotypes and antimicrobial resistance in shigella species was noticed in Kolkata during 1995-2000 (Dutta K et al, Shifting serotype plasmid profile analysis and antimicrobial resistance pattern of shigella dysenteriae isolated from Kolkata, India during 1995-2000, Epidemiol Infect 2002,129: 235-43).

On 21st May 2003, the Medical Officer of Sakawrdai Community Health Center informed the Chief Medical Officer of Aizawl East District through telephone that

an outbreak of bloody diarrhea with more than 200 cases had occurred in Mauchar village, one of the villages under its jurisdiction.
The outbreak occurred first among the internally displaced population from North Cachar Hills of Assam who had come to the village for shelter because of civil unrest. The outbreak then spread to the local population that was then mostly affected. The patients presented with symptoms of diarrhea, passed blood-stained stool, had fever and suffered from abdominal cramps. The patients were treated at home since there was no health care facility for hospitalization. No death was reported.

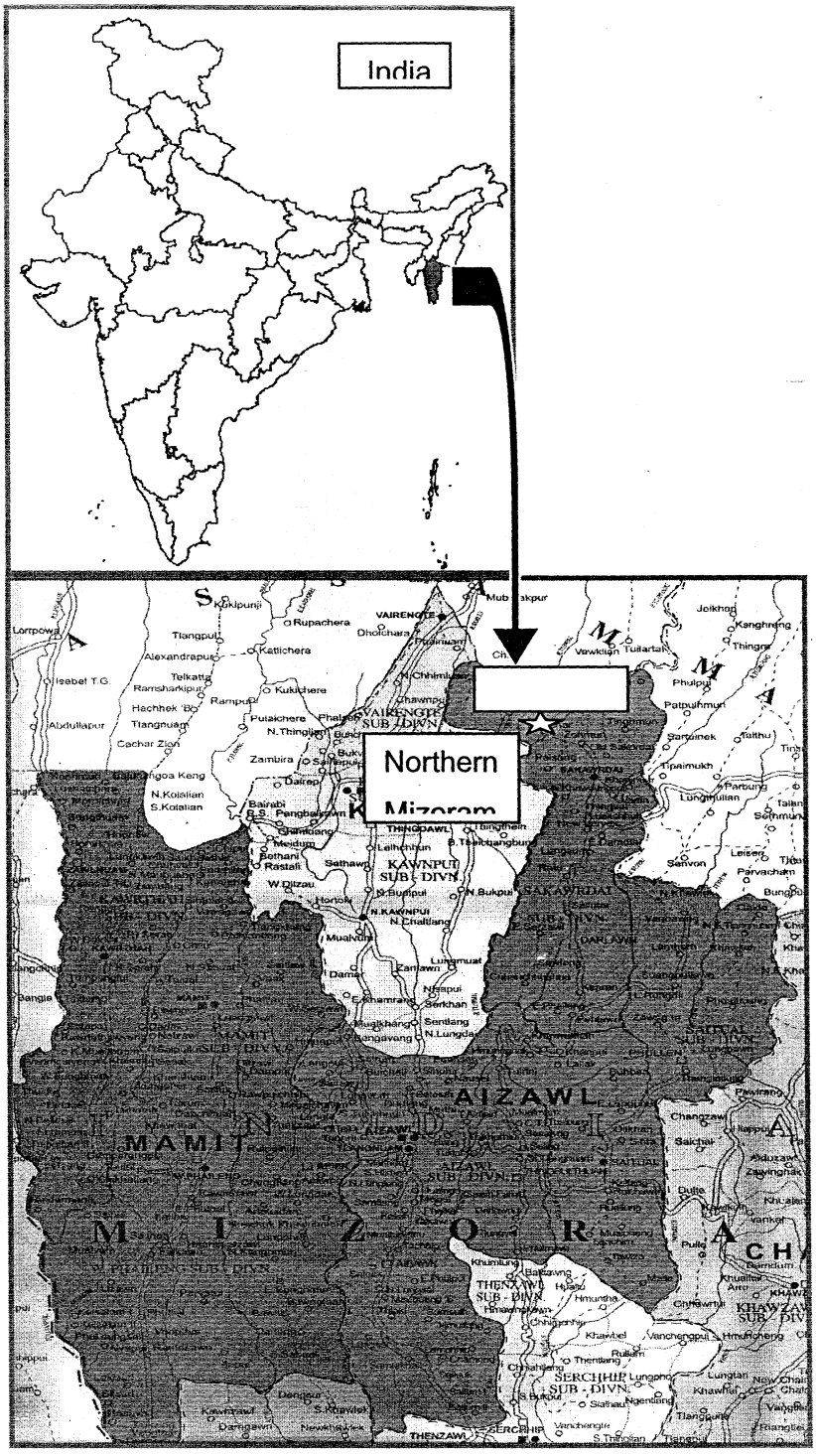
We investigated the outbreak to (1) estimate the magnitude of the outbreak (2) describe the outbreak in terms of time, place and person (3) identify the factors responsible for the occurrence of the outbreak (4) make recommendations to the health authorities and the community for prevention of similar outbreak in the future.

