FIELD PROJECT REPORTS

By

BIAKTHANSANGI

(MAE-FETP Scholar 2002-2003)

NATIONAL INSTITUTE OF EPIDEMIOLOGY

(Indian Council of Medical Research)

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JANUARY 2004

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Submitted in partial fulfillment of the requirements for the degree of

Master of Applied Epidemiology (M.A.E) of

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

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

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

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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. Biakthansangi 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 her in part or whole for any other (Publication or degree) purpose.

Date: 29.1.04

DIRECTOR

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ACKNOWLEDGEMENTS

Prof. M. D. Gupte, Director, National Institute of Epidemiology, Chennai readily accepted my application to undergo this course. He has been highly supportive of various endeavors and projects conducted under the training programme. I am grateful to him for his overall interest, advise and support.

All through the process of conducting this study, from developing the protocol to statistical analysis of the data and drafting the report, it was done under the guidance and close supervision of Prof. K. Ramachandran, formerly Professor and Head of Biostatistics, All India Institute of Medical Sciences, New Delhi and Advisor to DGICMR for Field Epidemiology Training Programme, National Institute of Epidemiology, Chennai. He was kind enough to personally go through most of his suggestions and advise in spite of his busy schedule. I gratefully acknowledge his help, valuable advice and guidance during the entire period of the training programme.

The Secretary and the Director, Health and Family Welfare Department, Government of Mizoram deputed me to undergo this course and I am indeed grateful to them.

Dr. Vidya Ramachandran, coordinator at NIE and my local preceptor, for her help, advice and guidance during the entire period of the training programme.

Several scientists and staff of NIE, Chennai including Dr. B.N. Murthy, Deputy Director, Dr. P. Ramakrishnan, Assistant Director, Dr. P. Manickam, Research Officer, Mr. Satish, Librarian and Mrs. Uma, Secretary, have all helped me in various ways during the course. I gratefully acknowledge their help.

Date: **Biakthansangi**

SECTION:1

FIRST FIELD POSTING

1.1 WORK PLACE DESCRIPTION, MIZORAM-2002

1. INTRODUCTION

Description of the work place is crucial in order to enable an overall holistic picture for clearer knowledge and understanding.

The whole of Mizoram is of hilly terrain with steep hills divided by deep gorges and numerous streams and rivers. My previous posting place as a Medical Officer at Aibawk PHC under Aizawl West District though only 30 km away, takes 1 ½ hours to reach, due partly to the bad road conditions and also to the narrow winding roads. This PHC covers a population of 7180 (MPW reports). It has 5 Sub-centers covering 9 villages and a bed strength of 10 (as all PHC's in Mizoram).

The activities carried out at the PHC were :-

1. Implementation and promotion of National health programmes.
2. To look after OPD and IPD.
3. In charge of various administrative activities within the PHC.
4. Official correspondences within the PHC, and with senior officers.
5. Visit Sub-Centres and conduct free clinics, orientation training camps and general IEC activities.
6. Supervision and monitoring of activities under the PHC.

In the course of my work, I was involved with different aspects of National Health Programmes on account of which I developed an interest in public health and realized its importance. At the same time I was acutely aware of my deficiencies, particularly in public health and surveillance activities and often felt incapacitated in fully implementing it. This lacunae could not be fully rectified. So when the MAE Course was offered, I opted for it.

After completion of three months contact session at NIE, I was posted under the Directorate of Health Services, in continuation of the letter received from Director, NIE vide No.NIE/D/MAE/II/154/2002, dt. 2nd May 2002.

The activities carried out for the course since being posted :

1. Collection of data for my first field projects from different sources.
2. Identifying local preceptor.

3. Meeting the Chief Medical Officer, Aizawl 'West', Director of Health Services, Secretary, Minister i/c Health for appraisal and support of the various activities under the MAE course.

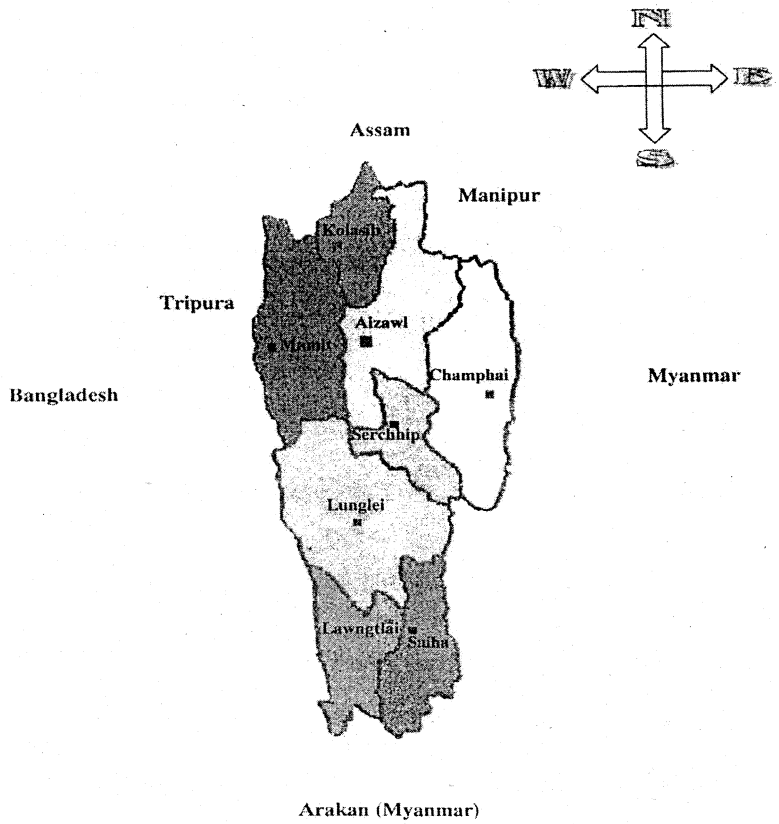
Objectives

1. To gain an overall knowledge of the working situation in Aizawl district.
2. To know the dimensions of the health problems.
3. To identify diseases of public health importance and suggest measures to control it.

Background information

Mizoram, literally the land of the Mizos is an expanse of green hills situated at the southern extreme of North East India. It was formerly a district under Assam, attained Union Territory status on January 1972 and became a full fledged state on February 1987.

Mizoram at a glance



Area and Population

1) Area	-	21,087 Sq. km
2) Total forest area	-	18,775 Sq. km
3) Population	-	8,91,058 (2001)
Male	-	4,59,783
Female	-	4,31,275
Rural (in percentage)	-	50.50
Urban (in percentage)	-	49.50
4) Scheduled Tribes	-	96.12%
5) Scheduled Castes	-	0.6%
6) Others	-	3.38%
7) Density of Population per Sq. km.	-	44
8) Sex Ration. Female per 1000 male	-	938
9) Literacy percentage	-	88.49
Male	-	90.69
Female	-	86.13
10) Villages inhabited (Rural)	-	704
11) No. of Urban Town	-	22

(source: census 2001)

Length and Width of State and Length of Borders

1) Length and Width		
a) North to South	-	277 kms
b) East to West	-	121 kms.
2) Inter State Border		
a) in the north with Assam	-	123 kms
b) -do- with Manipur	-	95 kms
c) in the West with Tripura	-	66 kms
3) International Border		
a) In the East & South East with Myanmar	-	404 kms
b) In the West with Bangladesh	-	318 kms
4) Geographical Location	-	92.15 to 93.29 E Longitude
		21.58 to 24.35 N Longitude

The Tropic of Cancer just passes the Southern periphery of the State Capital, Aizawl at 23.3 N Latitude.

(source: census 2001)

Administrative set up

1) District	-	8 nos.
2) Sub-Division	-	23
3) Rural Development Block	-	22 nos.
4) Lok Sabha Constituency	-	1 no.
5) Assembly Constituency	-	40 nos.

(source: census 2001)

Basic Health Indicators

1) Crude Death Rate	-	3.72/1000 mid-year population
2) Infant Mortality	-	13.92/1000 live birth
3) Maternal Mortality Rate	-	0.6/1000 live birth
4) Crude Birth Rate	-	19.7/1000 mid-year population
5) Growth Rate	-	29.2%
6) Doctor population ratio	-	3,149
7) Nurses population ratio	-	1154
8) Health worker population ratio	-	1129

(source: DHS statistics- 2002)

Geo-climatic features

The hilly terrain, plentiful monsoon rains, large numbers of rivers, forest of bamboo, timber, agar, etc has tourist potentials. However, the land area of Mizoram being formed completely by steep hills, the following are notable features relevant to socio-economic and health development :-

1. Climate is pleasant since its tropical location tempers the chilling effect of hilly-forest climate. Most of Mizoram is above an altitude of 2700 ft from the sea level. Nearly 57% of the land area is covered by forests. As a result, temperature ranges from 8^0 C in winter to 33^0 C in summer.
2. Rainfall is abundant and evenly spread out (250 cms on average) due to the ideal location of the state to receive the north-east monsoon rains. But due to rapid run off hillsides, and very few flat areas for collection of run-off water, availability of water has been a perennial problem in most parts of the state during summer.

3. Road communications are inadequate due to inherent difficulties of road-making in hilly areas, heavy rains resulting in rapid destruction of roads, non-availability of locally available materials, landslides, long winding roads to be traversed between two adjoining hills, and a very low density of the population to justify massive investments required for creating adequate infrastuctures. There is only one rail-link to Mizoram since 1993. The only airstrip in Mizoram at Lengpui, 40 km away from the state capital Aizawl, could be carved out from one of the few stretches of flat land available. It is connected by flights on all days to Kolkata & Imphal, and on alternate weekdays to Gauhati.

Demographic characteristics

The population profile of Mizoram and Aizawl District are as given in Tables I and II:

Table I- **Population of Mizoram** (source: Census 2001)

	Total	**Rural**	**Urban**
Population (T)	8,91,058	4,50,018	4,41,040
Male	4,59,783	2,33,718	2,26,065
Female	4,31,275	21,630	2,14,975

Table II- **Population of Aizawl district** (source: Census 2001)

	Total	**Rural**	**Urban**
Population	3,39,812	90,960	2,48,852
Male	1,73,930	47,070	1,26,857
Female	1,65,882	43,887	12,195

The area, Aizawl District is 3576.31 sq.km. Other demographic characteristics are:

Rural Population - 26.76%

Urban Population - 73.24%

Sex Ratio - 954 (female per 1000 male) (Census 2001)

There are many tribes among the Mizos. The tribal population constitutes 96.12% of the total population. The official spoken languages are Mizo and English.

There are 3 linguistic/minority groups namely the Chakmas, Lai and Mara, who have their own administrative District Councils.

Social characteristics

Mizoram 96.12% of the total population are tribals and the literacy rate is 88.49, males 90.69, females 86.30. The overall literacy rate in the rural population is 80.45 and in the urban population, it is 96.34 (Census 2001).

Irrespective of tribal identity or literary status, 97% are Christians, following the systematic work of the Christian missionaries since 1ate 19th century. The other religious minority groups are Hindus, Muslims, Buddhists, Sikhs. The same percentage of Christians speak the Mizo language, written in Roman Scripts.

The Mizos have centuries old binding ethic namely "Tlawmngaihna" which demands a person to be hospitable, kind, unselfish, courageous and self-sacrificing and combined with the common Christian faith have formed a very egalitarian, cohesive society without class and caste/tribe distinction, exploitation and hierarchy. Thus Mizo society is not characterised by some groups with concentration or deprivation of resources. Another in valuable custom for Mizo society is the centuries old binding tradition of voluntary work "Hnatlang". Many community assets like village paths, road construction, water hole or spring source construction, community halls construction and even in some areas construction of Anganwadi centres, Sub-Centres, and PHCs are done through 'hnatlang' organized by village councils and social voluntary organizations with limited financial support from the Government.

Some of the strongest and active State level organizations such as YMA (Young Mizo Association), MHIP (Mizo Women Association), MUP (Mizo Elderly Association) and Joint Churches Action Committee have universal membership and their activities encompasses the whole population covering all towns and villages all over the State.Both the joint and nuclear family types are observable. It is customary for the youngest child to look after the aged parents.

Economic characteristics

The main occupational activity in the State and in the district of Aizawl is agriculture. The non-agricultural activities comprises of 31.9% of the population in Mizoram and 62.44% in Aizawl District (Census 2001).

Though a patriarchal form of society, women enjoy a fair degree of autonomy in decision making. This could be due to the high work participation of women in economically productive activities.

Despite high literacy rate, unemployment rates are observed to be high (as could be elicited from my discussions with the staffs of Labour & Employment Department), as large number of people registered in the employment registers, for availing employment opportunities. Limited employment opportunities in the Government sector could be some of the causes for unemployment.

The main employing agency at present is the Government sector. Data for the percentage of population unemployed is not available. Those registered in the employment office is for the Government sector , the total number registered for all categories of work for the whole of Mizoram is 82,584 and for Aizawl District is 69,268. (Director, Labour & Employment Department, March 2002).

In spite of these drawbacks, the overall work participation rate for Mizoram and Aizawl District are rather high and are as given in Table III.

Table III: **Work participation rate- Mizoram, Aizawl district** (Census 2001)

	Mizoram	**Aizawl**
Male	57.39%	57.12%
Female	49.11%	43.85%
Total	58.93%	50.64%

Mizoram is still economically in the developing stage, the existing industries are still on small scale basis. Majority of the cultivators still follow the traditional method of Jhum cultivation, though government has taken active steps in training and motivating the farmers towards a more productive contour farming system, so as to enable a production 2-3 crops a year in rotation.

The registered households below the poverty line in Aizawl District are 14959 families (DRDA- District Rural Development Agency). As obtained from my various discussions of the staffs working under the said department and the Rural Development Department, this data is unreliable as many families register in order to avail the different facilities rendered towards such groups.

Cultural practices

The Mizos have no taboos or peculiar beliefs in regard to food habits. The staple diet is rice eaten along with vegetables or meat. The people consume large amounts of green leafy vegetables particularly mustard, pumpkin and spring bean leaves. The main method of cooking is just by boiling without addition of any salt or spices.

The major festivals celebrated by the people of Mizoram is Christmas and New-year, which is celebrated with great enthusiasm accompanied with singing, dancing

and community feasts. The Government has been trying to revive the centuries old festivals that was celebrated before the entry of Christianity in the state. These festivals or 'KUT' are associated with agricultural activities and celebrated with rice beer, singing, dancing and community feasts.

Mizoram has an abundant rainfall so most of the houses have sloping roofs. In the urban area, majority of the houses are of concrete construction and in the rural areas, only a small minority live in kachha houses. Since no data was available to describe the housing conditions, health habits etc., a small community survey was conducted where Sairang village (rural) and Chanmari (urban), Aizawl were purposively selected due to their operational conveniences. Households were selected by systematic random sampling techniques, head of families/responsible family members available at the time of the survey were interviewed, for Sairang village on 22.7.2002 and Chanmari on 23.7.2002. Total number of persons interviewed were 100 each (rural and urban) and total=200.

A structured interview schedule was used for conducting the community survey (as per questionnaire enclosed in Appendix), after assurance of confidentiality of the information given. No written consent was given, the consent taken as the willingness to give the information. Non-respondents were not encountered. The results of the community survey are as given in Tables IV-VIII as given below.

Table IV. **Number of persons indulging in risk behaviors**

N = 200 (R*-100, U*-100)

Habits/Risk behaviours	Rural	Urban
Smoking	74%	58%
Chew pan	84%	78%
Chew Tobacco	78%	69%
Drink Alcohol	27%	32%
Use drugs (IV/ Oral)	5%	8%

*R-rural, U-urban

Table IV depicts that majority of the people indulge in risk behaviours particularly smoking and tobacco use.

Table V: **Number of households with in-house latrines**

N = 200 (R*-100, U*-100)

Type of Latrine	Rural	Urban
Pit latrine	56	18
Septic Tank	44	82
Total	**100**	**100**

*R-rural, U-urban

Table V depicts that even in rural areas, people do not use open-air defecation.

Table VI: **Health seeking behavior of the community**

N = 200 (R*-100, U*-100)

Institution for seeking health	Rural	Urban
Govt. Hospital	84	82
Private Hospitals	4	12
Local healer/Quack	2	3
Own medication	10	3
Total	**100**	**100**

*R-rural, U-urban

From the Statistic Department, Anti Malaria Programme, data on active and passive case detection for the health seeking behaviour of the population of Mizoram was compared, and are as given in Table VII :

Table VII: **Active and passive case detection (for blood smear):**

Year	Active Case Detection	Passive Case Detection
1998	31069	82734
1999	22889	57273
2000	26296	65802
2001	34095	53115

From the above 2 tables (Table VI and VII), it can be gauged that the health seeking behaviour of the general population is good. This achievement can be partly attributed to various IEC activities undertaken by the Government.

Table VIII: **Housing conditions of the community**:

N = 200 (R*-100, U*-100)

Type of houses	Rural	Urban
Kaccha	17	Nil
Semi-kaccha	4	Nil
Semi-pucca	49	21
Pucca	30	79
Total	**100**	**100**

*R-rural, U-urban

It is also gathered from the community survey that 97% of the population in the urban area uses the Govt. garbage disposal system and the rest of the

community surveyed use their own garden for dumping their garbage. In the rural community, majority of the population use their own local dumping area which are under the control of the respective village councils, as no government disposal system has been fully implemented in the rural areas.

In spite of good achievements gained in terms of literacy , basic health, health seeking behaviour and economic status, much is still to be gained, particularly on the common social practices which are detrimental to health and well being like smoking, chewing pan/tobacco, alcohol and drug abuse.