The village is situated on the top of a hill and is located at about 210 kilometers from Aizawl, the capital of the state of Mizoram. The village is difficult to access by road and other means of communication. Water is mainly harvested from the rain and a few pools of spring water are located in some places. None of the water source is ever chlorinated.

Mauchar has a population size of 995 at the time of investigation (Record of village council, May 2003), 20 % of which consisted of the displaced population. A tribal society and the villagers are mainly farmers depending on the seasonal harvests besides meager income from domestic animals that move about the village freely and without restriction. In addition to the farmers, there are a few persons working in the two village primary schools.
There is a health sub-center, managed by Health and Family Welfare Department of the Government of Mizoram. This facility functions poorly as it is staffed with only one female health worker and one peon. There are no other

health care providers in the village. The villagers use self-medication using the local drug shopkeeper who advises them on what medicines to be taken.

Figure 1 . Location of Mauchar, Aizawl District, Mizoram



The health administration initiated action plan for investigation of the outbreak. We made necessary arrangements for supply of drugs and other logistics

including bleaching powder procured from the Mizoram State AIDS Control Society for chlorination of the village water.

We proceeded for Sakawrdai Community Health Center in the morning of 23rd May 2003 We left Sakawrdai in the morning of 24th May2003 (Sunday), for the outbreak site and reached Mauchar.

Methodology

We conducted a house-to-house visit during the active search for cases using the pre-tested questionnaire. A case was defined as – any person living in Mauchar village since first April 2003 and presenting with episodes of diarrhea with blood and mucus, abdominal pain or fever.

We also treated the patients simultaneously at their homes. In addition, we inspected the environment.

We collected stool samples and rectal swabs from the patients. We collected a total of 12 stool samples and rectal swabs in Cary Blair transport media and transported them from the field to the department of Microbiology, Civil Hospital, Aizawl. These samples were processed for isolation of enteric pathogens using standard microbiological techniques. Antimicrobial susceptibility of the isolated pathogens were done using disk diffusion technique.

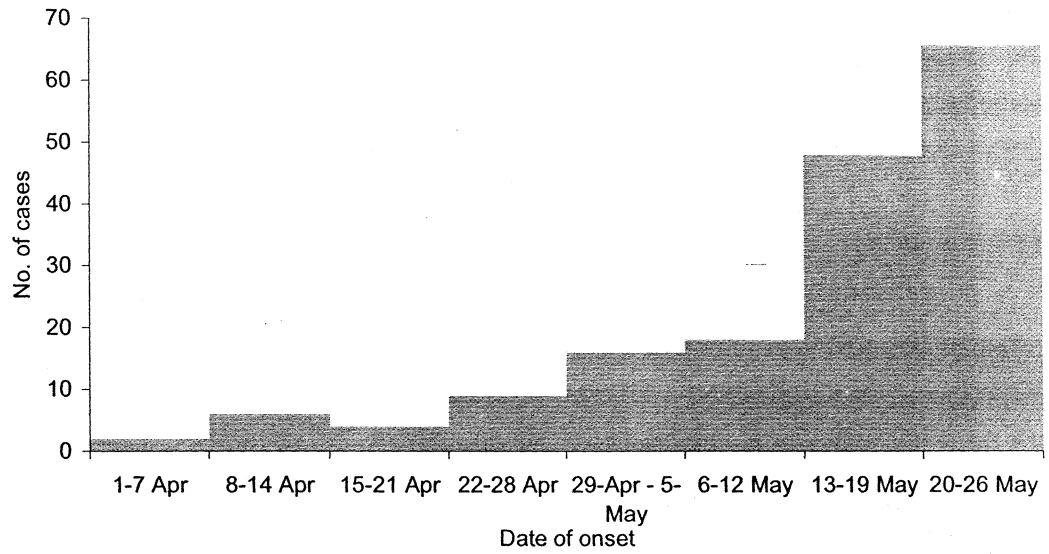
We also collected water samples from the homes of the patients and the spring water being used by the villagers handed over to the Public Health Engineering Laboratory at Aizawl to test for contamination with coliform bacteria.

We chlorinated water at household water and the pools of spring water at different points, which were found to be stagnant.

Results

We identified a total of 199 cases among the village population using the case definition. Our investigation indicated no such increase of cases of bloody diarrhea in the community in the previous years, though no data was available regarding this in the local health center for verification or from any report of the CHC concerned. Epidemic curve (by week) for 169 patients is given in figure 1.

Figure 1. Distribution of patients with bloody diarrhea (n=169) by date of onset, Mauchar, 2003



The overall attack rate was 20% (Table 1.) Cases were distributed in all age groups and both the sexes except below one-year children. As per attack rate, children (28%) were more affected than adults (12%). This is based on 100 case patients for whom data was available (Table 1). In each age group, there was not much difference between males and females. Of the total cases (n=199), 39 cases (19.6%) belonged to the internally displaced population while 160 cases (80.4%) were the permanent residents of the village. Attack rates were 20.56% and 18.84% for the locals and the displaced population respectively.

Fever (119/199), pain abdomen (199/199), passage of blood and mucus (188/199) were the most common clinical features presented by the cases. The frequency of passing stools varied between 10-20 times or more. Feature of dehydration were not present in most of the cases examined clinically. There was no reported death among the affected cases during the outbreak. There was no facility for hospitalization at nearby areas and all the patients were treated at home.

Table 1. Attack rate of bloody diarrhoea (n=100) by age group and sex, Mauchar, 2003.

Age group	Cases		Population		Attack rate (%)		Total
	Male	Female	Male	Female	Male	Female	
1-14	26	28	92	94	28.2	29.7	29.0
15-45	13	15	115	155	11.3	9.7	10.4
46+	9	9	47	50	19.2	18.1	18.6

3.6 Sources of drinking water and hygienic practice:

The source of drinking water in the village included rainwater collected from the roof of the houses and springs. Personal hygiene was found to be far from satisfactory and there was no practice of hand washing with soap and water following defecation or before food intake. Lot of flies was found to be moving in most of the houses indicating poor hygiene.

3.7 Source of the outbreak:

Interview using the questionnaire indicated the first case as a six-year old boy belonging to the internally displaced population. There was no history of travel before the diarrhoeal episode or any contact with another case patient. He was reported to have developed the illness on the way just before arrival to the village (2nd April 2003) affected by the outbreak. They had no choice but to eat or drink whatever was available on the way while braving through the jungles.

After one week following the onset of diarrhea of that child, the mother of the same got affected with bloody diarrhoea on 9th April, 2003.Personal hygiene was not satisfactory in the said family and there was history of close contact between the mother and the child.

3.9 Laboratory findings: Shigella dysenteriae type 1 was isolated from three out of the twelve samples tested. The strains were resistant to ampicilin, co-

trimoxazole, nalidixic acid, norfloxacin and ciprofloxacin. They were sensitive to ofloxacin, azithromycin and ceftrioxone.

All the samples tested for coliform bacteria using H2S test strip showed contamination of all the samples with the organisms.

Discussion

Acute diarrhoeal outbreak of this magnitude is rarely known in the state of Mizoram which was sensationalized in the local newspaper in the context of the recently displaced population from the neighbouring state of Assam. As monsoon had started and the site of outbreak difficult to access, the investigators had to brave the jungles infested with leeches.

The outbreak was caused by Shigella dysenteriae type 1, which is also known to be the epidemic strain of bacillary dysentery. The infection was obviously brought from outside the village by the six-year old boy whose family had to move for security of life as there was ethnic clash in the North Cachar Hills District of Assam. None other than the boy could provide history of the illness either from the displaced population or the permanent residents. The factors that may have contributed to the disease spread in a large scale included low level of hygienic practice either through personal contact or houseflies which were seen moving about in almost every household during the investigation.

Most cases were treated with antibiotics like tetracycline, norfloxacin, ciprofloxacin, enteroquinol and others in incomplete doses and for shorter duration.

Indiscriminate use of antibiotics contributed to the severity and duration of the outbreak as antibiotics were used for shorter duration and in improper doses. This was confirmed by the resistance developed by the causative organisms to commonly used antibiotics like ampicillin, co-trimoxazole, nalidixid acid, norfloxacin and ciprofloxacin.

This also seemed to contribute to the intensity of the outbreak as there was no advice nor health education from her side. This is a case of failure on the part of surveillance system, if there was any, which failed to detect the outbreak in time.

Constraints

Information on the outbreak was received when the same had already reached the peak, or it could have been worse if the investigation team reached the site later. Ignorance and inaccessibility of the place with heavy monsoon were the major factors for the high accumulation of cases in the present situation.

Limitation of the study: Analytical study was not done and we missed the opportunity, which made the study incomplete from epidemiological point of view.

Lessons learnt

Capacity building: The need to equip the health infrastructure with training of its staff to deal with outbreaks. Surveillance system, which is able to detect the presence of rare disease or slight increase in the endemic disease, need to be established in all parts of the state. A functional Rapid Response Team which meet periodically even in the absence of an outbreak need be in existence to tackle with any outbreak with a provision for stocking of necessary materials and logistic support.

The need for strengthening of laboratories in terms of trained staff and appropriate transport media for different field samples could not be overemphasized as it forms the core activity in the diagnosis of the disease or diseases under study for speedy control of outbreaks.