2. WORK SITUATION DESCRIPTION

Development of Health Care in Mizoram :

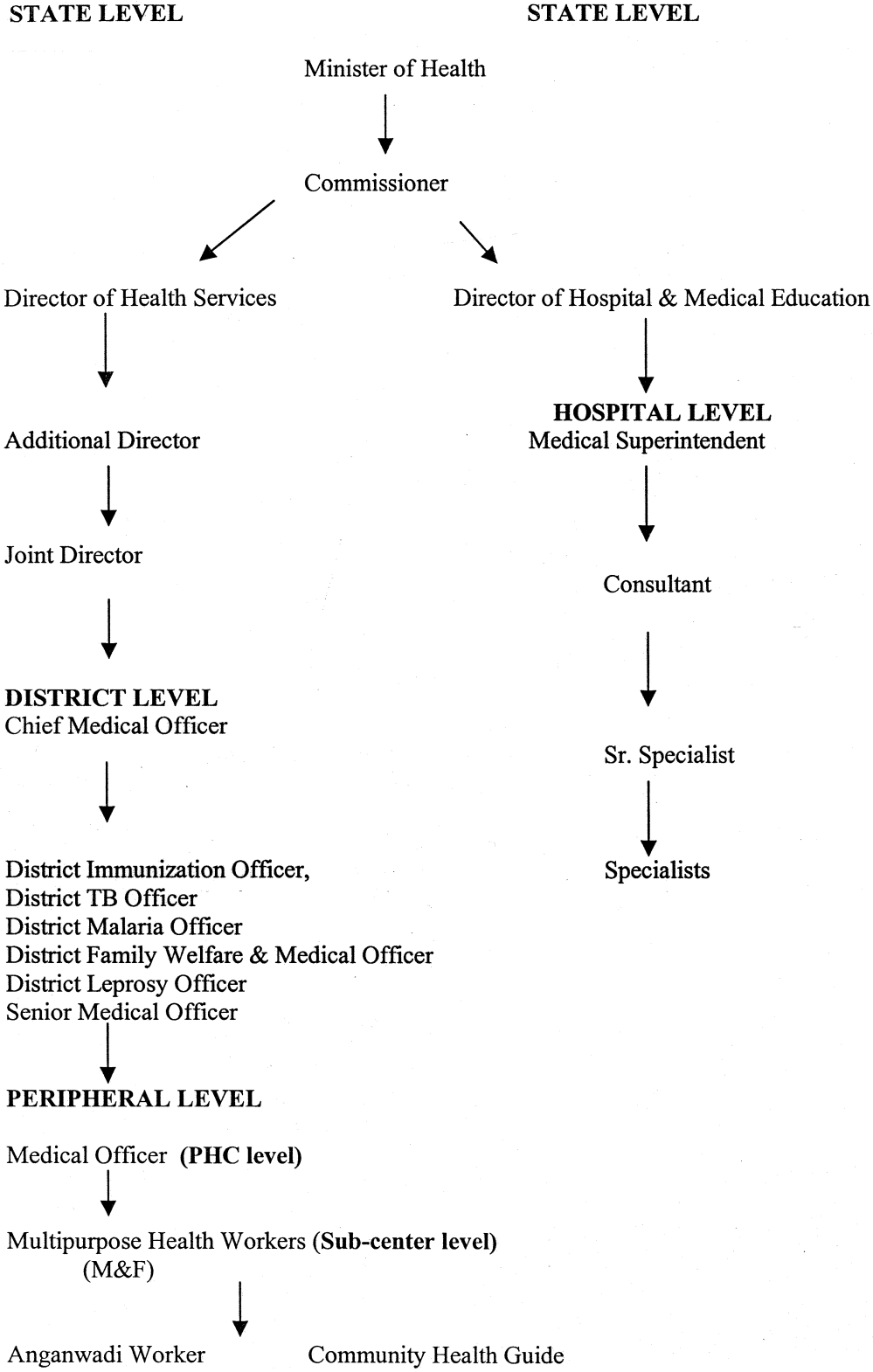
The Health service network has progressively expanded since 1972, when Mizoram attained Union territory status. However, two decades of insurgency, insecurity, political and administrative uncertainty prior to 1986 has retarded the developmental infrastructure of the state as compared with the rest of the country. After attaining full statehood and cessation of insurgency in 1987,there has been rapid progress in establishment of a well-distributed network of hospitals, CHC's, PHC's and Sub-Centres.

In keeping with the National Health policy of 1983, the Government of Mizoram has been pursuing the strategy laid out in the policy to achieve the goal of Health for all by 2000AD. Public Health Programmes that are implemented in the state like the Malaria Control Programme, Leprosy Eradication, Tuberculosis control, AIDS Control Programme, Blindness Control, School Health, Iodine Deficiency Control and Reproductive and Child Health Programme, besides providing curative services, had all been delivered through the Sub-centres, PHC`s, CHC`s and District Hospitals.

As of 2002, there are 351 Sub-Centres covering a population ranging from 1000 to 2600. These are manned by Health Workers (male and female), with one supporting group IV staff. There are 78 Supervisory centres and each is manned by a Medical Officer, Community Health Officer, Health supervisor (male and female) , Nurses and other supporting staffs like BEE, Driver, Clerk etc. There are 7 Hospitals and 12 Community Health Centers.

Health service delivery at the State level is the responsibility of the State Directorate of Health Services. As of 2001, March, 6.2% of the total budget in Mizoram is for the health department. At the District level, the Chief Medical Officer is responsible for organising health and medical services in the district. At each block and in some of the major towns, the Primary Health Centre is responsible for implementing the health, medical and family welfare services.

Health Manpower profile of the Health care system of Mizoram (source: General department, Directorate of Health Services):


STATE LEVEL
STATE LEVEL
Minister of Health
Commissioner
Director of Health Services
Director of Hospital & Medical Education
HOSPITAL LEVEL
Additional Director
Medical Superintendent
Joint Director
Consultant
DISTRICT LEVEL
Chief Medical Officer
Sr. Specialist
Specialists
District Immunization Officer,
District TB Officer
District Malaria Officer
District Family Welfare & Medical Officer
District Leprosy Officer
Senior Medical Officer
PERIPHERAL LEVEL
Medical Officer (PHC level)
Multipurpose Health Workers (Sub-center level)
(M&F)
Anganwadi Worker
Community Health Guide

Staffing pattern :

Staffing pattern for Aizawl District , district level (source: CMO office) :-

Chief Medical Officer

↓

District Immunization Officer,
District TB Officer
sDistrict Malaria Officer
District Family Welfare & Medical Officer
District Leprosy Officer
Senior Medical Officer

↓

Supporting staff – Drugs Inspector
Malaria Inspector
Inspector of Statistics
Statisticians
Public Health Nurse
Community Health Officer
Various clerks
Drivers
Group 'IV' Staff

At the PHC level (Rural) the staffing pattern are as follows :-

Medical Officer	-	1
Community Health Officer	-	1
Health Supervisor (M & F)	-	1 each.
Nurses	-	3-5
Microscopist	-	1
Pharmacist	-	1
Laboratory Technician	-	1
X-Ray Technician	-	1
Office clerk	-	1
Group 'IV' Staff	-	5-7

In Urban areas, we have Urban Health Posts called Main Centres. In the capital city of Aizawl, it is divided into 4 Main Centres and each of these centres are manned by :-

Community Health Officer	–	1
Health Supervisors (Male & Female)	-	4-6
Microscopists	-	1
Group 'IV' Staff	-	1

These Main Centres (both in the rural and urban set up) look after 4-8 Sub-Centres. The Sub-Centres are manned by Multipurpose Health Worker (Male & Female) and one (1) Group 'IV' Staff.

The activities at each level of the Health System are as follows:

Directorate of Health Services

At this level, they are largely responsible for management in terms of manpower, financial, policy framing, programme designing/ planning, general co-ordination and overall support.

District level

At this level, they are mainly the implementing bodies for policies framed and programme strategies designed at the state level. A fair share of preventive and curative components are also undertaken at this level.

PHC level

This is the grass root level for implementation of Health programmes. The thrust areas are mainly preventive aspects of Health care with some curative components which are mainly primary care.

Sub-Centre level

They are the grass root level for the implementation of Health programmes and are a primary source of reporting.

There are 2 (two) Government Hospitals within Aizawl District namely the Civil Hospital with the attached Post Partum Unit and TB Hospital, Aizawl.

Civil Hospital Aizawl

It has 300 bed capacity giving diagnostic, curative, preventive, promotive, counselling activities as well as surveillance and referral activities. It is equipped with the following specialities :-

Urologist	-	1	Anaethetist	-	6
Gen. Surgeon	-	5	Psychiatrist	-	3
Physician	-	4	Orthopaedic Surgeon	-	4
ENT	-	3	Radiologist	-	2
Ophthalmologist	-	3	Pathologist	-	3
Paediatrician	-	4	Microbiologist	-	2
Dermatologist	-	2	Biochemist	-	2
Gynaecologist	-	4	Forensic Medicine	-	2

Prosthetic & Orthotic limb fitting unit

Physiotherapy Unit

TB Hospital, Zemabawk, Aizawl

This is a referral centre for Tuberculosis cases equipped with 65 beds and manned by a Medical Officer as well as Lab. Technicians for laboratory activities.

Private Hospitals

There are four private hospitals in Mizoram, three are situated in Aizawl and one in Lunglei, a mission hospital.

Presbyterian Hospital, Durtlang

It is a 200 bedded hospital having diagnostic, curative, and preventive facilities and is in Aizawl district. It is a mission hospital and has the following specialities :-

General Surgeon	-	1
Paediatrician	-	1
Physician	-	1
Gynaecologist	-	2
Orthopaedic Surgeon	-	1
Ophthalmologist	-	1
Anaesthesiologist	-	1
Pathologist	-	1

Greenwood Hospital

It is a Nursing Home with 20 bed capacity providing diagnostic and curative aspects of health, situated in Aizawl. It is manned by :

General Surgeon	-	1
Paediatrician	-	1
Physician	-	1
Gynaecologist	-	1
Anaesthesiologist	-	1
Psychiatrist	-	1

Seventh Day Adventist Hospital

It has a 30 bed capacity and provides diagnostic and curative aspects of health. It is situated in Aizawl. It is a mission hospital and manned by

Gynaecologist - 1

Ophthalmologist - 1

There are a number of non-governmental organization linking with health services and whose main focus area are for HIV/AIDS, STD, Hepatitis B, Commercial Sex Workers and intravenous drug users. They impart counseling and referral services as well as curative and preventive services. Their location is as shown on the map attached. They are :-

1. SHALOM (Society for HIV/AIDS and life line operation in Mizoram.
2. WORLD VISION CARE PROJECT
3. TRAPS (Training rehabilitation after care, prevention and support)
4. CHAN (Community Health Action Network)
5. VOLCOMH (Voluntary Community for Mental Health)

Mizoram has been battling with a number of diseases of public health importance and has taken active control measures though they still continue to be of importance as can be seen from the data taken from the Statistics Department, Directorate of Health Services, Aizawl over a two year period for the year 1999-2000 and are as given in Tables IX, X and XI.

Table IX. Reported cases/100000 pop. and the CFR of important Communicable diseases-1999, 2000, Mizoram.

Diseases	1999		2000	
	Rates	CFR	Rates	CFR
Malaria	3114.4	0.002	3443.4	0.003
Gastro enteritis	1491	0.001	1417	0.001
Amoebiasis	687.7	Nil	568.8	Nil
URTI	1357.5	Nil	760.8	Nil
Bronchitis	1216.2	Nil	1295	Nil
Pneumonia	517	0.006	483.1	0.006
Viral Hepatitis	90	0.009	89	0.008
Tuberculosis	147.1	0.007	166.7	0.006
Food Poisoning	56.5	Nil	84.2	nil

Table X. Reported cases/100000 pop. and the CFR of important Non-communicable diseases-1999,2000, Mizoram.

Diseases	1999		2000	
	Rates	CFR	Rates	CFR
Acid peptic disorders	1422.9	0.001	1177.4	0.0001
Hypertension	97	Nil	114	Nil
Hypertensive Heart Disease	61.3	N.A.	75.5	N.A.
Cancers	47.7	0.027	58.6	0.03
Diabetes	21.2	Nil	23.6	Nil
Road traffic accidents	108	N.A.	71.9	N.A.

Table XI. Reported cases/100000 pop. and CFR of Nutritional deficiency diseases-1999,2000, Mizoram.

Diseases	1999		2000	
	Rates	CFR	Rates	CFR
Kwashiorkor	6	N.A.	2.6	N.A.
Marasmus	11.1	N.A.	11.8	N.A.
Other Protein calorie malnutrition	92.1	N.A.	84.5	N.A.
Anaemia	492.7	Nil	409.5	Nil

There are various Health programmes that are in operation, but no separate health programmes which is specific for the State, as it follows the National control programmes such as :

- Malaria Control Programme
- Tuberculosis Control Programme
- National Leprosy Eradication Programme
- National Blindness Control Programme
- Reproductive and Child Health Programme
- National School Health Programme
- Iodine Deficiency Control Programme
- Mental Health Programme
- Indian System of Medicine

Outbreak occurences in the State have been handled by the concerned Districts and their occurences and magnitude for the past 3 (three) years are shown in the table :

Table XII: Reported epidemics, Mizoram, 2000-2002 (source:DHS,Public health program)

Diagnosis	FHIR	Period	Area affected	Cases	Deaths	Lab. investigation	Control measures
Amoebic dysentery	MPW	May 2000	Phullen PHC	51	0	Clinical	Health Education Awareness
Food poisoning	MPW	April 2002	Hlimen Village Kulikawn M/C	130	1	Clinical based confirmation	IEC activities
Fever (Malaria)	MO	May 2001	Khawhai PHC	40	1	BS +ve for PF 27 nos	IEC activities DDT Spray Bednet impregnation
Fever(URTI)	MPW	Aug 2001	Lungleng Village Kulikawn M/C	54	0	Clinical	IEC activities
Amoebic Dysentery	MO	April 2002	Phulpui Village Aibawk PHC	20	0	Clinical	IEC activities

Other sectors linked with Health

Social Welfare Department (ICDS)

Health Services are linked with ICDS in the promotive and preventive aspect of health in under 6 years children; pregnant and nursing mothers in the provision of nutrition and immunisation facilities. Overall, Mizoram, has 1341 Anganwadi centres catering to a population of 216776 children below the age of 6 years and 26896 numbers of pregnant and lactating mothers (Directorate of Social welfare). The number of children, pregnant & lactating mothers receiving special nutrition program for the month of March 2002, are 101128 and 26401 respectively (Directorate of Social Welfare, March 2002).

Public Health Engineering Department (PHE)

They are responsible for the provision of safe drinking water. In rural areas, rural water supply are also covered by gravity feed water supply and in areas where it is not possible, water tanks are supplied for storage of rain water during monsoons.

In urban areas in house water connections are provided and where it is not possible, Public point or Public tap water outlets are provided. Each point is estimated for 50 households. There are 476 such points for Aizawl City.

Water that is provided for in house connection and Public points are taken from "Tlawng" river, where it undergoes the process of purification by alum treatment, clarifloculation, filtration, disinfection and chlorination, with the designed capacity of 10.8x10000000 L/day, with the designed population of 80000 @ 135 lpcd, but at present is supplying 197715 souls/persons.

- For the rest of the population, they have to depend on spring source water or water holes for their needs.
- This Department also undertakes water analysis of spring source water. (Source : Chief Engineer's Office, PHE department)

The Local Administration Department:

This department is responsible for waste disposal and sanitation processes. There are 15 garbage vehicles on service, for daily collection of garbage and are dumped at suitable dumping areas after treatment with insecticidal spray. This process is for Aizawl city. In rural areas, suitable dumping grounds are chosen in consultation with the local Village councils and where not available, each households dumps in their own attached garden.

There is no sewage disposal system or plant, each household manages on its own. With increasing awareness, particularly in health and hygiene, open air defeacation is not practised even in rural areas. Public latrines are available and are maintained by local social organization like YMA, MHIP etc.

School Education Department

Under School Health program, target group of primary school children, 6 to 12 years of age are under School Education Department. The objective of School health Programs like health awareness, health talks, medical checkup e.g. eye checkup, dental checkup, immunization and maintaining of health records are implemented by collaborating with school teachers. They impart health education information and their responsibilities. Health teachers are trained under the school health programs.

Mid-day meal programs are under School Education Department.

SCERT (State council for education, research and training): This is under School Education Department, and assistance for students needing hearing aids, spectacles,

artificial limbs etc. are given. Resource teachers are present and are involved in school health.

With high literacy rate, education is given high priority by the community, for both sexes, and there is no gender bias in this aspect. The position of schools in Mizoram (source: Directorate of School Education 2001),are as follows :

Table XIII. Total number of Schools in Mizoram

Year	Primary School	Middle School	High School	Higher Secondary School
2001	1377	851	370	33

From Primary level, the number of Government and Private schools are as given in Table XIV.

Table XIV: Total number of different types schools :

Level	Government	Deficit	Aided	Private
Primary School	1064	-	-	313
Middle School	340	245	55	211
High School	151	46	10	163
Higher Secondary School	17	8	-	8

Data for school enrollment rate is not available but the male female ratio is as follows:

Table XV: School enrollment by sex:

School level	Boys	Girls
Primary School	9434	8446
Middle School	7666	7581
High School	5683	6019

The school dropout rates in the year 2000 are as follows:

Primary level - 40.5%

Middle level - 51.49%

High school level - 61.13%

The high school dropout rates, as gathered from my discussion with the Research Officer of the department, is particularly high because many families, particularly well to do families send their children outside the State for their education.

The number of colleges for the whole State are as follows :

Government	-	7
Deficit	-	10
Private	-	11

These colleges are all Arts and Commerce colleges except two colleges, of Science (government) and of Law (private).

The existing professional colleges:

Health Workers training school	-	1 (Aizawl District)
School of Nursing (Govt)	-	2 (one in Aizawl,Lunglei dist.)
(Mission)	-	-do-
Regional Institute of Paramedical and Nursing	-	1 (Aizawl District)
Polytechnic	-	2 ,(one in Aizawl, Lunglei)
Industrial Training Institute	-	1 no (Aizawl District)
Veterinary & Animal Husbandary college	-	1 (Aizawl district)
College of Teacher's Education	-	1 (Aizawl district)
Mizoram Hindi Training College	-	1 (Aizawl district)
Special Hindi School	-	1 (Aizawl District)

3. DISCUSSIONS

In the district of Aizawl and the state of Mizoram, as can be gauged from Tables IV A,B&C, there are a number of diseases of public health importance, the reasons for which can be briefly summarized

Malaria

Malaria has gained tremendous impact in terms of morbidity and mortality, affecting all age groups for decades. Mizoram being a hilly state with its peculiar topography and abundant forest compounded with its humid tropical climate (in the border areas) is home to vectors of which malaria causing vectors is the maximum. It is highly endemic and is compounded with its long international border with Bangladesh and Myanmar where health care facilities particularly in malaria control are perhaps inadequate. The common practice of rain water harvestation and storage in big tanks has increased the vector density though data for the exact density cannot be ascertained due to negligible vector surveillance. The absence of proper sewage or drainage system has been a source of increased vector density.

Water borne diseases

Abundant forest with its flourishing flora and fauna, accompanied with scarcity of water in spite of heavy rainfalls has made it an easy target for water borne diseases particularly, during early monsoons where water from the early rainfalls are readily used for consumption. The government has made progress towards provision of clean and safe drinking water but much is to be desired, as rural populations do not avail of this opportunity. They thus have to depend on spring source water/waterhole and rain water. In some areas, where possible, the government has made provisions for water supply by gravitational source as well as provide water tanks for rainfall harvestation.

Spring water are routinely not purified or chlorinated. Therefore, can act as a common source of water borne infections.

Tuberculosis

The trend of Tuberculosis in Mizoram is perhaps on the increase. Decreased treatment compliance, perhaps inadequate economic development and influx of different varieties of workers from Myanmar and other neighbouring states to work as daily labourers as well as increasing the total floating/migratory population may possibly contribute the increasing trend in Tuberculosis.

Food poisoning

This has not manifested in a broad sense but nevertheless has made its marks as their occurrence is felt though usually sporadic.

Respiratory diseases

Cool climate, bad road conditions creating unwanted dust particles, increased influx of migrant workers and widespread smoking practices have perhaps resulted in increased incidence of respiratory diseases.

Acid Peptic Disorder (APD)

Smoking, ingestion of alcohol, food habits of having only two square meals a day with prolonged intervals in between meals, chewing pan and tobacco and drinking large quantities of tea are some of the many factors predisposing the increases in the state and district.

Hypertension and Diabetes

With increasing socio-economic advancement and urbanization, non-communicable diseases like Hypertension, Diabetes, Coronary Heart Diseases, etc. seems to be rising. Improved socio-economic conditions leading to increased purchasing capacity of high cholesterol diets, particularly pork meat which is a great delicacy among the Mizos.

Cancers

The wide practice of smoking, chewing pan and tobacco, alcohol and centuries old practice of eating smoked meats and vegetables has resulted in the rise of cancer cases creating great socio-economic burden. These factors could also possibly contribute to the large number of cancer of the stomach (which is the most common of all cancers in Mizoram), as reported by the department of Pathology, Civil Hospital Aizawl. Analysis of all available cancer cases from all possible sources within Mizoram demonstrates that stomach cancer comprises of 37.5% and 20.8% of male and female cancers respectively.

Road traffic accidents

The narrow winding roads throughout the state, sub optimal road conditions with the added effect of alcohol ingestion and drug abuse has created many road traffic accidents with loss of lives and various disabilities.

Anaemia

The high endemicity of Malaria, worm infestations, and improper dietary intake due to various reasons has resulted in Anaemia emerging as a public health burden.

Various control measures have been implemented in the state, particularly after attainment of Union Territory status since 1972. Much remains to be done in terms of manpower capacity building and motivation of the public towards healthier living habits.

Recommendations

1) To address the existing disease burden and lacunae in the state, the foremost necessity is development of a good surveillance system whereby the trends and patterns of diseases can be understood and proper, timely action can be initiated.
2) A strong and firm political commitment at all levels is a must for progress, particularly in public health. This can generate community awareness and participation, as well as concerted and committed actions.
3) Stronger inter-sectoral coordination between various Government departments and the community, to effectively address the lacunae is a dire necessity so that a combined and multi angle approach can be taken. The existing set up of health being in the hands of the Health Department only should be rectified. The socio-epidemiological aspects of health need to be studied and the problems identified as social aspects of health can be one of the main causes of ill health.

4) Vector surveillance has to be properly established and where needed, strengthened at State Headquarters and at all District Levels. As vector borne diseases, Malaria is the main disease burden of the State, this lacunae should be immediately corrected.

5) Motivation of the population towards healthier practices should be strengthened because mere awareness is not sufficient to change life-long habits or practices. Evaluation of various IEC activities should be undertaken (it is not executed) and needed lacunae, remedied accordingly.

6) Drug abuse and addiction with psychoactive drugs, mainly among the youth is widespread. Data from the State AIDS Control Society shows that a total number of HIV infected cases (total blood screened since October 1990 is 68,256), is 404 out of which 184 cases are found to intravenous drug users. (Source: State AIDS Control Society, March 2002). One possible contributing factor for the extensive drug abuse may be its easy accessibility in the state channelized through the international borders with Bangladesh and Myanmar. Legislative control of psychoactive drugs in Mizoram should be enacted and enforced.

Though Mizoram Total Prohibition Act 1996, has been implemented, it's impact on drug abuse has not been carefully studied nor assessed. The general public opinion is that it has probably impacted negatively.

Conclusions

Mizoram is burdened with communicable and non-communicable diseases. In spite of the high literacy rate achieved, Mizoram being a relatively 'young' state, needs strengthening in many areas for its 'all round' development. There is need for a sensitive surveillance system to initiate effective public health action and to respond to challenges. Sharing of relevant information at different sectors should be encouraged. Enhanced community participation for planning and implementation processes should be encouraged and adopted.

There is a need for enhanced public health actions towards social practices, in particular, tobacco and alcohol use which are wide spread and are detrimental towards good health. Not only should the department of health be responsible for delivery of IEC activities, but strengthen collaboration and cooperation with NGO's for increased impact.

APPENDIX I

Questionnaire: Community survey

Rural:
Urban:
Type of house:

1. When you are ill, which of the following institutions/persons do you go first?
   - Government Institutions
   - Private Hospitals
   - Local healer/ Quack
   - Own medication
2. Do you use a pit latrine or a septic tank system in your home?
3. Do you smoke tobacco (in any form)? Yes___ No___
4. Do you chew tobacco (in any form)? Yes___ No___
5. Do you chew pan? Yes___ No___
6. Do you drink alcoholic beverages (in any form)? Yes___ No___
7. Do you indulge in drugs of any kind? (oral/IV) Yes___ No___
8. Do you make use of the government garbage disposal system (Local administration department)?
9. If No to question 8, what other methods do you use?

Operational definitions of the type of houses:

Kaccha: construction of house with more than one room with bamboo or wooden walls and a thatched roof made of straw.

Semi- kaccha: construction of house with wooden posts and Aluminium corrugated plain sheet (AC sheet walling) walls with tin roof.

Semi-Pucca: construction with cement/concrete posts as foundation with Alluminium corrugated plain sheet (AC sheet walling) or bamboo walls and tin roof.

Pucca: construction with cement foundation, with stone or brick walls and roof made of concrete slab.

1.2 DETAILS OF LABORATORY SUPPORT, AIZAWL DISTRICT

1. INTRODUCTION

Laboratory diagnosis is the trend in these present times. It is the basis on which current disease treatment, prevention and control programmes are based.

With increasing sophistication and awareness in the development of modern medicine and public health, reliance on laboratory confirmation is increasing. Management of diseases warrants diagnosis, which mostly can be done by laboratory tests. Prevention and control of important diseases can be planned realistically only if the exact magnitude of these diseases are accurately projected, based upon laboratory results.

Laboratory services are useful for detection and confirmation of cases/epidemics, identification of immunological status, carrier state, resistance to parasite or anti microbes, disease elimination, eradication, surveillance and detection of new pathogens. Laboratory forms an integral part of National health services and contributes effectively to health care and disease prevention. High quality laboratory services contribute directly to early detection and treatment of cases and consequently reduce the cost of providing health services.

There has also been an increasing importance accorded to laboratory confirmation by the State of Mizoram and District headquarters. In spite of financial constraints, progress has been made towards strengthening and upgrading the capacity of laboratories in various aspects.

Objectives

(1) To know the existing condition

(2) Identify areas with respect to available laboratory facilities in Aizawl 'W' district requiring strengthening

(3) Establish networking relationships and enlist support in cases of outbreak occurrence.

2. METHODS

The secondary data obtained are from the abstract register and formats for reporting. Primary data are obtained after discussions and informal interviews with

Health functionaries and laboratory personnel of the health system and the private hospitals. The list of functionaries from which data were elicited were:

TABLE I: LIST OF FUNCTIONARIES FOR DATA SOURCE

Level	Institution	Functionaries
Primary Health Centre	PHC-Lengpui	Medical Officer
	Aibawk, Sairang	Laboratory technicians
Main center/UHP	Kulikawn M/C	Community Health Officer
		Health Supervisors (M&F)
District	Civil hospital	Medical Superintendant
		Pathologists
		Microbiologists
		Biochemists
		Blood Bank Officer
		Laboratory technicians
Private Hospitals	I. Durtlang Hospital	Pathologists
	Green wood Hospital	Laboratory technicians
	Seven day Hospital	Director

3. RESUTLTS

In the Government setup in Aizawl District, Laboratory diagnosis has gained wide importance and as such Lab technicians are posted at the PHC level.

TABLE II: MANPOWER PROFILE OF LABORATORIES, AIZAWL DISTRICT

Level	Bed strength	Lab. Tech	Micros copists	Microbi ologists	Pathol ogists	Bioch emists	Lab. attendant
PHC	10	1	1	Nil	Nil	Nil	Nil
UHP/MC	Nil	Nil	1	Nil	Nil	Nil	Nil
District	300	14	3	2	3	2	4
Private I	200	5	Nil	Nil	1	Nil	1
Private II	30	3	Nil	Nil	Nil	Nil	1
Private III	50	1	Nil	Nil	Nil	Nil	1

TABLE III. LABORATORY FACILITIES PROFILE, AIZAWL DISTRICT

Diseases	Levels	Tests available	Capacity/d	Performance
Malaria	PHC	Peripheral smear	30	20-30
	UHP	-do-	-do-	-do-
	District	-do-	90	50
	Private	-do-	Variable	Variable
Tuberculosis	PHC	ZN stain for AFB	Variable	1
	UHP	-do-	Variable	Variable
	District	-do-	30	30
	Private	-do-	Variable	Variable
Meningitis	PHC	CSF, R/e *	Variable	Nil
	UHP	Nil	Nil	Nil
	District	R/e* CSF, C/S, serotyping	Variable	Variable
	Private	R/e* CSF, C/S	Variable	Variable
Cholera	PHC	Nil	Nil	Nil
	UHP	Nil	Nil	Nil
	District	Anti sera typing, culture		
	Private	Nil	Nil	Nil
Typhoid	PHC	Nil	Nil	Nil
	UHP	Nil	Nil	Nil
	District	Widal, Anti sera typing	Variable	Variable
	Private	Widal	Variable	Variable
Diarrhea's	PHC	Nil	Nil	Nil
	UHP	Nil	Nil	Nil
	District	R/e *, C/S, Anti sera typing	Variable	Variable
	Private	R/e*	Variable	Variable
Diabetes	PHC	Urine for sugar	2	Variable
	UHP	Nil	Nil	Nil
	District	Blood sugar	15	15
	Private	Blood sugar	Variable	Variable
HIV/AIDS	PHC	Nil	Nil	Nil
	UHP	Nil	Nil	Nil
	District	Elisa , different antigens	20	20
	Private	-do-	Variable	Variable
Hepatitis B,C	PHC	Nil	Nil	Nil
	UHP	Nil	Nil	Nil
	District	HbsAg	20	20
	Private	-do	Variable	Variable
Cancers	PHC	Nil	Nil	Nil
	UHP	Nil	Nil	Nil
	District	Histopath, cytopath	20-30	30
	Private	-do-	Variable	Variable
STD's	PHC	Nil	Nil	Nil
	UHP	Nil	Nil	Nil
	District	VDRL, gram stain	Variable	Variable
	Private	Nil	Nil	Nil

*Routine test

The capacity for performance of tests are more than the present performance, in particular, at the peripheral level, as the work load in a peripheral unit is routinely small, except for examination of malarial blood slides. The performance in the PHC is perhaps less than it's capacity. This could be due to faulty equipments and reagents, as financial constraints is being faced by the state, resulting in centralised strengthening of the district hospital.

In the event of occurrence of outbreak, capacity at each level (besides the private hospitals) can be enhanced as per the requirement because they are Government institutions. Drug susceptibility tests can be performed only for bacteria at the district level only.

4. DISCUSSIONS

District Hospital (Civil Hospital) being a Governmental hospital has offered its assistance in the event of outbreak occurrence for diseases that they can handle (as per lists above). The number of samples that can be handled will be as per the need or requirement. From discussions with various functionaries, the existing laboratory facilities, with regard to the disease burden of the state, have handled the situation well till date. Though vectors for Dengue and Japanese Encephalitis have been identified in Mizoram cases have not been identified so far.

But looking at the changing health scenario, up gradation of the existing laboratory facilities is necessary. Orientation training of laboratory staff, particularly towards handling outbreak investigations is needed. Strengthened laboratory infrastructure in terms of equipment and reagents at all levels is needed to tackle the emerging and re-emerging diseases. Integration and feed back of the laboratories with enhanced communication facilities at various levels and with the private institutions should be initiated. The relevant information thus generated should be efficiently used for control and prevention of diseases.

The Government Health Department has submitted to the finance department, an action plan for strengthening the Laboratories in terms of acquisition of equipment, instruments and manpower, in preparedness for newly emerging and re-emerging diseases and outbreak occurrence. Government approval is awaited. This would greatly enhance the capacity of the Laboratories, particularly in surveillance and outbreak investigation activities.

The State has been included under the World Bank programme for the Integrated Disease Surveillance Project which is expected to be implemented in the year

2003 through which laboratory capacity at the peripheral and district levels will be strengthened.

In the event of outbreak occurrences where diagnostic or confirmation facilities is beyond the capacity of the district or of the state of Mizoram, National Institute of Epidemiology, Chennai could take an active role in facilitating network activities particularly with other ICMR institutions with specialized laboratory facilities to overcome this existing constraints.

Recommendations

1. At present, only the laboratory at the district hospital is being utilized in outbreak occurrences. Dissemination of laboratory results during outbreak occurrences is negligible, except to the personnel involved. Routine dissemination of relevant laboratory results during outbreaks should be instituted and disseminated to all government and private institutions.
2. Up gradation of laboratories in terms of equipment, reagents, man power deployment and training programmes to handle the changing health scenario is necessary.
3. Testing facilities should be more decentralised so that diseases/diagnosis can be handled more efficiently, even at the peripheral levels.
4. Involvement of private laboratories for sharing of relevant information and better coordination should be initiated.
5. Integration of laboratories at the district/state level for compilation, analysis and dissemination of data for needed action

1.3 DESCRIPTION OF SURVEILLANCE SYSTEM,

MIZORAM

1. INTRODUCTION

Public health cannot progress without disease surveillance. Surveillance is the ongoing systematic collection, collation, analysis and interpretation of data and the dissemination of information to those who need to know so that timely and appropriate action may be taken. Surveillance is one of the main components of public health and is essential for early detection of diseases/outbreaks. Surveillance provides information on the status of the public health system and identify health problems, in whose absence specific or targeted public health action cannot be taken. It can also monitor and evaluate programs and conduct research. It monitors progress of ongoing disease control programme and help in optimizing the allocation of resources.

In Mizoram, there does not exist a formal surveillance system. However, surveillance for all national disease control programmes eg. Malaria control programme, TB, Leprosy, AIDS etc. does exist. A sentinel surveillance system for specific diseases, which are vaccine preventable and have epidemic potentials also exists. For the purpose of description both the system will be described.

Objectives

1. To gain an overall knowledge of the organization and functioning of existing surveillance systems in Aizawl district, Mizoram.
2. To identify the lacunae so that more effective public health action can be delivered
3. To suggest measures to strengthen the surveillance

2. METHODS OF DATA COLLECTION

Study area – Aizawl district, Mizoram.

Study period – 16.5.2002 – 15.6.2002

Source of information

Discussions with health functionaries at different levels was used for obtaining information and the list of functionaries with which discussions were held is as below :

Table 1: Lists of functionaries interviewed (informal) at different levels :

Level	Institution	Functionaries
State Headquarters	Directorate of Health services	Programme Officers, i/c Malaria, PublicHealth Research Officer Entomologist Statisticians
District	District Headquarters	Chief Medical Officer Senior Medical Officer Statisticians
PHC	Lengpui Sairang Aibawk	Medical Officer i/c Community Health Officer Health supervisors (M & F) Microscopists
Sub-Centres	Kulikawn Vaivakawn Sateek Lengpui	Health Workers (M & F)

Study of relevant records and documents

Following documents were studied for obtaining information :

1. Monthly reports and formats
2. Out patient register
3. Abstract register
4. Correspondence regarding surveillance system

3. RESULTS

Description of surveillance for National Vertical Programmes – Malaria

When Mizoram was a district under Assam, under the national programmes for Malaria Eradication, surveillance was initiated in 1962. But progress

was limited due to lack of manpower and communication facilities, compounded by a decade of insurgency. However, with the attainment of Union territory status in 1972, and the establishment of Directorate of Health Services, surveillance was strengthened for the state. After the introduction of the Multipurpose Health Workers scheme in 1978, it gained momentum.

Data, regarding the availability of the specific Government order for Malaria surveillence is not available.

Objectives

1. to know the number of cases
2. early diagnosis and prompt treatment
3. to decrease the mortality and morbidity
4. to evaluate the situation
5. to know the trends of the disease and predict epidemics

Case definitions

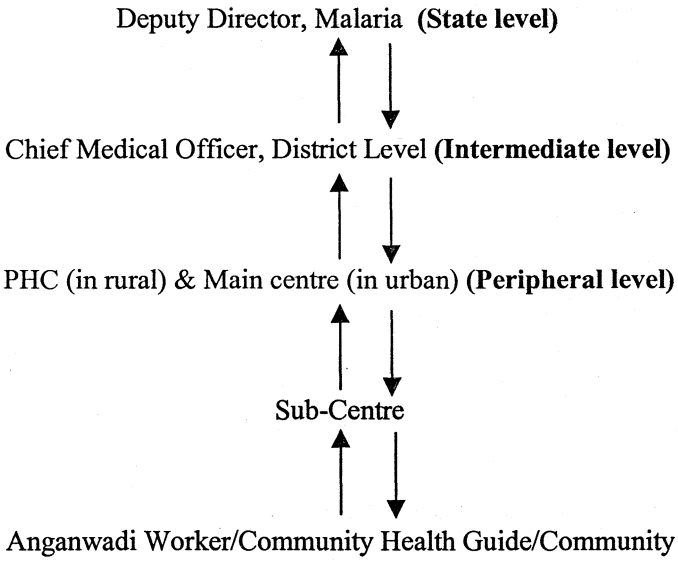
Suspected case – all fever cases unless otherwise proved

Probable case - fever cases without the following associated symptoms and not subjected to microscopic examination will be reported separately as Clinical Malaria.