Lacunae in system

While there is need to equip laboratories with facilities and man-power besides the rapid response team, the lacuna in establishment of able and functioning communication system could not be neglected as information has to be received without any delay in the event of diseases outbreak.

Recommendations

In the light of the factors contributing to the occurrence and magnitude of the outbreak and the constraints faced in the investigation, we recommend a) proper management of cases including treatment with effective antibiotics suggested by the laboratory sensitivity test results in the right dose with complete course, b) intensification of information, education and information (IEC) activities by the Health Educator of the concerned Community Health Center and the staff at the sub-center of the village after placement, particularly on issues of hygienic practice like hand washing with soap and water before intake of food and after defecation, c) proper and safe disposal of excreta to avoid contact with flies by proper closing of the lids of the pit latrines of the households, d) protection of food items from flies, and e) the need to use only boiled water for drinking.

Our recommendations for long term measures include a) improvement of community water by periodical chlorination of the sources, b) improvement in sanitation in the community by involvement of local governing bodies, non-governmental organizations in the locality and the churches, c) placement of functioning surveillance system for the community by posting trained staff in the sub-center besides the female health worker who will also oversee disease conditions and treat cases in a timely and proper manner to detect or avoid outbreak of communicable diseases, e) placement of active Rapid Response Team at District and Head quarters levels and training of the members including medical officers of every PHC and CHC, who would in turn train their respective health staff, f) equipment of laboratories with trained staff and facilities at primary health center, community health center and at district levels for early diagnosis and treatment of cases and control of outbreak and h) establishment of a working laboratory network with those outside the state for diagnosis and related issues which may not be available locally.

Conclusion

We held a session of serious discussion with the village leaders in the end to really contain and control the outbreak this time. After a word of promise received from them as how to dispose excreta and the need to promote hygienic conditions, we left the village leaving behind another staff nurse of Sakawrdai CHC to help aid the patients and do the needful.

We imparted health education on the importance of hand washing before eating and after defecation also stressing the need to have a safe system of human disposal. We left one public health nurse behind in the village to continue treatment of the patients and for continued education. We imparted health education on the importance of hand washing before eating and after defecation also stressing the need to have a safe system of human disposal. We left one public health nurse behind in the village to continue treatment of the patients and for continued education.

Food poisoning at Ramhlun Vengthar, Aizawl, Mizoram, 2003

1. Introduction:

1.1 An outbreak of food poisoning was reported in the local news paper in the first week of September, 2004. The report further stated that all those who had consumed the locally prepared fermented soyabean were suffering from fever, diarrhoea, pain in the abdomen and many of them complaining of body ache. Many of the affected persons were admitted in the Civil Hospital, Aizawl even though the actual number was not specified. No death was reported.

1.2 Ramhlun vengthar locality is situated in the north-eastern part of Aizawl, the state capital of Mizoram. There is a health clinic run by the health workers under Ramhlun health Sub-center of the Health and Family Welfare Department, Government of Mizoram. The locality has a population of 2282 belonging to 434 families according to the record of the concerned sub-center. The sub-center is under the jurisdiction of the Aizawl East District of the state Health Department.

1.3 The outbreak seemed to have begun in the later part of the 1st September, 2003 with abrupt increase in the number of cases of diarrhea after a few hours of ingestion of fermented soyabean, a local side dish prepared and sold by the family belonging to the affected area.

1.3 The Directorate of Health Services in its letter No.B.11014/10/2003-DHME/Prog., dated 8th September, 2003 detailed the scholar, who was then placed at the Aizawl East District Office to conduct an investigation of the outbreak. The faculty members of the National Institute of Epidemiology, Chennai were contacted and the matter discussed over telephone and internet for necessary guidance.

1.4 The matter was discussed with the Chief Medical Officer of the Aizawl East District and subsequently with the Assistant Director, in charge of epidemic

investigation at the Directorate of Health Services. A questionnaire was prepared for active search for cases in the locality and from hospital records of Aizawl Civil Hospital where patients of food poisoning were admitted.

2. Objectives

- To define the magnitude of the outbreak in terms of time, place and person
- To determine the conditions and factors responsible for the occurrence of the outbreak
- To control the outbreak, if still necessary, and prevent future occurrence of similar outbreak
- To make recommendations to the Government regarding food hygiene and related issues

3. Methodology

3.1 Investigation team : The team consisted of the local volunteers, the health workers of Ramhlun Sub-center and clinic under the leadership of the scholar, MAE-FETP, National Institute Epidemiology, Chennai. The team conducted the investigation during 8th and 9th September, 2003.