1.Cough – Acute respiratory infection
2. Cold with running nose
3. Skin rash suggestive of eruptive illness
4. Skin infection – eg. Boils, abscess, infected wounds
5. Painful swelling of joints
6. Ear discharge
7. Urinary Tract Infection
8. Tonsillitis

Confirmed cases – all fever cases with blood smear positive for malaria parasite.

Reporting system and flow of information :



The tasks at the peripheral level (PHC) are reporting of cases, diagnosis and case management, analysis in terms of simple tabulation of data and feedback to the Sub-centres.

The tasks at the intermediate level (District) are case management of referred cases, analysis of data from the peripheral level, investigations of outbreaks feedback to the peripheral level and reporting to the state level.

The tasks at the state level are overall support and co-ordination at all levels, analysis of data from the intermediate/district level and the peripheral level, support to the intermediate level for outbreak investigations, feedback to intermediate and peripheral level and report to the Government of India.

Collection of data

The Multi purpose Health workers undertake active case search, by going for home visits within their jurisdiction and collect blood slides for suspected cases. The PHC's, Main Centres act as passive detection centres. The data collection by the Health Workers can also be passive, when patients present themselves to the Centres for their illnesses. Standardized formats are used.

Fever Treatment Depot is established in all areas per 1000 population or even below, depending on the location and specific needs of the area. These are manned by volunteers within the community and they collect blood slides and give presumptive

treatment for suspected cases (they have been trained to carry out their functions)The data that are collected are as per the standardised formats used.

Data requirement

Denominators data are the whole population, collected and reported as MPW monthly reports. Numerator data are the number of cases- morbidity and mortality.

Data sources

Sources of data are

1. Community Health Guide/Anganwadi Workers/Community
2. Multipurpose Health workers (M & F)
3. Main Centres (UHP)
4. Primary Health Centres
5. District Hospitals

Data from private hospitals, clinics or laboratories are routinely unavailable.

Reporting and Compilation of data

The reporting mechanism that is practiced is by paper submitted by special messengers on a monthly basis, and a weekly savingram (WT Message) which reports the number of positive cases, the blood slide collection and the number of deaths at the end of every week. The compiled reports are submitted from the peripheral level to the intermediate level and to the state level, and the feedback mechanisms are vice versa.

From the Sub-centre to the Primary Health Centre – from the 15^{th} – 18^{th} of every month.

From the Primary Health Centre and the Main Centre to the District – 18^{th} – 24^{th} of every month.

From the District Level to the State Headquarters 25^{th} – 3^{rd} of the next month.

Timeliness and completeness of reporting is strictly followed, failure to submit which Monthly salaries are with held. Zero reporting is observed also.

Data Analysis

Data analysis is undertaken at the PHC, District, and at the State Headquarters. Number of cases and deaths are compared with the previous month and year. Incidence rate, in terms of API (Annual parasite incidence/1000) is calculated,

ABER (Annual blood examination rate) are calculated on a monthly basis. SPR (slide positive rate), SFR (slide falciparum rate) and Pf% are also calculated.

Feedback

Written documents on feed back that was available at the District level was a request to be on the alert, to create more of community awareness particularly during the peak seasons from April to September. The feedback that are usually given, (from my various discussions) was that it was usually given during monthly review meetings (at the PHC level) and during review meetings held quarterly at the District Level and the half-yearly meetings at the State Headquarters. During these meetings administrative matter as well as various achievements are discussed along with the surveillance activities in various aspects. Evaluation of the various programmes are studied and discussions for improvements and remedial measures made. These meetings are attended by Programme Officers, Senior Medical Officers, Medical Officers, Community health Officers and Health Supervisors and is usually chaired by the Chief Medical Officer, at the District Level and the Director at the State Headquarters.

Vector surveillance

Vector surveillance is not conducted at the District level. No Entomologist, Insect Collector or Technicians are posted for under taking this activity.

4. DISCUSSIONS

Strengths

1. The District has a well-developed health care infrastructure with a good network of sub-centres, adequate manpower and good communication facilities.
2. Data is collected regularly as per prescribed formats.
3. Reporting system is well established where reports are submitted personally by special messengers and time schedules are laid and followed well.
4. The state has a high literacy percentage (88.49%)
5. Mizo's are a cohesive and egalitarian society with no class or caste distinction.

Constraints

1. Mizoram, hilly terrainous area with its peculiar topography has caused many constraints in the surveillance activities. Delays in timely

submission or timely actions, particularly during the monsoons occurs. This has perhaps weakened the system.

2. It also has a floating/migratory population across international borders with Myanmar and Bangladesh and from other states of the country.
3. Data collection is only from the Government institutions.
4. Estimation of Vector density can give early warning signal for Malaria epidemic but Vector surveillance is not carried out in the District due to various constraints.
5. Feedback is a weak link in the surveillance system
6. Community awareness has been greatly achieved through various IEC activities used by the Government. The high literacy rate has perhaps also played a role. But strengthened IEC activities is needed for community participation, which is lacking at present.
7. Malaria Inspectors are not posted at PHC's, thereby hampering the various control measures, as well as surveillance activities.

Recommendations

1. The Deputy Director at the State Headquarter is not endowed with DDO (Drawing and Disbursing Officer) powers and as Malaria control programme is a centrally sponsored scheme, utilization of funds requires prior approval by the Finance Department of the State Government. This has resulted in delays in the timely allocation of funds.
2. No District Malaria Officer or Assistant Malaria Officer are posted at the District for various administrative reasons. This lacunae may be rectified so that surveillance and control actions can be strengthened.
3. Strengthen the Vector Surveillance through posting of manpower for Vector surveillance activities.
4. Reorientation Training of the Multipurpose Workers, Microscopists, Medical Officers toward surveillance and for capacity building be strengthened.
5. Generate community awareness and participation. Though much has been achieved in this aspect, strengthening is needed particularly for the more interiors of the rural population.

Conclusions

1. The State has been identified as one of the 7 states for the implementation of the Integrated Disease Surveillence Programme. It will encompass all Districts with involvement of Private institutions.
2. A Malaria society has been formed at the state level for enhanced implementation of the programme. This will rectify the delays in the timely allocation of funds that was existing and will be a step towards enhanced programme implementation.
3. The NSPCD was implemented in Aizawl district in the month of September 2003. The activities undertaken are identification of Nodal Officers and constitution of a Rapid Response Team. Training activities are to be undertaken at all levels.

1.3 SECONDARY DATA ANALYSIS OF ONE PARTICULAR DISEASE (TUBERCULOSIS), TO LOOK AT THE TRENDS, AIZAWL DISTRICT.

1. INTRODUCTION

Secondary data on the profile of diseases and epidemiological trends in the community gives an insight into their patterns and associated risk factors over a period of time. It enables assessment of the disease impact of intervention programmes or disease patterns. It permits forecasting of disease trends. Analysis of secondary data can facilitate evidence based policy development and prioritization of priority areas. Appropriate strategies can be developed which could be properly targeted in a manner to identify threats and risks. This will enable planned investments for actions to be initiated.

Secondary data on all diseases of public health importance for a period of 3-5 years are unavailable. Data are nevertheless available for Tuberculosis (TB). Hence analysis of the same for TB for Aizawl District, for a period of 6 years is done.

Tuberculosis is one of the infectious disease burden of the district, affecting both sexes in all age groups. A quarterly report on performance of National TB Programme, Vol 26/1, Jan-March 2002 shows that Mizoram State has the third highest annual cases/lakh population and annual Sputum (+) cases/lakh population of 247 and 76 respectively, next only to Arunachal Pradesh (another state in the north-east) and Pondicherry. This shows the burden of this disease in the whole country and in the state.

Though tuberculosis is known to be one of the major public health problem in the state of Mizoram and in the district of Aizawl, proper epidemiological study of the trend of Tuberculosis has not been studied. The Revised National Tuberculosis Control Programme (RNTCP) with the DOTS component has not been introduced during the study period in the district or in the state of Mizoram. Though passive methods are used for data collection, it is regarded as a good representation of the population as cases from the three private hospitals in the district are referred to the District Tuberculosis Center (DTC).

Objectives

1. To study the burden of Tuberculosis in the district.
2. To look at the trends of the disease.
3. To identify measures to check spread of disease

2. METHODOLOGY

Study design- a retrospective study of all registered cases from the District Tuberculosis center.

Study area- Aizawl district, Mizoram which comprises of Aizawl City, the capital of Mizoram, having 4 (four) Urban health posts or Main centers and 10 (ten) PHC's in the rural area.

Study population – The population of Aizawl district according to the 2001 census is 339,812, with the male, female population as 173,930 and 165,882 respectively, accounting for 38.14% of the total population of Mizoram state (891,058).

Study period-The study was carried out during the period of 1.8.2002 to 1.9.2002.

Sources of data: Secondary data from patient registers, patient cards, and out door registers from the DTC, over a period of 6 years (1995 to 2001) were studied. All the PHC, CHC and the District Hospitals report to the DTC. Cases are referred to the DTC from the private institutions. The basic identifying information are collected and duly registered in the registers. The quality, consistency, availability and completeness of data have been generally satisfactory. However, for the year 1996, 2 pages of information on the address of the individual patients were found missing.

3. RESULTS

Table I. Total cases of TB by sex, Aizawl District (1995-2001).

Year	Male	Female	Total
1995	390	255	645
1996	448	315	763
1997	375	267	642
1998	467	348	815
1999	465	347	812
2000	448	294	742
2001	442	302	744

Fig. I. Total cases of TB by sex, Aizawl District (1995-2001).

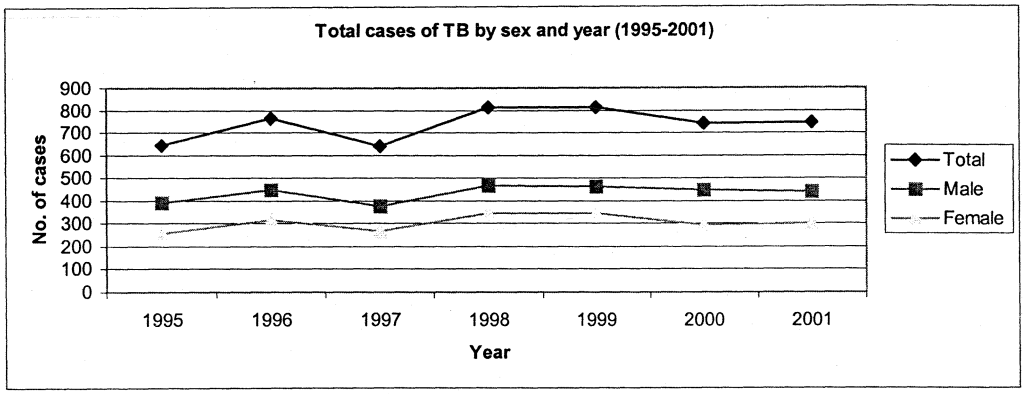


Table II. Case* rate/1 lakh population of Tuberculosis by sex and year, Aizawl District (1995-2001).

Year	Male	Female	Total
1995	271.6	186.3	230
1996	301.3	222.3	262.8
1997	243.3	182.2	213.5
1998	294.1	229.9	262.8
1999	283.8	222.2	263.7
2000	265.2	182.6	224.9
2001	254.1	182.1	219

*Case- cases of newly registered sputum (+) TB, X ray (+) TB and extra pulmonary TB, Aizawl District (1995-2001).

Fig. II. Case rate of TB by sex, Aizawl District (1995-2001).

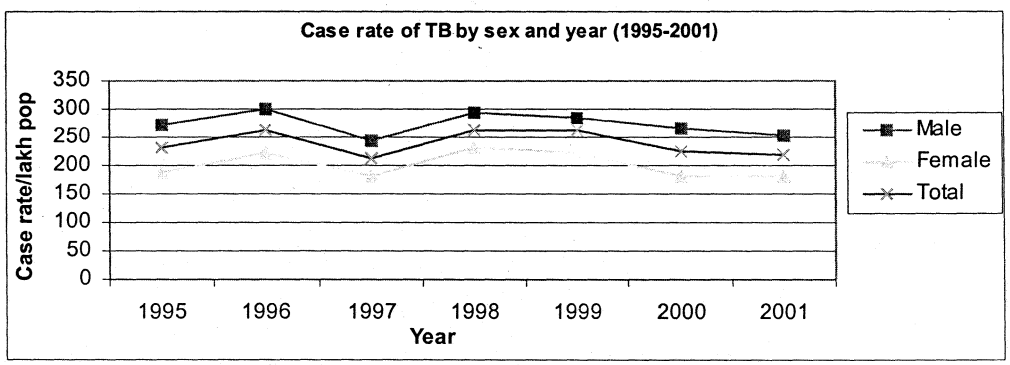


Table III. Comparision of Case* rate of Tuberculosis of Aizawl district with Mizoram state (1995-2001):

Year	Aizawl district	Mizoram
1995	230	148.7
1996	262.8	150
1997	213.5	151
1998	262.8	153.8
1999	263.7	150.3
2000	224.9	149.7
2001	219	NA

*Case- cases of newly registered sputum (+) TB, X ray (+) TB and extra pulmonary TB, Aizawl District (1995-2001).

From the above Tables I, II, III and Figures I, II, it is seen that the case rate has decreased to a small extent from the year 1999 to 2001, whereas year 1996 and 1998 has shown a small increase in cases. There appears to be an increased number of cases during the year 1996, but this could be due to incomplete data, as 2 pages ofinformation on the address of the patients in the register were missing. So rather than err on the small side thereby missing out on information, the investigator has incorporated all missing addresses of the patients to be under Aizawl district. This has resulted on the apparent increase on the number and rates of cases. The total case rate for the whole state of Mizoram has remained stable throughout the study period.

The case rate of TB has remained higher in Aizawl district as compared to the state of Mizoram. This could be due to better diagnostic facility in Aizawl, the state's referral center. Another reason, as elicited from the Programme Officer at the Health directorate (data for the state was from the office of the TB contorl programme, DHS, Aizawl), could be poor reporting from districts. It was very frankly stated by the concerned Programme Officer that the State data was rather unreliable. This fact is also ascertained as the quarterly report on performance of National TB Programme, Vol 26/1, Jan-March 2002 depicts that Mizoram has 247 and 76 respectively of annual cases/lakh pop and annual sputum cases/lakh pop. As data for Aizawl district was taken directly from individual patient registers and cards, so the completeness and reliability of the data. Therefore, from the data presented, comparability of the district with the state would be rather inappropriate.

The increased number, and therefore the rates of cases during year 1998 and 1999 (although the total case rate for the State has remained stable) could perhaps be explained by the fact that there was an inter tribal clash in neighbouring Manipur State in the year

1997. This had resulted in a number of mizo ethnic tribes fleeing across state borders to settle in various parts of Mizoram and possibly within Aizawl district since it is the capital and the commercial center of Mizoram. From my discussions with the staffs of DTC, Aizawl, substantial number of cases were seen to be from such persons who have newly settled in Mizoram, though addressess of these patients that were registered were invariably their present residing address of Mizoram. This may have resulted in increased number in the following years of the clash i.e 1998 and 1999. The years 2000 and 2001 have seen decreased number and rates of cases which may perhaps be explained by the stabilized population movement and thereby the decreased rate of infection among such populations.

Table IV. Total cases* of TB by type and year, Aizawl District (1995-2001).

Year	Pulmonary TB			Extra Pulmonary	All cases
	Sputum +	X-Ray +	Total		
1995	68	452	520	125	645
1996	101	516	617	146	763
1997	63	429	492	150	641
1998	107	405	512	303	815
1999	108	454	562	250	812
2000	117	360	477	265	742
2001	167	283	450	315	744

*Case- cases of newly registered sputum (+) TB, X ray (+) TB and extra pulmonary TB, Aizawl District (1995-2001).

From Table IV, it may be seen that the X-ray (+) cases constitute a larger proportion of cases throughout the study period, although the trend seems to be decreasing. Sputum (+) and extra pulmonary (+) cases are on the increasing trend.

Table V: Total case* rate/100000 population of Tuberculosis by year and type, Aizawl District (1995-2001).

Year	Pulmonary TB			Extra pulmonary	All cases
	Sputum +	X-ray +	Total		
1995	24.2	161.2	185.4	44.6	230
1996	34.8	177.7	212.5	50.3	262.8
1997	21	142.9	163.9	50	213.9
1998	34.5	130.6	165.1	97.7	262.8
1999	33.7	141	174.7	78.1	253.7
2000	35.5	109.1	144.6	80.3	224.9
2001	43	83.3	126.3	92.7	219

*Case- cases of newly registered Sputum (+) TB, X ray (+) TB and extra pulmonary TB

From the Table V above, it can be seen that sputum (+) and extra-pulmonary cases are on the increasing trend whereas X-ray (+) TB are on the decreasing trend. Year 1996 and 1998 saw an overall increase in the cases for all types of TB.

Table VI: Total reported death of Tuberculosis (all types) by age, Aizawl District (1997-2001):

Age group	1997	1998	1999	2000	2001
15-24	3	2	1	2	2
25-34	1	1	1	2	0
35-44	2	2	1	3	4
45-54	2	0	2	1	2
55-64	2	3	1	0	0
65+	4	2	6	3	5
Total	14	10	12	11	13

From the Table VI, it can be seen that death due to TB has not been reported below 15 years of age. The highest number of reported deaths occurred above 65 years age group and the highest mortality rate occurred above the 65 age group. The reported mortality is more or less the same through out the study period.

Table VII: Total reported death of Tuberculosis (all types) by age and sex, Aizawl District (1997-2001).

Age group	1997			1998			1999			2000			2001		
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T
15-24	1	2	3	1	1	2	0	1	1	1	1	2	2	0	2
25-34	1	0	1	1	0	1	0	1	1	1	1	2	0	0	0
35-44	2	0	2	1	1	2	0	1	1	3	0	3	4	0	4
45-54	1	1	2	0	0	0	1	1	2	1	0	1	1	1	2
55-64	2	0	2	3	0	3	0	1	1	0	0	0	0	0	0
65+	3	1	4	2	0	2	6	0	6	3	0	3	4	1	5
Total	10	4	14	8	2	10	7	5	12	9	2	11	11	2	13

From Table VII above, documentation of the reported mortality due to TB during the study period is demonstrated. More males are reported to have died due to the disease. This scenario has a plausible explanation as more males are reported to be suffering from the disease. The overall death rates are highest among cases above 65 years in both sexes.

Table VIII : Percentage of total reported cases of Tuberculosis by sex and type, Aizawl District (1995-2001):

Year	Pulmonary TB						Extra pulmonary		
	Sputum			X-ray					
	M	F	T	M	F	T	M	F	T
1995	6.5	4	10.5	44.4	25.7	70.1	9.6	9.8	19.4
1996	9	4.2	13.2	43.1	24.5	67.6	6.6	12.6	19.2
1997	6.4	3.4	9.8	41	25.8	66.8	11.1	12.3	23.4
1998	9.1	4	13.1	30	19.7	49.7	18.3	18.9	37.2
1999	8	5.3	13.3	34	21.9	55.9	15.3	15.5	30.8
2000	11.2	4.6	15.8	32.5	16	48.5	16.7	19	35.7
2001	13	6.6	19.6	22.5	15.6	38.1	23.9	18.4	42.3

Table VIII demonstrates that males are more affected than females for sputum (+) and X-ray (+) TB throughout the study period. Extra pulmonary TB affects females at a slightly higher percentage than males during the study period, except during the year 2001, where males are more affected at 23.9% and females at 18.4%.

Figure III. Monthly distribution of TB cases, Aizawl District (1995-2001).

Figure III depicts the overall comparison by monthly distribution of TB during the study period. It is seen that cases occur throughout the year with a homogeneous distribution, though there seem to be a small increase during the months from March to September with a peak during the months of May to July. This may perhaps be attributed to the time of year when people are more intensely engaged in their agricultural activities, thereby resulting in increased physical stress with increased susceptibility to infections. These seasons are also noted for their heavy rains with its accompanying dampness which are generally not conducive for good health.

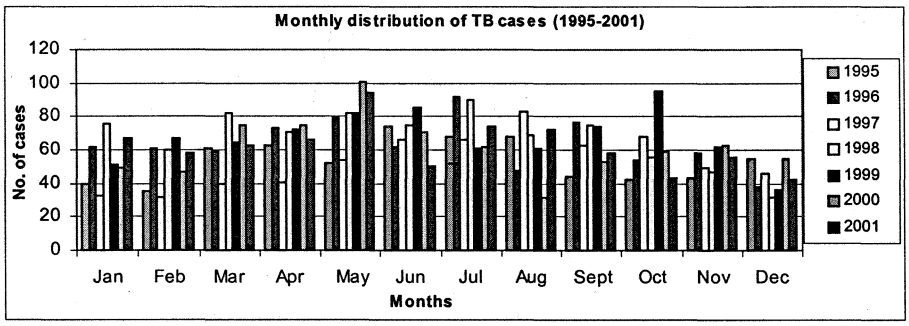


Table IX: Case rate/100000 population by Area (Main-Centre), Aizawl District [1995-2001].

Main-Centre	1995	1996	1997	1998	1999	2000	2001
Aizawl 'North'	264.5	241	212.1	244.4	297.7	213.8	252.5
Aizawl 'West'	266.8	362	265	282.6	315.5	275.5	258.2
Aizawl 'South'	249.5	280.9	163.5	267.8	212.2	223.5	189.3
Aizawl 'East'	318.6	394.5	358.2	439.7	358.2	337.5	312.1
Sialsuk	81.1	159.3	62.6	200.1	181.6	74.4	87.9
Aibawk	88.9	174.4	71.3	168	68.8	94.6	93
Sairang	290.5	443.7	315.8	545.4	422.4	409.1	417
Thingsulthliah	161.7	114.5	116.8	130.4	154.2	160.6	114.6
Saitual	78.1	107.3	135.3	96	94.2	106.8	118.9
Khawruhlian	168.2	65.4	95.5	155.1	241.8	73.7	172.7
Darlawn	143.9	58.6	137.2	78.2	98.2	96.1	167.2
Sakawrdai	48.2	58.6	34.2	88.9	43.3	63.4	20.6
Suangpuilawn	40.8	13.2	51.6	75.4	49.1	59.9	35.9
Phuaibuang	70.1	45.2	66.3	43.1	21	82	20
Total	230	262.8	213.5	262.8	253.7	224.9	219

From Table IX, it can be gauged that centers within urban Aizawl have a high number of reported cases as compared to rural centers except Sairang center, a rural area which has the highest case rate throughout the study year. Sairang is generally known or presumed to be of a less healthy place due to its location at a lower altitude as compared with the rest of Aizawl district. It has a hot climate and is noted for it's large number of floating populations. These could perhaps be some of the reasons for the high case rate of TB.

Urban areas within Aizawl show high case rate. This could be due to overcrowding as well as other factors such as stress of urbanisation although Aizawl 'S' has a comparatively lower rate as compared to the rest of urban centers. This could perhaps be due to smaller number of areas of 'lower' socio-economic status within it's jurisdiction. Aizawl 'E' has a high case rate and this area is known to have large number of floating/migratory population as well as large areas of over crowded buildings and homes. Rural areas have a comparatively lower case rate, though some centers are seen to have higher rates but these areas are usually composed of larger populations like Saitual and Thingsulthliah.

Table X: Dstribution of Tuberculosis (%) by occupation, Aizawl District (1995-2001).

Occupation	1995	1996	1997	1998	1999	2000	2001
Govt. Servants	12.9	13	13.9	14.1	13.5	14.4	14.2
Manual labourers	2.6	3.9	3.8	4.6	3.7	4.1	4.2
Business	6.4	6.1	6.3	6.8	7.1	7.2	6.9
Students	11.2	12.1	10.2	12.6	11.9	11.2	10.8
Cultivators	5.3	6.5	3.4	4.1	5.1	6.1	5.9
Unemployed	60.2	56.3	58.3	55.4	57.2	55.3	57.1
Unknown	1.4	2.1	4.1	2.4	1.5	1.7	0.9

Table X shows the percentage distribution of TB by occupation. The unemployed are seen to be most affected, while manual laborers are seen to be least affected. This could be due to factors associated with unemployment such as decreased income, stress due to various associated reasons compounded by the possible association with decreased quality of nutrition intake. On the other hand, there might be more unemployed persons and less of manual laborers in the district. Data regarding the percentage of unemployed in the district is not available as persons who are registered at the Employment Exchange are for Government related posts only.

Table XI: Percentage distribution of Tuberculosis by Ethnic groups, Aizawl District (1995-2001).

Year	Mizo	Others
1995	93.4	6.6
1996	94.5	5.5
1997	93.5	6.5
1998	96.1	3.9
1999	95.7	4.3
2000	95.2	4.8
2001	94.4	5.8

Table XI demonstrates the distribution of reported TB among mizo ethnic groups and 'others'. The percentage of TB by non-mizos is perhaps smaller than the actual scenario. The data that was used to generate this finding was based on individual identification particulars such as name, name of father and their home address. As it has been experienced, many TB patients particularly from Myanmar and Manipur give their 'new' mizo names and address, thereby creating difficulties in true identification of an individual based on limited particulars.

4. DISCUSSIONS

1) Tuberculosis is one of the main infectious disease burden of the district, affecting both sexes in all age groups. A quarterly report on the performance of National TB programme 26/1, Jan-March shows that Mizoram State has the third highest annual case/lakh population and annual sputum (+) case/lakh population of 247 and 76 respectively, next only to Arunachal Pradesh and Pondichery. The high number of TB cases may be attributed to the geography of the state and the climate which is naturally cool with heavy rainfalls. While the health seeking behaviour of the people is towards allopathic health practioners, access towards health facility/resources may be below optimum due to the hilly terrain compounded with sub-optimum communication facilities.

Though National TB Programme (NTP) has been implemented in the state for the past 30 years, its annual case rate has been still high. Active case finding was not undertaken due to various constraints. The percentage of those who completed treatment varies from 46.3% to 59.8% for standard regimens, during the study year and that follow up of those who did not complete treatment was usually by letter posting retrieval action. The letter posting percentage for drug defaulters were 4.4% in 1995, 6.6% in 1996, 19.6% in 1997, 20.5% in 1998, 24.1% in 1999 and 23.8% in 2000 only. The rest of the defaulters were not sent letters. As elicited from my various discussions, second letter posting nor home visits were not done due to various constraints, mainly financial. This reflects the lacunae in the existing NTP, even in the district capital. Estimate on the percentage of drug defaulters who were re-diagnosed with Tuberculosis was not done.

2 Surveillance system of diseases, particularly in this context, Tuberculosis, should be strengthened with strengthened component in analysis, interpretation and feedback mechanisms. Surveillance/follow up studies of control measures such as Chemotherapy may be done.

3) In the United States of America, there has been a decline in the cases and death due to Tuberculosis, prior to the emergence of HIV/AIDS. This decline started before the advent of BCG Vaccination or Chemotherapy and has been attributed to changes in the non-specific determinants of diseases such as improvements in the standard of living and the quality of life of the people, coupled with the application of available technical knowledge and health resources [6].

Per Capita Income, Gross State Domestic Product (GDSP) and Net State Domestic Product (NSDP) of Mizoram during the study period has been on the increase as can be elicited from Table XII as given.

Table XII: Per capita income, GDSP and NDSP of Mizoram, 1995-2000.

(source: Eco & Stat. Mizoram)

Year	Per capita in Rs.	GDSP in Rs.	NDSP in Rs.
1995	10953	93654	85874
1996	12210	107234	98293
1997	12393	112317	102239
1998	13479	124590	113896
1999	14909	140939	128818
2000	18491	17687	163461

Per capita income, GSDP and NSDP are seen to be on the increase. On the other hand, the number of BPL families to ascertain the presence of increasing poverty could not be measured as the present listed BPL families that was constructed in the year 1996 is to be updated in the year 2003 only, which was not even available at the time of the study.

Overall socio-economic status can be improved so that the purchasing capacity of populations, particularly TB patients can be enhanced. This can produce overall improvement in the standards of social, environmental and educational aspects. The quality of health of the population can thus be enhanced.

4) With the emerging HIV/AIDS infection that is experienced world- wide, the yearly trends on the infection is on the increase in the district too, as elicited from the State Aids Control Society, Mizoram.

With knowledge gained of the presence of co-infection of TB with HIV, the burden of TB may perhaps be attributed to the increasing HIV/AIDS infection. But as elicited from the Mizoram State Aids Control Society, though the number of newly detected HIV infection is on the increase, number of AIDS cases during the study period have been rather small. And the actual contribution of TB burden due to HIV/AIDS cannot be stated as the DTC do not have the specific information, but is in the stage of eliciting needed information in this regard

5) Generate more community awareness by intensifying IEC activities, not only for dissemination of information but motivation as well, resulting in behavioural change of the population, particularly TB patients. This may perhaps reduce drug defaulting resulting in improvement in treatment compliance, for overall progress in the control programme.

Conclusions

TB Control is an exercise in vigilance. A properly targeted and sustained effort for prevention and control measures is needed particularly in the areas of rapid diagnosis, ensured completion of treatment with prompt and complete reporting. Epidemiological studies for the risk factors as well as the knowledge, attitudes and practices can be undertaken at the local level so that more effective public health action can be initiated.

Prolonged treatment is required for TB which has resulted in incomplete treatment of almost half the patients. A mechanism for monitoring the treatment of the patients is not instituted in Mizoram nor in Aizawl district. The Revised National TB Control Programme with the DOTS component has been adopted and has been implemented for the whole state on March 2003. This programme produces cure rates of up to 95% even in the poorest of countries [3]. This will perhaps reduce the overall morbidity and mortality due to this disease and rectify some of the existing lacunae, thereby reducing the overall burden.

SECTION: 2

SECOND FIELD POSTING

2.1 Evaluation of National Anti Malaria programme, Aizawl District (W), Mizoram.

I. INTRODUCTION:

Global scenario:

Malaria is a public health problem in more than 9 countries, inhabited by a total of approximately 2.4 billion people, representing about 40% of the world's population. Best estimates currently describe the annual burden of Malaria as 1.1 million deaths and 300-500 million cases. Over 90% of the disease burden is in Sub- Saharan Africa and the vast majority of deaths occur in Africa. Most of the remaining burden is distributed between the Indian sub- continent, South- East Asia and Oceania and the Americas.

South-East Asia scenario:

Malaria burden in South- East Asia Region of WHO has remained static (1994-1997) at about 3 million cases annually. An estimated 1,2025 million people or 80% of the total population in South East Asia Region are at risk of Malaria. About 90% of the population living in moderate to high risk of malaria live in India, Indonesia, Myanmar and Thailand. India accounts for 85%of the total malaria cases in South-East Asia.

India scenario:

India in 1998 reported a total 2.15 million cases of malaria and the number of deaths was 653. Plasmodium falciparum, the main cause of severe malaria, accounts for 35-40% deaths due to malaria in India. (Sharma et al. 1998).

Mizoram scenario:

Mizoram, bordered internationally with Bangladesh in the west and Myanmar in the east and south, is a small state at the southern tip of North- East India. It has a small population of 8,91,058 only and accounts for 0.087% of the total population of India (census 2001).

Malaria continues to be a major Public Health problem in Mizoram. It is the major contributory factor for morbidity and mortality. Mizoram has been declared a 'high risk' area for Malaria, with a persistently high API (above 10) and Pf % >60, as can be deduced from Table I as given:

Table I- Basic indicators of Anti-Malaria programme, Mizoram:

Year	ABER	API	SPR	SFR	Pf%	No. of deaths
1998	35.23	13.59	3.84	2.43	63.35	56
1999	37.93	19.27	5.04	3.34	65.94	73
2000	20.33	11.63	4.10	2.42	59.91	33
2001	25.35	12.3	4.86	2.91	60.26	43

(source: Malaria, Directorate of Health Services)

Aizawl district (W) accounts for 40.64% of the total PF cases in the state and is a cause for concern due to the seriousness of the infection. Some of the parameters of the National Anti-Malaria programme is as given in Table II:

Table II- Basic indicators of Anti-Malaria programme, Aizawl district (W).

Year	ABER	API	SPR	SFR	Pf%	Death
2000	28.87	6.9	3.27	2.32	69.59	NA
2001	25.98	9.81	3.58	2.7	73.48	NA

(source: Malaria, Directorate of Health Services)

Analysis of secondary data of Aizawl district for the year 2001 (1st. field work) indicates that Malaria is the 2nd leading cause of mortality in the district. National Malaria Control Programme have been ongoing in the state for the past 4 decades. However, evaluation of the programme has not been conducted. Therefore, evaluation of the Anti-Malaria Programme is undertaken and the objectives re;

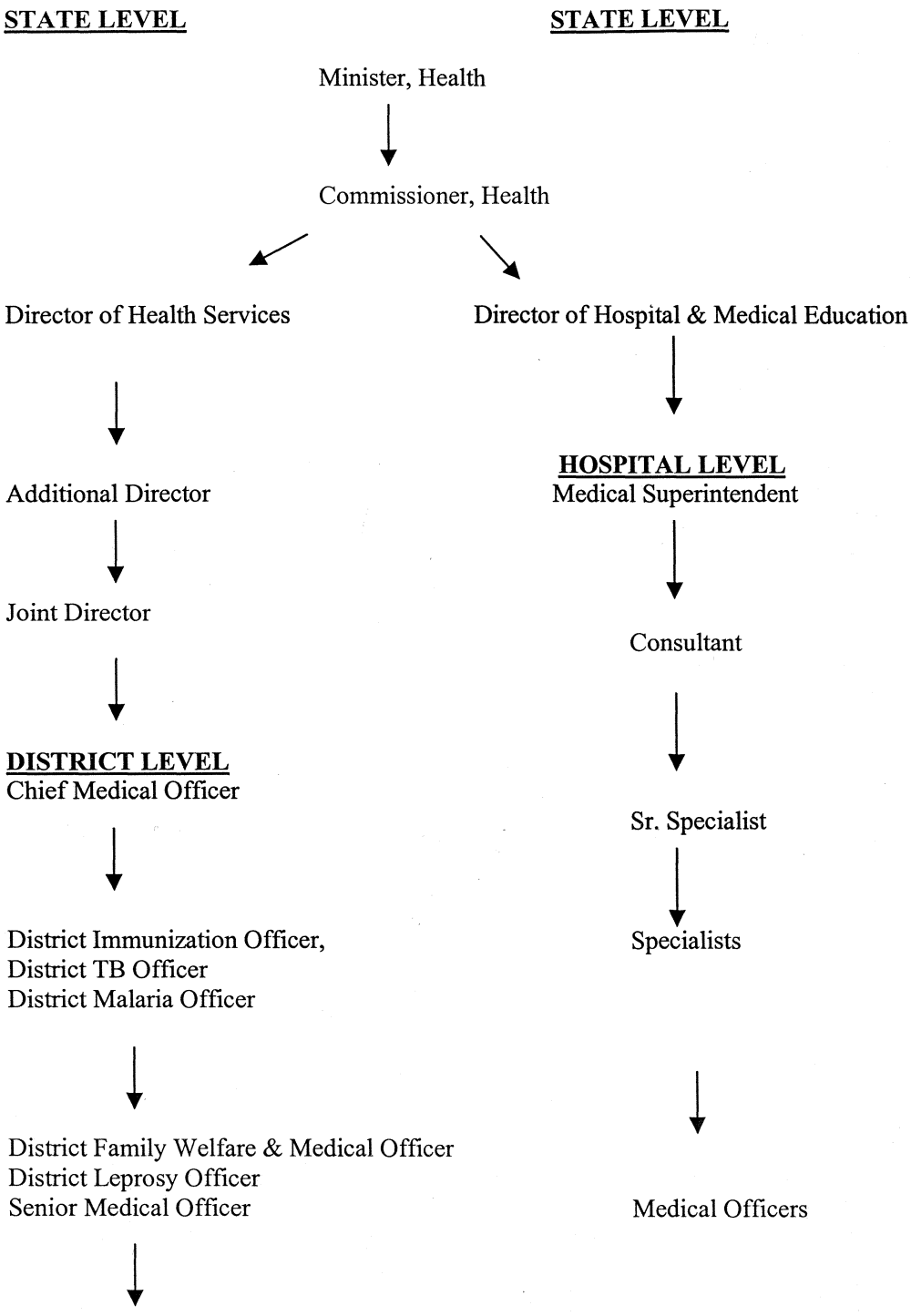
1. assessing the achievements of the stated objectives of the programme by reviewing the structure, process and outcome of the programme
2. identifying the gaps in the structure, process and outcome of the programme
3. to suggest appropriate measures for strengthening

Description of the programme:

Background:

Malaria control programme has been implemented in the state of Mizoram since1953, then just a district under Assam. At present, NAMP (National Anti Malaria programme) is a centrally sponsored scheme in Mizoram and so logistics and supplies are from the central government. The programme has been integrated into the general health services as the former posts of the malaria surveillance workers have been converted into the multipurpose health workers who are responsible for the delivery of the health services at the grass root level. The entire state of Mizoram has been covered under the programme with the availability of Sub- center (S/C) at the village level and where unavailable, Fever Treatment Depot (FTD) and Drug Distribution Center(DDC) are set up and manned by community volunteers.