3.2 Confirmation of the outbreak and diagnosis : There had been no such increase in the number of cases of diarrhea of similar nature during the last few years either from the records of the local clinic and Ramhlun sub-center or from information obtained from the community leaders. It was presumed by the local leaders that the outbreak occurred due to the consumption of fermented soyabean prepared and sold by the local woman as cases were not seen among those who did not consume the same preparation. It was suspected that the woman who had prepared the soyabean must have purchased it from unscrupulous dealers who sold the raw soyabean treated with chemicals for agricultural use.

3.3 Case definition and identification : The investigation team visited the affected area without delay and conducted active search for cases using the case definition – any person staying in Ramhlun Vengthar locality developing

abdominal cramps, loose motions, with or without fever and vomiting since 31st August, 2003 till the date of investigation.

3.4 A total of 73 cases were identified with the above case definition (Figure 1.) All, except one patient, complained of fever, abdominal cramps and loose motions while 12 persons did not complain of vomiting. The average frequency of stools was 13 times per day. The average incubation period is 18 hours. 70 of the cases identified gave the history of ingestion of fermented soyabean purchased from the same seller in the locality. The remaining three patients belonged to the families of those ill and with the history of consumption of the alleged food item.

The overall attack rate was 3.19 % (Figure 2.) The attack rate among males was 2.74% while it was higher for females (3.64%). Only two cases were found below 4 year old children, one male and the other female. Among the cases belonging to 15- 24 years age group, females were affected more than males. However, the attack rate was not significantly different in the higher age group of 25-54 years. In the 54 years and above age group, males were affected more than females, although difference in the number of cases was not significant. The age and sex distribution of cases is shown in Figure 3.

3.6. Laboratory studies : 17 stool samples from patients who were still ill were collected and cultured at the Laboratory of the Microbiology Department, Civil Hospital, Aizawl. 16 out of 17 stool samples showed the growth of E.coli

Three fermented soyabean samples were collected from different households of the affected community and two of these were discarded owing to heavy contamination with worms. The lone sample which was subjected to microbial culture showed growth of E.coli.

3.7 Implementation of control measures : Those who were still ill were accommodated in the local church compound under round the clock medical care and supervision of medical doctors and health workers of the same locality and nearby sub-centers. This arrangement was made at the behest of the Minister of Health and Family Welfare, Government of Mizoram, who was also

the representing member of Legislative Assembly. Cases were treated with analgesic, intravenous fluids, and antibiotics like ciprofloxacin and metronidazole.

Majority of the cases were in the convalescent stage at the time of investigation while only four patients were still undergoing treatment at Civil Hospital, Aizawl.

The need for application of food hygiene was emphasized in the community along with maintenance of personal hygiene and proper sanitation at household and community levels.

4. Discussion : An occasional food poisoning due to consumption of fermented soyabean is not unknown in the mizo society and most of the times procurement of the item meant for agricultural use is generally accepted as the responsible causative factor in the absence of proof otherwise. The data on the frequency of occurrence and magnitude as well as severity are not available or not documented in the state. This study thus served as the pioneer in the investigation of outbreak due to consumption of fermented soyabean in Mizoram. In the absence of proper laboratory support for special investigation such as sub-typing of the probable causative organisms and serum antibodies, the points in favour of or against the hypothesis of the outbreak having been caused by contamination with chemicals or microorganisms need consideration.

The points in favour of the poisoning caused by bacterial contamination are stated below :-

1) The soyabean in the raw form was repotedly procured from Manipur, the neighbouring state and was learn to have been sold to a number of people in other localities. The kind of outbreak which was noticed at the study area did not seem to take place in other areas. Chemically contaminated soyabean should have caused the same illness otherwise.

2) Fever is hardly ever noticed in the cases of food poisoning due to chemical toxins.

In the present outbreak, fever was developed by all the patients.

3) The appearance or manifestation of food poisoning due to chemical or toxin is usually instantaneous, few minutes to few hours. The average incubation period of this foodborne illness was 18 hours.

4) In support of the hypothesis of the food poisoning of this case having been caused by bacterial organisms, 16 of 17 stool samples showed the presence of E.coli on culture, the incubation period of which ranged from 10 to 72 hours.

Recommendation :

- Further investigation to demonstrate the enterotoxin produced by immunoassay or bioassay which however requires laboratory strengthening or networking with reference laboratories outside the state.
- Health education or campaign for the promotion of food hygiene particularly for those catering to the public.
- Proper implementation of Food Laws with reference to the Prevention of Food Adulteration Act (PFA) by the government in the interest of public health and economic loss due to large scale food poisoning.
- Epidemic Response Team should be formed at the state and district levels for instant and effective response to such unforeseen events.