Health Manpower profile of the Health care system of Mizoram (source: General department, Directorate of Health Services):



PERIPHERAL LEVEL

Medical Officer **(PHC level)** [Rural]

Community Health Officer (Main center) [Urban]

↓

Multipurpose Health Workers (**Sub-center level**) (M&F)

↓

Anganwadi Worker

Community Health Guide

Staff profile at the district:

Staff profile at Aizawl District , district level (source: CMO office) :-

Chief Medical Officer

↓

District Immunization Officer,
District TB Officer
District Malaria Officer
District Family Welfare & Medical Officer
District Leprosy Officer
Senior Medical Officer

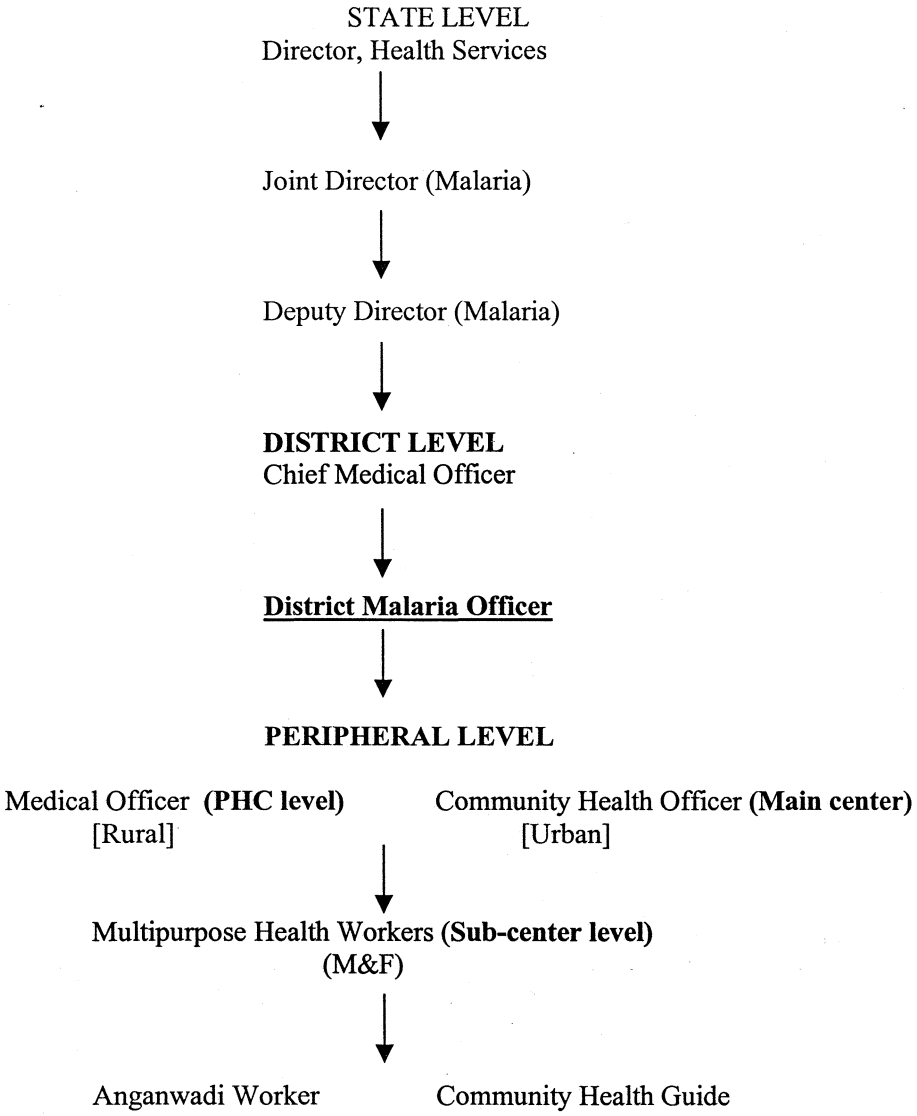
↓

Supporting staff – Drugs Inspector
Malaria Inspector
Inspector of Statistics
Statisticians
Public Health Nurse

↓

Community Health Officer
Various clerks
Drivers
Group 'IV' Staff

Manpower profile of the Anti-Malaria Programme, Mizoram:



Objectives of the programme

The health care infrastructure in Mizoram is under the Directorate of health services. As regards the Anti Malaria Programme, Joint Director (Malaria) is the programme Officer for the overall in charge in the planning of the programme, and is assisted by a Deputy Director (Malaria), Malaria Inspector and other supporting staffs. State entomologist is responsible for various entomological aspects such as entomological research, vector control and surveillance.

The overall objectives of the Anti malaria programme in the district is to decrease the morbidity and mortality due to malaria. The strategies adopted to achieve the objectives are:

1. Early diagnosis and prompt treatment
2. Insecticidal residual spray with DDT
3. Impregnation of bed nets
4. IEC activities
5. Capacity building of the workers

1. The entire state of Mizoram has been declared a 'high risk' area, and hence has resulted in enhancement of presumptive treatment from one day to 3 days, and a single dose of tablet primaquine being included on the first day of presumptive treatment.

At the PHC/CHC and Main Center (M/C-urban supervisory center), the overall health service delivery is the responsibility of the Medical Officer and a Community Health officer at the M/C. In the context of malaria control, these Officers are further assisted by the Microscopist/Lab.technicians, Health Supervisors and a Pharmacist. At each Sub-Center level, health workers (M&F) are responsible for health services delivery and conduct active surveillance of Malaria cases by conducting home visits (active surveillance) twice a month for male and once a month by female Health Workers. They collect blood slides from persons having fever. The health workers are assisted by Community health guides for collection of blood slides along with presumptive treatment (chloroquin and primaquin tablets).

2. Two rounds of IRS (insecticidal residual spray) with DDT (50%) in a year is conducted to cut off man mosquito contact. Besides IRS, impregnation of bed nets in the community for the Jhum hut dwellers is also undertaken. The main occupation of the community is agriculture and Jhum cultivation (agricultural activities are being undertaken on the hills and the farmers spend their working hours and nights on these sites building temporary dwelling huts called jhum huts) being the prevalent practice,

impregnation of bed nets for the Jhum hut dwellers in order to prevent Man-mosquito contact is felt necessary.

3. The only diagnostic laboratory examination under the programme is smear examination. Quality control of all the positive slides and 10% of all negative slides are sent to the state head quarters and these are further sent to the Regional Office for Health and Family Welfare in Imphal, a reference laboratory.

4. Mechanisms for supervisory visits are conducted from the higher administrative level, though the state headquarters infrequently conducts supervision at the grass root level as the need arises. The state headquarters are to make a quarterly visit to the district level, the duration of which may vary depending on local needs or situations. The district headquarters are to make monthly visits to the PHC or the M/C and these in turn are to make monthly visits to the sub-centers at the community level. Review meetings are held quarterly at the state and district headquarters and monthly at the PHC and M/C levels.

5. Indicators used for programme monitoring and evaluation are API, ABER, SPR, SFR, Pf% and the number of deaths due to Pf malaria.

6. IEC (information, education and communication) activities are carried out through out the year, not only for community awareness, but for involvement of the communities, particularly the NGO's and local leaders in a campaign towards malaria control.

7. Capacity building in terms of improvement in skills and knowledge is needed for good delivery of services and overall improvement towards malaria control. The strategy for achieving this goal has been by conducting in-service training and refresher courses for the Medical Officers, Multipurpose health workers, Microscopists/Lab.technicians.

2. METHODS.

Study design

Cross sectional survey, which commenced from 17th of January to May 2003 in Aizawl District (W).

Sample frame and sample size

There are 4 rural PHC and 4 M/C (urban) in the district and all MO's (Medical Officer) at the PHC level and one H/S (Health Supervisor) from the M/C were interviewed. There were 30 S/C's and 11 S/C's in urban and rural Aizawl district respectively. 15 urban S/C 's and 6 rural S/C's were randomly selected and the H/W (Health workers) interviewed. There were 8 Microscopists, 4 each in the urban and rural

sector . 2 were randomly selected from both the urban and the rural center and interviewed.

A community survey with a sample size of 404 (urban) and 138 (rural) was conducted where households (from the randomly selected S/C) were randomly chosen and one randomly selected adult above the age of 20 years was interviewed. If only one adult was available at the time of the interview, the available adult was interviewed. The sample size of 404 was calculated assuming the highest possible utilization rate of the health services at the community level (urban) at 50 % (as there was no data available about the percentage of utilization of the services), the utilization of the health services at the rural level assumed at 90% (due to absence of any private institutions or practisioners in the rural Aizawl district), alpha error both set at 5% and precision at 5%, and to make up for possible 5% non-response, sample size of 404 (urban) and 145 (rural) was calculated.

Urban

$$\text{Sample size} = \frac{1.96^2 \times \text{prevalence \%} (100\text{-prevalence \%})}{\text{Precision \%}^2}$$

$$= \frac{1.96^2 \times 50 (50)}{5 \times 5}$$

$$= 404$$

Rural

$$\text{Sample size} = \frac{1.96^2 \times \text{prevalence \%} (100\text{-prevalence \%})}{\text{Precision \%}^2}$$

$$= \frac{1.96^2 \times 90 \times 10}{5 \times 5}$$

$$= 145$$

Data collection tools

Data collection tools that were used are: A pre-tested questionnaire containing various variables was used to elicit information from the state, the district headquarters, PHC, M/C, S/C and the community. The questionnaire was pre-tested and translated into the local language and was used to elicit information from the community. A check-list was also used to collect data from the PHC, M/C and the S/C.

The Deputy Director of Malaria at the state headquarter (as the Joint Director at the State headquarter was on the verge of retirement at the time of the study), CMO (Chief Medical Officer) at the district level were interviewed using pre-prepared questionnaire.

All interviews were conducted by the principal investigator except the community survey, which was conducted with the help of a Health worker who was trained in the method. A door- to- door survey of the selected households was performed.

3. RESULTS

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

The objective of the programme in Mizoram and in the district of Aizawl is to reduce the overall morbidity and mortality. The objectives of the programme are perhaps vague and difficult to measure. It should be made with realistic timeframe and objectives that are measurable and more focussed. Specific goals, activities should be framed and followed meticulously.

Review of secondary data of the analysed report is the means by which, whether a decreasing trend over the past 5 years is being experienced. One of the limitation of looking at the trend for Aizawl district is that, the present districts in Mizoram have only been recently divided into more districts and so the available data for the present (new) Aizawl district is only for the past 2 years. Therefore, reviewing the available data in the district to look at the trends has limited usefulness. But, reviewing the overall programme indicators in Mizoram, has shown that the overall morbidity level, in particular Pf infection has increased, though the overall mortality has decreased. This decreasing mortality for the past 2 years (2000, 2001) could be due to other environmental or social factors such as overall improved education and socio-economic status, for which the present study has not looked into. On the other hand, when case fatality decreases but morbidity either remains static/increases, it shows that case management may have improved in the area, though public health measures for disease prevention may not be adequate and/or effective.

However, it would be useful to have data in regard to the year 2002 for further comparision. But analysed data were not available from the state headquarters or from the district when request was made in the month of June 2003. This demonstrates another lacunae in the system, though it is claimed that data are analysed yearly, data are not

being analysed within specified time frame (within 3 months of year ending), thereby limiting proper or effective action initiation.

Structure of the programme

Review of the structure of the programme is as follows:

Buildings

All the buildings from the state headquarters, the district, the PHC, the M/C and the S/C under the district are in good condition, functional, well maintained and occupied by the staffs of the Health services, Government of Mizoram.

Logistics and supplies

NAMP, being a centrally sponsored scheme, logistics and supplies such as anti malarial drugs, lancets, slides, reagents, etc are from the central government of India. Indents are made in anticipation of the requirements and there are no shortages of any anti malarial drugs. As per the information gathered from interviews during field visits, held at different levels of the health system, logistics and supplies are adequate and hence, shortages have not been experienced for the past 3 years. Registers were adequate.

An action plan is formulated at the state level for the acquisition of logistics, funds for training, IEC, supplies etc. to the central government. Budget for the staffs have been borne by the state. The action plan has not been made in consultation with the district headquarters and there are no timeframes or specific targets incorporated into it. This may be rectified as plans and assessment of needs has to be planned from all angles and if possible, Senior Medical Officers should be included in the discussion for the annual plan of action.

Manpower availability

At the PHC & M/C level, all posts such as Medical Officer, Community Health Officers and Health Supervisors, are all filled up and there were no vacant posts. At the S/C level, all the posts of the Health Workers within the district are non vacant and at the time of conduction of field visits, the staffs were at their respective posting places, except a S/C under Aizawl 'W' M/C, the female Health Worker was on maternity leave.

At the district level, as per the recommendations of the programme the post of DMO (District Malaria Officer) has not been filled up and has been lying vacant since the retirement of the post holder in the year 1998. The work of the DMO has been shouldered by the SMO (Senior Medical Officer) in addition to the other routine work thereby the possibility of resulting in decreased fulfillment of the responsibility of the work of a DMO exist. As stated earlier, malaria is a cause of great concern in the state of

Mizoram, therefore the post of DMO who is the main responsibility of malaria control at the district level should not be vacant.

At the state headquarter, an entomological cell has not been formed due to absence of posts for an Insect Collector and Lab. technician. This absence has created a setback in vector surveillance and control and such studies are not conducted in Mizoram. Considering the importance of malaria as a public health problem in Mizoram, as well as in the district of Aizawl, and the importance of vector surveillance in order to give early warning signals of impending epidemics, etc. this lacunae may be rectified.

Equipment

As per the recommendations of the programme, all the PHC and the M/C that were visited had a functional binocular microscope and they were very much in use as verified during the field visits. Reagents were adequate and clear labelling of the reagents and stocks was done in all the centers. The quality of the equipment, instruments and other supplies were found to be good.

Process indicators

Surveillance mechanisms

Passive and active surveillance mechanism is instituted in the programme. Health workers visit the homes under their jurisdiction to search for cases meeting the case definition of suspected malaria- 'all case of fever unless otherwise proved'. The Health Worker (M) has to visit all the households under his jurisdiction. Passive surveillance is when the patients utilize the health services provided under the programme by either coming to the health institutions or by being catered to by the health workers, when they are called upon to their homes for collection of blood slides and anti malarial treatment.

Active surveillance undertaken by the H/W (male) is to visit the homes under his jurisdiction twice a month, and the H/W (female) to visit the homes once a month. They are to search for suspected cases of malaria. It was gathered from the interviews that they usually undertake home visits once in a month only, and rarely twice a month. Even this home visit does not encompass all homes within their jurisdiction, as they usually concentrate on homes where they believe beneficiaries for the RCH programme like homes with children, pregnant mothers or homes that need 'special' care, and these homes are more often visited. The community survey conducted provides evidence for this as given in Table III:

Table III: Number of home visits by Health Workers in a month, Aizawl District, 2002.

Number of visits	Urban (n)	%	Rural (n)	%
No visit	153	37.9	27	18.6
Once a month	128	31.7	71	48.9
Twice a month	91	22.5	43	29.7
Thrice a month	9	2.2	2	1.4
Four times a month	Nil	Nil	2	1.4
Don't know	23	5.7	Nil	Nil
Total	**404**	**100**	**145**	**100**

All the grass root level workers interviewed could correctly give the definition of a suspected or a case of malaria, which is 'all cases of fever unless otherwise proven'. Adherence to the case definition was maintained. It was also gathered that even a case of headache with its associated symptoms of malaise/myalgia was also considered a suspect case of malaria if history of jhum cultivation is present. Blood samples from such cases are taken and presumptive treatment started accordingly. The drug/treatment that was prescribed to the patients by the grass root level workers was as per the programme. Screening was not routinely conducted. All health workers interviewed have knowledge on complicated malaria and knew when and where to refer patients.

Epidemics have, during the past 2 years, not been reported in the district.

Blood examination

Blood slides that are collected by the H/W are sent to the PHC (rural) or to the M/C (urban), as per the programme. Slides are examined at these centers where a Microscopist is posted and the results are collected by the respective centers and finally disseminated to the concerned patients.

The duration of blood slide collection and examination varies. The usual practice in all the S/C's visited is that blood slides are sent on weekly basis, on specific dates for slide examinations. In case of emergencies or increased blood slides collection, more than a weekly despatch of slides were done. By the time the results are eventually received at the respective centers and information to the patients given, considerable time has elapsed which varies from 1 day to 10 days or more. The usual practice again, is to inform only patients whose blood slides are found positive for malarial parasite. This information is further confirmed from the community survey where the number of days for receiving the results of blood slides examination is as given in Table IV:

Table IV: Number of days to receive results of blood slide examination, Aizawl District, 2002.

Number of days	Urban	%	Rural	%
Not told/don't know	149	36.9	36	24.8
After 10 days	30	7.4	9	6.2
After 1 week	103	25.5	29	20
Within 5 days	116	28.7	48	33.1
Same day as blood slides taken	6	1.5	23	15.9
Total	**404**	**100**	**145**	**100**

There is a higher percentage of blood slides results received on the same day from rural areas and this could be due to more utilization of PHC services reflecting a better rate than urban areas, which do not have a PHC. Although Private services and District Hospital (Civil Hospital) services are largely utilized, the number of respondents receiving blood slide results on the same day as a result of utilization of the services of these institutions has not been considered in this survey.

Supervision

Supervisory visits are to be conducted from the state headquarters to the district level on a quarterly, basis but this is routinely not done. As per information elicited form interviews, presence of variability in the frequency of supervision to the district occurs but the usual practice is a visit of once/twice a year. Supervisory check-list is also routinely unavailable. Documentation of the visits are available, though feedback of supervisions are routinely not given/ available.

The district headquarters are to make a minimum monthly visit to the PHC/MC. But from the interviews held, it was seen that visits from the district headquarters was irregular and infrequent, except during the spraying seasons i.e from the 1st of April to the 30th of September, during which supervisions are more intensified. Written feedback reports from their visits are routinely unavailable.