SECTION -4

REVIEW OF LITERATURE

Vitamin A deficiency

2.1. Vitamin A

Vitamin A is a fat soluble substance available in liver, egg yolk and dairy products. The pre-cursor of vitamin A, carotenoids, are present in green leafy vegetables, red palm oil and yellow fruits. They can be converted to retinol in the gut wall.50 to 90% of the ingested retina is absorbed in the small intestine and transported to the liver in association with chylomicra where it is stored mainly as retinyl palmitate. In response to the demand of the body, it is released into the blood stream as retinol in combination with retinol-binding protein. Retinol binding protein is a specific carrier protein manufactured by the liver. The retinol is then dissociated from the serum for utilization by the target cells whose metabolism are influenced by retinal. There are specific receptors for vitamin A complex or its active metabolites on the surface and nucleus of target cells. When the intake of vitamin A and pro-vitamin A carotenoids exceeds the body requirement, 180 to 450 ug per day, which depends on the age, sex and physiological status, the excess is stored in the liver increasing the reserve. On the other hand, when the intake of vitamin A is lower than the requirement of the body, it is released from the liver stores to maintain the serum retinol at a normal level which is above 20ug/dl. As a consequence of prolonged deficient intake of vitamin A, the liver stores of vitamin A are depleted resulting in the lowering of serum retinal level. This has a deleterious effect of impairment of cellular function in the form of abnormal differentiation leading to the development of xeropthalmia. The speed at which the cellular abnormalities develop depends on various factors such as the duration of inadequate intake of vitamin A or its pre-cursors, the extent of pre-existing liver stores and the rate at which the body utilizes vitamin A. Children with marginal intake of vitamin A will have very low level of vitamin A stores in the liver. Further sudden drop in the intake as a result of dietary change or impairment of absorption as in gastro-enteritis, sudden increase in metabolic demand as in the event of fever or growth spurt will cause depletion of the limited reserves with rapidity. These conditions can precipitate blinding xeropthalmia, overwhelming sepsis and even death (10).

2.2. Role of vitamin A in the body

Vitamin A is indispensable for normal vision. It contributes to the production of rhodopsin, retinal pigments, which are necessary for vision in dim light. It plays a vital role in the maintenance of the integrity and the normal functioning of glandular and epithelial tissues lining the intestinal, respiratory and urinary tracts including the skin and the eyes. It also plays an important role in growth especially skeletal growth. There is an increased susceptibility to infection and lowered immune-response in deficiency states of vitamin A. Some studies suggested the role of vitamin A in the prevention of epithelial cancers such as bronchial carcinoma although the data are not fully consistent ((11).

2.3. Vitamin A deficiency

Vitamin A deficiency refers to a state in which liver stores of vitamin A and its surrogates are below 20ug/dl (12). Vitamin A deficiency can occur at any age, with consequences ranging from sub-clinical effects that increase the risk of morbidity and mortality to blinding nutrition (Keratomalacia) indicating clinical vitamin A deficiency (13). Vitamin A deficiency occurs when body stores are depleted to the extent that physiological functions are impaired in spite of the apparent absence of clinical eye signs. The level of depletion at which impairment of physiological functions take place is not entirely clear (13).

2.4. Classification of clinical vitamin A deficiency

The signs and symptoms of xeropthalmia are classified in Table.

Table. Classification of xeropthalmia[13]

XN	Night blindness
X1A	Conjunctival xerosis
X1B	Bitot's spot
X2	Corneal xerosis
X3A	Corneal ulceration/ keratomalacia <1/3 corneal surface
X3B	Corneal ulceration/ keratomalacia >/= 1/3 corneal surface
XS	Corneal scar
XF	Xeropthalmia fundus

2.5. Indicators for vitamin A deficiency surveillance

The major aim of vitamin A deficiency surveillance is to determine its magnitude, severity and distribution through surveys. The data can be used to highlight the significance and initiate action. Both clinical and sub-clinical biological indicators of vitamin A nutritional status are essential for the purpose. Biological indicators of vitamin A status, cut-off levels for defining vitamin A deficiency and minimum prevalence levels used to define a public health problem are presented in table one (13)

Table1 . Indicators of clinical vitamin A in children 6-71 months of age*

Indicator	Minimum prevalence
Conjunctival xerosis/ with Bitot's spot (X1B)	>0.5%
Conjunctivalxerosis/ ulceration/ keratomalacia (X2, X3A, X3B)	>0.01%
Coneal scar (XS)	>0.05%

*Prevalence of any one or more indicators signifies a public health problem

The level of public health importance is indicated by the prevalence noted in the table when the prevalence in a population of at least two of the biological indicators of vitamin A status is below the cut- off; or when one biological indicator of deficiency is supported by at least four (two of which are nutritional and diet related) of a composite of demographic and ecological risk factors which are:-

- infant mortality rate >75/1000 live births; under-5 mortality rate >100/1000 live births;
- full immunization coverage or, particularly measles immunization coverage, in < 50% of children at 12-23 months of age;
- < 50% prevalence of breastfeeding in 6-month old infants;
- median dietary intake <50% recommended safe level of intake among 75% of children 1-6 years of age;
- 2-week period prevalence of diarrhea =/> 20%;
- measles case-fatality rate =/> 1%;

- no formal schooling for =/> 50% of women 14-44 years of age, and
- < 50% of house-holds with a safe water source.