The PHC or the M/C are to make monthly supervision to the S/C's. The urban S/C's are visited monthly by the Health Supervisors. Whereas, rural S/C's are visited by their concerned MO and this depends from center to center, which varies from 6-10 times in a year but never as per the schedule. Feedbacks are routinely not given on these supervisory visits. This is further corroborated by the rural S/C reports, i.e. supervisions are intensified during the months from April to September and irregular during the rest of the months. Whereas, all the urban S/C's said that they were regularly visited by the H/S on a monthly basis and confirmed from the Visitors notes at the respective centers.

Quality control of the blood slides

Slides were kept for quality control. From the state headquarters it was found that there were no discordant results or such information intimated to them from the Regional headquarter. The usual practice is to send 10% of all negative slides and all positive slides for quality control at the state headquarters which are further sent to Imphal at the Regional Malaria Control Center. As elicited from records at the Office of the Deputy Director, Malaria, DHS, slides were regularly sent for quality control from all the PHC's and M/C's that were visited. The results of the slides that are examined for quality control at the state headquarter or from the Regional Malaria Control Center, Imphal, were not routinely intimated to the respective centers.

Payment of services

None of the community surveyed said that they paid for any of the treatment given to them from the S/C or the PHC. The health functionaries also do not demand for any payment from the community for the services.

Treatment counseling and follow up

Treatment counseling was usually not given and the community survey revealed that 127 (31.4%) in the urban and 53 (36.5%) in the rural area said that they were not told or informed about the side effects or pharmacological effects of the drugs that was given to them.

Patients were usually not followed up for completion of treatment/if patients were cured/whether further complications have developed. The community survey revealed that 145 (35.89%) in the urban and 47 (32.4%) in the rural area confessed that they did not take the full course of the drugs that were given to them, due mainly to the side effects and also because they feel that they were cured.

Reports and records

The reports and records at the PHC, M/C and S/C that were visited were checked and it was found that the overall maintenance of the records and reports were good, credible and consistent. Reports and records are routinely cross- checked by the staffs themselves at each level and by the supervisory visits when conducted from time to time. Timeliness and completeness of the reports are well instituted, otherwise, monthly salaries are withheld.

Feed back on reports

As per information elicited from interviews, feed back on reports from the district was limited and was usually given when incomplete forms are submitted or

writings are ineligible. The same pattern existed with respect to the PHC or the M/C, on feed back of reports.

Analysis and feed back of reports

Analysis of reports are undertaken at the state headquarter and the district head quarter on a quarterly basis. At the state headquarter, district wise yearly analysis are conducted and feedback on these analysed reports are sent on a yearly basis to the district.

At the district headquarter, center wise yearly analysis were conducted and feedback sent accordingly. At the PHC and M/C level, analysis of the reports by S/C's are conducted but feedbacks were not routinely sent to the respective S/C under their jurisdiction.

Review meetings

A review meeting is held at the state headquarter twice a year whereas at the district level, a quarterly review meeting is held. During these meetings administrative matter as well as various achievements are discussed along with surveillance activities in various aspects. Evaluation of various programmes are studied, and discussions for improvements/needed remedial measures made. These meetings are attended by Programme Officers, Senior Medical Officers, Chief Medical Officers and chaired by the Director at the state headquarter. At the district level the meeting is chaired by the Chief Medical Officer and is usually attended by the Medical Officers, Community health Officers and Health Supervisors. But these meetings are again subjective to the availability of funds.

At the PHC or the M/C level, a monthly review meeting is to be held which is chaired by the MO or the CHO respectively but the number of review meetings held at theses centers again varies from 5-8 times in a year. None of the PHC or the M/C regularly held monthly review meetings within their jurisdiction.

Training of staffs

Trainings are usually conducted as per availability of funds. All the MO's at the PHC visited were trained once on Complicated Malaria and its Management during the past 2 years. Only one MO at the PHC was trained in Malariology (a 5 day course) during the past 2 years. All the H/S at the M/C (urban) were trained once during the past 2 years under RCH programme, with Malaria as one of the subjects. None of the rural H/S at the M/C level were trained during the past 2 years on Malaria. The H/W's who had undergone training at the said course during the past 2 years were 22(61%). The

methods of training were didactic, along with classroom discussions. None of the Microscopists that were interviewed had undergone a refreshers training course during the past 2 year.

Research

No malaria related research activities are conducted. Though chloroquin resistance has been documented in one PHC in the district, no mechanism for monitoring the efficacy of the drug or the trend in the resistance has been conducted or initiated.

Preventive measures

Preventive measures that are undertaken under the programme are IRS (insecticidal residual spray) with DDT, impregnation of bed nets for jhum hut dwellers and IEC (information, education and communication) activities.

IRS and impregnation of bed nets are conducted twice a year. For the successful propagation and motivation of the community towards acceptance of IRS, local NGO's have rendered their support and help by informing the community through the local information system. From records of the H/W, it was seen that acceptance of IRS by the community (in terms of the number of households that are sprayed) varies from center to center. It varies from 64% to 90 %. The community surveyed also showed similar results. In urban areas, 31 (7.7%) of households were not sprayed. Out of all the households that were interviewed, 345 (85.4 %) sprayed twice in a year as per the programme schedule and 28 (6.9%) sprayed only once in the previous year. In rural areas, only 4 (2.8%) of the households interviewed did not spray their households, 134 (92.4) sprayed their households twice as per the programme schedule and 7 (4.8%) sprayed only once in the previous year.

While this may be a very good acceptance percentage, it was further seen that actual acceptance as per programme schedule was different, as can be seen from Table V as given:

Table V: Acceptance of IRS by households surveyed, Aizawl District, 2002.

Area of spray	Urban (n)	%	Rural (n)	%
Only animal shed	30	7.4	7	4.8
Only outside of home	90	22.3	23	15.9
Only sitting room	Nil	Nil	4	2.8
Only beneath the beds	67	16.6	18	12.4
As per programme schedule	209	51.7	85	58.6
All above	8	2	8	5.5
Total	**404**	**100**	**145**	**100**

Therefore it can be seen that spray of households as per programme schedule is just above 50% in rural and urban areas.

Impregnated bed nets are being distributed to jhum hut dwellers, though provision is also made to non-jhum hut dwellers as per the availability of chemicals. As could be deduced from interviews and discussions with the Health Workers and the community, impregnation of bed nets are well accepted. But since it is targeted mainly for jhum hut dwellers, it's scope for the control of malaria may be limited and the community survey has revealed that 341 (84.4%) in urban and 53 (36.6%) in rural are not jhum hut dwellers. On the other hand, 394 (97.5%) in the urban and 139 (95.2) in the rural uses bed nets, of which 198 (49%) in urban and 117 (80.7%) in rural areas uses impregnated bed nets. This seems hearkening as it demonstrates that though it was targeted for jhum hut dwellers, people without jhum huts also utilizes this aspect of the programme.

IEC activities plays an important role for public health actions. The activities that were undertaken are preparation and distribution of charts about malaria and its prescribed dosages, time to time display of advertisements through local daily newspapers, periodical magazines in organs of voluntary organization like the YMA, MUP, MHIP, KTP etc. Time to time appeal by various dignitaries/senior officials through AIR, DDK, local cable TV and publicity advertisements through TV, AIR, DDK and local TV channels. NGO's and local leaders are also involved in this regard, for cooperation and coordination in education and propagation to the community.

Co-ordination within and with other departments

As elicited from interviews with Deputy Director, Malaria at the state headquarter and the Chief Medical Officer of the district, co-ordination within the department is sub-optimal resulting in non-uniformity of data within the department. Co-ordination with other government departments or with the private institutions is practically absent.

Quality of care

Assessment of the quality of care at the peripheral level was by the community survey, where question on overall satisfaction of the respondent to the services provided at the peripheral level was answered 'yes' by 344 (85.2%) and 85 (61.6%) in urban and rural areas respectively. The answer 'not very satisfied, okay' was given by 41 (10%) and 45 (32.6%) in the urban and rural area respectively. The answer 'no' was given by 10 (2.5%) and 5 (3.6%) in urban and rural area respectively. There were 9 (2.2%) in

urban and 3 (2.2%) in rural areas who declined to give a response. Their reasons for their satisfaction or dissatisfaction were not assessed in this study.

Outcome indicators

Outcome indicators will deal with review of the epidemiology of the disease and trends over the past 2 years. Utilization/knowledge of the services of the programme and the practices of the community were also assessed.

Utilization of services

A community survey revealed the following as can be seen from Table VI.

Table VI. Utilization of health services institutions when having suspected signs and symptoms of malaria, Aizawl District, 2002.

Type of institution utilized	Urban (n)	%	Rural (n)	%
S/C	151	37.4	60	41.4
Private institutions	66	16.3	7	4.8
Civil (District) hospital	163	40.4	25	17.2
All above 3	24	5.9	10	6.9
PHC	Nil	Nil	43	29.7
Government institutions	314	77.7	128	88.3
PHC & S/C	Nil	Nil	103	71
Total	**404**	**100**	**145**	**100**

There fore it is seen that substantial number of the community utilizes the health services provided by government institutions at the grass root level.

Knowledge of services of the S/C and about Malaria

The community survey revealed that 374 (92.6%) in urban and 117 (80.7%) in rural could correctly say that the S/C's were open 5 times in a given week, as it is supposed to be open. Whereas 9 (2.2%) in urban and 11 (7.6%) in rural said that they did not know the number of days S/C's were open.

Only 33 (8.2) in urban and 11 (7.5%) in rural said they did not know the kind of services provided by the S/C's. Otherwise, the rest of the surveyed households gave correct but varying responses such as immunisation services, minor treatment of wounds, medication to pregnant mothers, anti malarial services like DDT spray, take blood slides and give medicines etc.

Only 6 (1.5%) in urban and 2 (1.4%) in rural area said they did not know the cause of malaria, otherwise 223 (55.2%) in urban and 64 (44.1%) in rural said that it was due to mosquito bite. There were 74 (18.3%) in urban and 40 (27.6%) in rural who said it was due to the bite of a mosquito infected with the malarial parasite, and 76 (18.8%) in urban and 33 (22.7%) in rural area said that it was due to mosquitoes. The remaining answers varies from one person saying that it was due to improper net use; improper net

use and mosquito bite from 5 respondents; hard work, jhum cultivation and mosquito bite from 2 respondents in urban and 1 from rural area; 4 response in urban and rural said it was due to dirty surroundings and 1 response said that it could be due to the environment.

The communities were aware of the symptoms of malaria as 114 (28.2%) in urban said it was fever; 101 (25%) said it was fever and headache; 114 (28.2%) said it was fever; headache and rigor. In rural area, 36 (24.8%) said it was fever; 54 (37.2%) said it was due to fever and rigor; 38 (26.2%) said it was due to fever, headache and rigor. One response from the rural area said it was anaemia and one in the urban area said it was fever with unconsciousness. None of the respondents gave the answer 'I don't know'.

Practices of the community

Questions regarding the duration of fever/sickness before consultation of a health professional varies. While it is optimal that communities should consult health professionals immediately when having symptoms of suspected malaria, the message of which has been given to the public time and again. The response on duration of days before seeking advice from a health professional varies which can be seen from Table VI as given.

Table VI. Number of days before seeking advice from a health professional, Aizawl District, 2002.

Duration	Urban (n)	%	Rural (n)	%
After symptoms get worse	78	19.3	47	32.4
After 1 week	47	11.6	11	7.6
Within 5 days	128	31.7	35	24.1
As soon as I get sick	121	30	41	28.3
Depends on the occasion	30	7.4	11	7.6
Total	**404**	**100**	**145**	**100**

This demonstrates the need for strengthening IEC activities, in particular towards early seeking behaviour from a health professional , particularly in rural areas.

Review of the epidemiology of the disease

Review of the epidemiology of Malaria from reports demonstrates that the total API has increased from the year 2000 –2001. The SPR and SFR has also increased to a small extent. The PF % has also increased when compared between 2000 and 2001 even though the ABER has decreased from the preceding year. This has shown that the disease is on the increasing trend in the district.

4. DISCUSSIONS:

Strengths of the programme

- Good infrastructure, adequate manpower and logistics at all levels
- Regularity of monthly reporting mechanisms, and channels well established
- NGO's involved in preventive and IEC activities
- Quality control of blood slides instituted
- Surveillance mechanism instituted
- Community involvement in outbreak reporting
- Preventive aspects of the programme well accepted
- Well maintained, consistent and credible reports and records
- Timeliness and completeness of reports well instituted
- Utilization, Knowledge of services and disease good.
- No payment for the services

Weaknesses

- No entomological cell at state level. No entomological studies or vector surveillance.
- Active surveillance needs strengthening
- No weekly trends monitored and epidemics not identified from analysed data.
- No RRT at district level
- Private sectors not involved
- Limited co-ordination with other departments
- Delayed diagnosis, laboratory support needs strengthening
- Supervision and monitoring mechanism needs strengthening
- Analysis at peripheral level limited. Delayed analysis at district or state level.
- No training institute, irregular training of staffs.
- No research conducted
- Preventive measures like IRS well accepted, but acceptance as per programme schedule is below 60%.

Strengthened infrastructure

Malaria is the main disease burden of the district. There seems to be an increasing trend as depicted earlier, in spite of various preventive measures undertaken.

The district has well developed health infrastructure with adequate logistics. However, inadequate man-power at the state and district level may perhaps improve the

overall performance of the programme. Vector surveillance for early warning signals about impending epidemics are not undertaken due to shortage of manpower at the state level.

Strengthened surveillance systems

While knowledge about the disease is seen to be good and treatment iss as per the programme schedule, active surveillance mechanism, though in place needs strengthening, more so in urban areas.

While the number of home visits are below the programme schedule, efforts should be made in this regard for continued and sustained improvement for systematic home visits, and not only to be based on the perceived needs of the community. The private sectors should be identified for improved coverage of surveillance activities, which has not been the present case. Coordination with various government departments and NGO's should be strengthened, with sharing of relevant information, training, IEC activities and feedback. Disease surveillance cell should be instituted at the state headquarter to monitor surveillance activities.

Review meetings, one of the main tools for feedback mechanism should be regularly conducted, with regular dissemination of relevant information to all concerned. Reports and records were well maintained. Analysis of data though undertaken, is limited and not conducted in a timely manner. Analysed data of the previous year was not even available at the state headquarter by the month of August. Weekly trends are not systematically examined thereby loosing it's usefulness for epidemic detection. Regular analysis at all levels should be conducted in a timely manner. Needed training's imparted if absence of skills/tools for analysis is present. The skills and practices of all health personnel in aspects of surveillance and epidemic preparedness may be enhanced, particularly in methods of analysis. Timely dissemination and utilization of data at state, district and PHC or M/C levels may then be achieved. The statistical unit at state and district headquarter should be strengthened for early detection of epidemics, with rapid analysis and interpretation of data.

Training is the most fundamental activity for strengthening the capacity of a personnel. Trainings imparted to the staffs may perhaps be sub-optimal. Effeciency of manpower in terms of skills can be strengthened with re-orientation training. Training should also encompass the NGO's for orientation towards different aspects of the programme.

Research is essential for improvements, and this aspect needs to be considered. If the skills/tools are lacking in this regard, collaborations with other agencies can be done. Relevant matters can be studied for improvement in the delivery of the programme and for overall health. Though present preventive programmes are being conducted at the right operational level, preventive measures that are adopted by the state may be studied. Needed change or improvements may be incorporated for a more effective delivery of the programme.

Treatment follow up and counseling activities needs strengthening, as the anti malarial drugs that are used in the control programme are known to produce side effects. This has the potential to be interpreted as signs of decreased efficacy of the drug/being useless and therefore unsuitable for the user by the general public. This can result in incomplete treatment or preference for private practioners, with the potential of incorrect or incomplete treatment. This aspect has to be strengthened. It may be achieved by proper treatment counseling and follow up home visits, which has been lacking in the present situation.

Laboratory strengthening

Another aspect for strengthened surveillance is laboratory support for confirmation of diagnosis. The number of days for diagnosis at the peripheral level is perhaps delayed, requiring 1-10 days with manual transfer of information and material. This delay in diagnosis of a condition looses its integrity for proper and timely action. Due to financial constraints that is being faced, it might not be possible to ideally have a Microscopist posted at each S/C for immediate laboratory examination. But considering the hilly terrain and long distances between villages, it is suggested that microscopic centers be opened even at 'hard to reach' centers, which can be properly defined. If computer facilities are not within immediate access, telephone facilities should be made available to all the centers, for improved data reporting or dissemination.

Quality control of blood slides, though instituted, has to incorporate feed back mechanisms, which have not been properly instituted. This should be strengthened so that needed areas may be tackled accordingly.

Epidemic detection

Epidemic detection is an important function of a good surveillance system, which is perhaps lacking in the present situation. Identification of early warning signals is a key process for detection of an epidemic in it's early phase. Epidemics are usually identified and reported through direct verbal communications, usually by the community and

usually managed by 'crisis'. Therefore, establishment of early warning signals with hands on training on epidemic preparedness at all levels and in the private sectors with formation of a RRT at district levels too. Formats for reporting of epidemics are absent. Rapid Response Team (RRT) has been formulated at the state level only.

Strengthened supervision mechanisms

To achieve sustained commitment at all levels, coordination, supervision, monitoring and feedback mechanism should be strengthened. Supervisory visits should be conducted with regularity from all levels, with need assessment at local levels for enhanced performance of the programme. Role of each level of supervisory staff should be identified and followed accordingly.

Feed back system with dissemination of factual information should be encouraged and accompanied by comments on the quality/quantity in recording and reporting of cases. And constructive suggestions can be given in a timely manner for areas that need strengthening. Feed back will keep staffs motivated by helping them to understand that the information they collect is important. The efficiency of manpower in terms of their efforts has to be strengthened by a clearly defined objectives and responsibilities, and sustained with strengthened feedback, supervisory and monitoring mechanisms.

Community survey

Overall utilization of the health services by the community has been good. But since there was no control group for comparision in the community survey, whether this utilization of the health services is because of the satisfaction derived from such utilization or because private sectors are still very limited in Mizoram, cannot be fully ascertained. Though the quality of care was assessed as a component of the efficiency of the service delivery, the method of assessment may be inadequate to fully come to a conclusion because of the difficulty in assessing this variable objectively.

The knowledge of the services provided under the programme, knowledge about the cause and spread of malaria and the symptoms of malaria has been good. But due to the absence of a control group, the inferences that it was due to the programme is difficult to arrive at, as it could be due to improved education, socio-economic status etc. and not due to the IEC activities of the programme.