2.6. Epidemiology of vitamin A deficiency (14)

Vitamin A deficiency as a public health problem occurs within an umbrella of ecological, economical and social deprivations in the macro environment in which the populations live in different regions and countries, and in the micro-environment in which the families live in communities and households. The influence of the causal factors may vary at the regional, national and even at local levels. This necessitates situation analysis to identify the factors leading to the problem of vitamin A deficiency. There are some underlying epidemiological traits that tend to characterize most situations where vitamin A deficiency exists as a public health burden (15)

2.6.1. Ecological factors: Hostile environments such as arid, infertile land, periodicity of excessive rain, and humidity partly determine the amount and variety of foods rich in vitamin A that can be cultivated and the duration of their availability. Countries or parts of countries deprived of water for prolonged period and relatively hot temperatures are more likely to face vitamin A deficiency problem than other countries with relatively consistent water supplies. Vegetable and fruit crops usually occupy a second place and do not compete for land use. Vitamin A rich crops are often provided through horticulture activities at micro-level. Environmental hostility at the community and house-hold levels due to shortage of water limit home and community gardening activities at the micro-level with the result that the people have less access to vitamin A-rich vegetables and fruits which contribute to the occurrence of vitamin A deficiency in the communities. The seasonality of vitamin A deficiency is partially related to ecologic factors influencing food availability. Vitamin A deficiency tends to reach its peak when diarrhoeal and respiratory diseases are also at their peak prevalence. Overcrowding, contamination of environment, poor living conditions also contribute to the problem. Epidemics of measles in these environments

worsen the problem and often precipitate vitamin A deficiency leading to night blindness and even deaths for many children.

2.6.2. Social factors: Poor social development in a country limits availability of health and social services including education. Traditional ideas and practice are usually followed by impoverished and illiterate women and are hesitant to engage in social interactions where modern concepts and practices are promoted. The under-education comes in the way of their learning from educational displays at health centers and those used in health related community educational activities including those with appropriate child care and feeding practices. The low standard of living in the backward impoverished environment favours large family size with the resultant overcrowding and its associated undesirable environmental sanitation as well as personal hygiene which are the determining factors to the occurrence of malnutrition and vitamin A deficiency. Crowded conditions in urban areas provide the ideal environment for the culture and spread of old diseases, such as cholera and TB, as well as for many newly emerging diseases, such as HIV (16).

2.6.3.Economic factors: Vitamin A deficiency is usually seen in poor countries, neighbourhood and families which depend largely on less expensive pro-vitamin A sources. The series of events between consumption and conversion of pro-vitamin A involve several steps that require normal physiological functions. Foods of animal origin contain pre-formed vitamin A but are generally expensive. It is more difficult to meet the vitamin A activity needs of infants and young children from foods of vegetable origin than from food of animal origin. Unemployment and low-paid jobs are also the major factors leading to vitamin A deficiency in communities.

2.6.4. Clustering: There is a tendency for clinical vitamin A deficiency to occur in clusters than to be evenly distributed .Ecological factors are related to clustering within a country at the macro-level exacerbated by poor infrastructure to evenly distribute vitamin A-rich containing foods from areas abundant in vitamin A-rich

foods to areas with deficiency of these food items. Vitamin A-rich food items are usually easily perishable and particularly susceptible for uniform intra-country distribution.

2.6.5. Host factors:

Sex: Differences in the occurrence of vitamin A deficiency have been reported from some cultures which are more likely to be connected to cultural practices which favour a particular gender in feeding and care rather than to physiological differences.

Feeding practices: Readily absorbable form of retinal is provided by breast milk. Among populations in which breast feeding prevails, clinically apparent vitamin A deficiency is not common. Dietary fat is very important for the absorption of vegetable sources of pro-vitamin A. The diet of a newly weaned child frequently has little vitamin A and often contain less fat than at any other period at life cycle of man. The post-weaning period is therefore a period of vulnerability to vitamin A deficiency for the child.

Disease patterns: The severity, frequency and duration of infections contribute directly and indirectly to the vulnerability of the child to vitamin A deficiency. Infections reduce appetite of the child and are especially devastating to the child. In addition, infections reduce the efficiency of absorption, conservation and utilization of vitamin A. Repeated bacterial infections cause damage to the mucosal surfaces required for absorption. Further, intestinal worms may directly compete for the intake of vitamin A besides their deleterious impact on health by reducing appetite. The frequency of diarhoeal and respiratory infections is associated with vitamin A vulnerability (17). Restoration of vitamin A status in diarhoeal cases decreases the severity of subsequent episodes and lowers the risk of death (18).

A Malaysian study of vitamin A absorption in children with ascariasis indicated that in populations with marginal intake of vitamin A, is an important contributing factor in producing clinical vitamin A deficiency. This study also demonstrated that stool egg counts for *Ascaris lumbricoides* were not related to the degree of

vitamin A malabsorption. Immediately after deworming and expulsion of the worms, vitamin A absorption improved in 93% (13/14) patients. In addition, eradication of *Ascaris lumbricoides* and *Giardia duodenalis* in infected children promptly led to significant improvement in vitamin A absorption and restoration of its level to normalcy (19). Malnutrition, complicated by parasitic infections, is often found in impoverished societies with inadequate sanitation. Malnourished individuals, particularly children, are seriously affected by parasitic infections because these infections can result in reduction of nutrient availability. In addition to this, the presence of intestinal parasites frequently diminishes appetite and food intake besides increasing the loss of nutrients by causing diarrhoea and dysentery. Hookworms can suck as much as 30 milliliter of blood from an infested person each day, gradually weakening the resistance of the individual to other diseases(20). An estimated 5-20% of the daily food intake of an individual is used to offset the effects of parasitic illnesses thus markedly lowering the overall nutritional status of a parasite-infested person over time(21). Acute infection is associated with increased metabolism, micronutrient loss, and protein consumption (22).

A study carried out in Ecuador suggested that weekly low-dose vitamin A supplements prevent acute lower respiratory infections (ALRI, or pneumonia) in underweight and stunted children (23). The beneficial effect of vitamin A supplements on the prevention of severe diarrhoea has been documented (24).

Periods of increased physiological need: During growth spurt, vitamin A needs on the basis of body-weight are increased which is one of the major reasons for the vulnerability of younger children. School going-age are growing but at a slower rate than the younger age group. Height seems to be influenced by vitamin A through growth hormone production (25). The only biochemical parameter validated and found practical for routine use is serum retinol concentrations. Since severely depressed retinol concentrations for example, equal to or less than 0.35 micromol/ L are difficult to reproducibly and reliably detected in routine laboratory tests, the index has been raised to less than 0.70ugmol/L or 20ug/dl, double the concentration originally adopted in 1980 (3).

As a larger number of children will have these higher levels, the prevalence criterion was raised from more than 5% to more than 15% (26). It is widely accepted that vitamin A deficiency occurs when the liver store of vitamin A falls below 20ug/dl . By convention, serum retinol levels less than 20ug/dl are considered deficient although in most well-nourished populations, average serum retinal levels generally exceed 30 ug/ dl (27).

The cut-off values suggested for ecological and demographic risk factors are arbitrary. A contextual analysis is necessary to determine the likely causes of the public health problem and timely attention is required for allocating resources and taking action. Two biochemical indicators are currently recommended for determining whether vitamin A deficiency (VAD) is a public health problem: serum retinol and serum retinol-binding protein (RBP). After consideration of 40 data sets and the original rationale for previously proposed cut-offs, a cut-off for serum retinol concentration was proposed at <0.70 micro mol/L (20 micro g/dL) in > or =15% of the sampled population. This cut-off should be applied to a representative group of preschool age children who are 6-71 months old. Because measurement of low serum retinol concentrations requires high precision, analysis by High Performance Liquid Chromatography is necessary (28). High Performance Liquid Chromatography (HPLC) is considered the only laboratory technique sufficiently reliable for routine use and reporting (29).

2.7. Nutritional status and vitamin A deficiency

An association seems to exist between malnutrition and vitamin A deficiency (30). A number of studies have demonstrated the association between increasing severity of anthropometric deficits and mortality, and the substantial contribution to child mortality of all degrees of malnutrition is now widely accepted (31). For assessment of malnutrition at population level, anthropometric measurements of have been internationally recommended. Anthropometric indices are constructed based on these measurements of height and weight (32). In children the three most commonly used anthropometric indices are weight-for-height, height-for-

age, and weight-for-age. These indices can be expressed in terms of z-scores, percentiles, or percentage of median, which enable comparison of a child or a group of children with a reference population (33). After selecting an anthropometric indicator and a reference population, it is necessary to determine the limits of "normality". There are three classification systems for comparing a child, or a group of children, to the reference population: *Z*-scores (standard deviation scores), percentiles and percent-of-median (34).

Since the late 1970s WHO has recommended using the *Z*-score system because of its several advantages .The present practice also quite often recommends the use of a universal cut-off point, for example, -2 *Z*-score, which proved very useful for population-based monitoring. Nutritional status can be assessed using clinical signs of malnutrition, biochemical indicators and anthropometry. Inadequacies in nutritional intake eventually alter functional capacity and result in many adverse health outcomes that are distinct expressions of malnutrition's different levels of severity (35).

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