Practices of the community with regard to the number of days before seeking advice from a health professional has been sub-optimal. This is one area that IEC

activities have to be targeted. The reason for delay in health seeking behaviour can be studied and measures taken accordingly.

Conclusions

Though progress has been made in terms of effeciency in implementation of the services and it's overall impact, review of the epidemiology of the disease over the past 4 years has shown that the disease is on the rise. Though the morbidity rates has been on a rise, the mortality rates has decreased. This may reflect improved case management while measures for disease prevention may not be adequate. The set of non-achievements that is established cannot be fully labelled inadequate as previously established adequacy criteria is not available. So general trends has been measured. However, the rationality of the health programme is relevant and is aimed at giving effect to accepted health policies for solving problems of high social and health relevance.

The activities of the programme are also clearly related to the objectives of the programme. But considering all the factors that was lacking in the optimum delivery of the services, it may perhaps be plausible to say that the programme was successful in preventing the situation from getting worse. However, it is recommended that the programme should be continued, with formulation of a strengthened course of action as its termination will result in serious aggravation to the problem. It should be remembered also that no other programme, service or institution would provide an alternate service to deal with the problem.

Some of the Comments by the community from the survey on methods or ways for improvement in the control of malaria are highlighted- all should use mosquito net properly; the government to search for better means for control of malaria besides DDT; spraying with DDT should be done three times in a year instead of only 2; to increase community participation; more intensified IEC or mass campaigns; to search for a better way than what is done now; decrease mosquito breeding places near the homes with environmental hygiene; impregnated bed nets for all; be more pro active; consult people who know how to treat as soon as fever develops; quicker blood slide results; microscopist at S/C; clean the compounds with personal hygiene; spray with DDT all the jhum huts; S/c too far from my home.

2.2 DESIGNING A POPULATION BASED CANCER REGISTRY, FOR THE STATE OF MIZORAM.

1. INTRODUCTION

The rapid rise of non-communicable diseases (NCD's) represents a major challenge to global development in the 21st century. Based on current trends, by the year 2020, these diseases are expected to account for 73% of deaths and 60% of the disease burden. WHO estimates that, within the next few years, non-communicable diseases will become the principal global causes of morbidity and mortality. The state of Mizoram is beginning to show signs of such a problem. Analysis of available secondary data for Aizawl district (which constitutes 38.14% of the total population of the state), shows that 57.9% of all reported deaths are due to NCD's. Among deaths due to NCD's, cancer accounts for 21.8%, which is the highest among deaths due to NCD's. Although this data does not represent the whole state of Mizoram, it nevertheless depicts the high burden of this disease.

Cancer is a devastating disease. In India, it is estimated that there are approximately 2-2.5 million cases of cancer at any point of time with around 70,000 new cases being detected each year. Nearly half of these die each year. The social, economic and health burden attributable to cancer is high in the state of Mizoram. The available data indicates that cancer cases have been steadily increasing for the past decade in Mizoram, as can be seen from Table I as given.

Table I: Cancer incidence rate, Mizoram

Year	Incidence rate/1 lakh pop
1991	21.9
1992	30.9
1993	29.2
1994	30.9
1995	24.6
1996	29.5
1997	30.9
1998	42.4
1999	47.7
2000	58.6
2001	66.7

(source: Directorate of Health Services statistics)

Table I above depicts the increasing trend that is experienced in the state of Mizoram. This trend may be attributable to either a real increase in cases or results of better diagnostic facilities being available. The above incidence, however may represent only the 'tip of the ice berg', when considering the absence of registration/notification system, absence of formal disease surveillance system and the fact that majority of the suspected or diagnosed cases are referred out of the state for further investigations and treatment. Therefore the true burden of this disease is yet to be assessed.

Cancer surveillance is the key to a unified scientific and public health approach to cancer prevention and control. It is the ongoing timely and systematic collection and analysis of information on cancer and it's risk factors (such as life style factors, behavioural influences, genetic pre-dispositions or environmental exposures), screening and early detection, new cancer cases, cancer deaths, extent of disease at diagnosis, treatment, clinical management and survival. Cancer registration is an important component of cancer surveillance. Cancer registration should be the fundamental method where information is systematically collected about the occurrence of cancer (incidence), about the types of cancer that occur (histology, morphology), the anatomic location (site, topography), the extent of disease at the time of diagnosis (stage), kind of treatment received by cancer patients and the outcomes of treatment/clinical management (mortality and survival).

A Population Based Cancer Registry (PBCR) is urgently required for the state of Mizoram. Mizoram is a small state with a population of less than 10 lakhs (census 2001). Cancer diagnostic facilities are available only in 4 hospitals and 3 private clinics. Most of the cancer patients eventually come to the Civil Hospital Aizawl, the district hospital and also the referral center of the state.

1.2 Patterns of cancer in Mizoram

Analysis of the available data from the Directorate of Health Services for a 10 year period from 1991-2001 (Statistic Cell), gives details of the most common cancers in Mizoram, as given in Table II:

Table II. 10 most common cancers in Mizoram, 1991-2001

Site	Total no.	% of total cancer
Stomach	744	29.9
Breast	165	6.6
Lung	153	6.1
Cervix	141	5.6
Esophagus	108	4.3
Leukemia	80	3.2
Nasopharynx	74	2.9
Liver	62	2.4
Rectum	59	2.3
Hypopharynx	57	2.2

(source: Directorate of Health Services statistics)

It is observed that stomach cancer is the most common cancer in Mizoram. Analysis by sex depicts the following as given in Table III:

Table III. 10 Most common cancer by sex in Mizoram, 1991-2001

Male			Female		
Site	**No**	**%**	**Site**	**No**	**%**
Stomach	507	37.5	Stomach	237	20.8
Esophagus	87	6.4	Breast	157	13.7
Lungs	56	4.1	Cervix	141	12.4
Hypopharynx	51	3.7	Lungs	97	8.5
Oropharynx	47	3.4	Leukemia	46	4.0
Nasopharynx	44	3.2	Liver	34	2.9
Larynx	39	2.8	Ovary	32	2.8
Leukemia	36	2.6	Nasopharynx	30	2.6
Rectum	35	2.5	Rectum	24	2.1
Lymphoma	33	2.4	Uterus	23	2.0

(source: Directorate of Health Services statistics)

It can be seen that stomach cancer is the most common cancer in both sexes.

1.3 Description of the existing disease reporting system

There is an absence of a formal disease surveillance system, except the Vertical National Control Programmes. Monthly reporting system is instituted and a format for reporting of cancer cases is also included. The data variables that are collected are name, age, sex, name of the father or address, site of cancer, type of treatment and place of death. Data are collected only from government institutions. Reports are submitted to the district headquarters, from the peripheral levels and the compiled data are then submitted to the state headquarters. Cross checking, for the presence of duplicity in the

reports are routinely not undertaken. Therefore the data that is thus generated is not credible and not representative of the whole population

1.4 Description of existing cancer reporting system

sA reporting system of all cancer cases in the District Hospital (Civil Hospital), Aizawl to the National Cancer Registry Programme (ICMR) ans supported by WHO, under the project 'Development of an Atlas of Cancer in India' for the past 2 years is in existence. However, the data that is thus generated is not representative of the population of Mizoram, and in view of the increasing burden of Cancer in the State, the need for a Population Based Cancer Registry (PBCR) is felt.

1.5 Rationale for development of a Population Based Cancer Registry (PBCR)

Absence of a formal disease surveillance system in Mizoram as well as routine absence of data from the private institutions has created difficulties in computing incidence or mortality rates, giving rise to questions regarding the quality and reliability of the data that is thus generated.

The extent of the cancer problem and other aspects of epidemiology can best be assessed by a PBCR. It would provide a more accurate and stable estimate of cancer incidence for population groups, enable identification of populations at risk and demonstrate, whether screening and other prevention measures that are functioning are making a difference. It would also help in monitoring trends in cancer risk factors and contribute significantly to the understanding of cancer risks.

This enable public health officials plan an effective comprehensive and integrated approaches to cancer prevention and control. It would also provide accurate information necessary to answer public questions about cancer in the community, to plan, design, conduct epidemiologic and clinical research, as well as provide information for scientific and medical research about cancer in the state.

In view of the emerging problem of cancer in the state, the need to develop an effective Cancer Registry and document possible risk factors contributing to the same is urgent. It is in this context that the present effort to design a Cancer registry for the state of Mizoram is being attempted.

1.6 Objectives

To design a Population Based Cancer Registry for the state of Mizoram, with the following objectives:

1. the primary objective of the cancer registry will be to collect and classify information on all cancer cases in order to produce statistics on the occurrence of cancer in Mizoram.
2. to provide a framework for assessing and controlling the impact of cancer in the community.

1.7 Pre-requisites of an effective Population Based Cancer Registry

The prerequisite of a Population Based Cancer Registry includes the following:

1. Support and cooperation of the medical community. An advisory committee may be formed to ensure close contact with the medical and public health personnel, which can facilitate access to the data sources.
2. Staff and finance are needed to run the registry
3. Equipment and office space
4. Population denominators.

Conditions necessary to develop a cancer registry include generally available medical care and ready access to medical facilities, so that a great majority of cancer cases will come into contact with the health care system at some point in their illness.

2. METHODS

The methods for designing PBCR, Mizoram were undertaken in two stages

Stage I. Preparatory stage

Stage II. Design of the registry

2.1 Stage I. Preparatory stage

Preparatory stage included five components, i.e.

1. preliminary survey of all key hospitals, laboratories and interview of cancer patients
2. assessment of financial and personnel with training requirements
3. legal aspects of the registry
4. sources of data for the registry
5. identify gaps that needs strengthening for establishment of a cancer registry

2.1.1 Preliminary survey

A preliminary survey of all key hospitals (3 government, 4 private institutions) and 3 laboratories in the state were done with the objectives of assessing:

1. existing situation for the availability of support and cooperation
2. load of patients at each institutions
3. available diagnostic and treatment facilities at each institutions
4. available resources

Methods

Three Government Hospitals, 4 private Hospitals and 3 private laboratories were surveyed. The Medical Superintendent of all Government Hospitals and Directors/Proprietors of all Private Institutions were interviewed using structured questionnaire enclosed in Annexure III.

Results

The results of the survey is as given in Table IV below. It can be seen that there are limited cancer diagnostic and treatment facilities in Mizoram and the highest number of cancer patients, diagnostic and treatment facilities is at Civil Hospital. There are no specific cancer hospitals in Mizoram, but Civil Hospital Aizawl has Cobalt Therapy for treatment of cancer patients. All key institutions were supportive and willing to participate in the proposed PBCR programmes.

The head of the institutions, at each hospital, private laboratory and hospitals were interviewed regarding the core proforma that is to be administered to cancer patients. All said that the questions were adequate in terms of the requirement for such programmes. There were no items that would intrude on a person's privacy.

Therefore, as initiating, establishing and sustaining a PBCR, as per international standards requires meticulous planning, cooperation of medical institutions in the area, dedicated personnel and adequate funding, cooperation of private institutions, dedicated personnel and planning are all available.

Therefore, with external funding, implementation of a Population Based Cancer Registry (PBCR) is possible. This external funding will all be provided by Indian Council of Medical Research (ICMR), under the National Cancer Registry Programme

Table IV. Results of preliminary survey of key hospitals and laboratories, PBCR, Mizoram 2003:

Variables	Gvt. I*	Gvt. II*	Gvt. III*	P L I*	P L II*	P L III*	P H. I*	P H II*	P H III*	PH IV*
Bed strength	300	200	75	Nil	Nil	Nil	200	50	30	100
Cancer cases/month	30	10	6	6	7	7	10	4	3	7
OPD *cases/month	25	8	5	6	7	7	8	2	2	6
IPD*cases/month	5	2	1	Nil	Nil	Nil	2	2	1	1
Diagnosis month	3-4	0-1	0-1	1	1	1	0-1	0-1	0	0-1
Diagnostic facility	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Treatment facility	Yes	No	No	No	No	No	No	No	No	No
Manpower, diagnosis	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Manpower, treatment	Yes	No	No	No	No	No	No	No	No	No
Willingness to participate	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Manpower, resources	No	No	No	No	No	No	No	No	No	No
Financial resources	No	No	No	No	No	No	No	No	No	No

*[*Gvt I- Aizawl Civil Hospital; Gvt II- Lunglei Civil Hospital; Gvt III- Saiha Civil Hospital; PL I-Genesis lab (pvt); PL II- Lifeline lab (pvt); PL III- Newlife Polyclinic (pvt); PH I- Synod hospital; PH II- Green wood Hospital; PH III- Adventist Hospital; PH III- Baptist Hospital, OPD-out patient department; IPD-in patient department]*

2.1.2 Interview of cancer patients

Cancer patients (44), aged above 15 years from Civil Hospital were interviewed were interviewed with the objective of identifying:

Patients perception and willingness to respond to questions in the core proforma

Methods

Cancer patients from Civil Hospital were interviewed during the month of November by the Principal Investigator and a trained registered Nurse. Core proforma for the registry were administered to them and after administration of the core proforma, a semi-structured questionnaire enclosed in Annexure IV were administered too them.

Results

The results of the interview are as given in Table V. There were 32 patients who answered the questions themselves and 12 answers were from their accompanying relatives of the patients, after obtaining the permission of the respective patients. Their

ability and willingness to answer questions regarding the core proforma for the registry are as follows:

Table V: Respondents from patients, PBCR, Mizoram, 2003:

Variables	Yes		No		Don't know	
	N	%	N	%	N	%
Patient/relatives co-operative	44	100	-	-	-	-
Difficulty in answering Proforma questions	44	100	-	-	-	-
Proforma questions too lengthy	-	-	37	84.1	7	15.9
Any difficult questions in the proforma	-	-	40	90.9	4	9.1
Intrusion on privacy of any items	-	-	44	100	-	-
Unwilling to answer all questions	-	-	44	100	-	-

There were 7 respondents who said that the questions were too lengthy, but when told the purpose of the questions, they added that the reasons justify it. Therefore, core proforma that is to be used for the registry is feasible for use by the patients.

2.2 Stage II. Design of a Population Based Cancer Registry (PBCR)

2.2.1 Population denominators and geographical area

PBCR will collect information on all new cancer cases reported from persons residing in a defined geographic area, in this instance, the whole Mizoram. Under the PBCR, the period of residence in the geographic area is for a minimum period of one year, at the time of diagnosis of cancer. Regular and accurate population data (by age and sex) available from Census, will be used for population denominators.

2.2.2 Physical location of the registry

Aizawl Civil Hospital will be the physical location of the registry. It is the main referral center of the state with all the basic specialities. A referring board, that refers patients across state borders for treatment is also instituted in the said hospital. The Head of department of Pathology, at whose initiation, the registry is to be initiated will be the Principal Investigator. He will have accessed to advise from consultants on clinical oncology, epidemiology, statistics and public health.

2.2.3 Participating Institutions

All PHC/CHC will be participating/reporting units. Government District Hospitals such as Aizawl Civil Hospital, Lunglei Civil Hospital, Saiha Civil Hospital, Kolasib Hospital, Champhai Hospital, Mamit Hospital and Serchhip Hospital will also be designate as reporting units in the registry.

Three Private Hospitals in Aizawl such as Durtlang Hospital, Greenwood Hospital and Seventh day Adventist Hospital and one mission Hospital in Lunglei are designated as participating/reporting units. Three private laboratories, all situated in Aizawl, namely Genesis, Lifeline and Polyclinic are also identified as reporting units due to their cancer diagnostic capacity. The Directorate of Economics and Statistics where registry of births and deaths are situated is another identified participating/reporting units.

All heads of Institutions will be in charge of overall reporting and provision of data.

2.2.4 Finance and personnel

Proposed staff and budget

The proposed staff and budget for the implementation of the registry programme is as follows:

Table VI: Requirement of salaries for staff, PBCR, Mizoram:

Post	Requirement	Monthly salary (Rs)	Total/ month (Rs)
Medical officer	1	15,000 (fixed)	15,000
Statistian	1	6,000 (fixed)	6,000
Social Worker	2	6,000 (fixed)	12,000
Computer Operator	1	6,000 (fixed)	
Attendant	1	2,500 (fixed)	2,500
Total			**41,500**

Salary per year = 41,500 x 12 = Rs. 4,98,000.00 (Rupees four lakh ninety thousand only)

The Head of Department of Pathology will function as the Principal and the Pathologists as Co-investigators and will be in charge of the overall workings of the registry, helped by the Medical Officer. The Medical Officer (Research Officer) will assist the Principal Investigator. He will look after the daily routines and be in charge of the functioning of the staffs. The statistical Assistant will be in charge of all statistical works and can assist the Social Workers in their activities, as permissible. The Social Workers will be responsible for active surveillance, with regular visits to all the reporting units. Computer Operator will be responsible for all related computer works, as well as clerical and accountancy works. An Attendant is a requirement of an office, and so for this Registry too.

Training of the registry personnel at all levels is an important aspect of the cancer registry's operation. Provisions will be made available for training courses for all personnel in the registry as applicable.

Table VII. Non- recurring expenditures, PBCR, Mizoram:

Items	Quantity	Rate	Total
Office furniture			
Tables, Godrej, large	1	9000	9000
Tables, Godrej, small	4	4500	18000
Chairs, with arms	5	1500	7500
Chairs, armless	5	1000	5000
Steel Almirah, Godrej	1	9000	9000
Steel rack	1	5000	5000
Book rack	1	7000	7000
Computer & accessories	1	60,000	60,000
Telephone connection	1	2000	2000
Internet connection	1	3000	3000
Miscellaneous			5000
Total			**1,30,000**

Table VII: Recurring expenditures, PBCR, Mizoram:

Items	Requirement/month	Requirement/ year
Telephone bill	1,000	12,000
Stationeries with IEC materials	-	50,000
Computer consumables	1500	18,000
TA/DA of staff	-	1,00,000
Miscellaneous	1000	12,000
Total		**1,92,000**

TOTAL BUDGET FOR ONE YEAR:

1.	**Salary**	**:**	**Rs. 4,98,000.00**
2.	**Non- recurring expenditures**	**:**	**Rs. 1,30,000.00**
3.	**Recurring expenditures**	**:**	**Rs. 1,92,000.00**
Total Budget		**:**	**Rs. 8,20,000.00**

(Rupees eight lakh twenty thousand only)

Therefore it can be seen that the total budget that has been projected is economical.

2.2.5 Training needs

Capacity building and up gradation of knowledge in terms of improvement in skills and knowledge is needed for good delivery of services and overall improvement and the strategy for achieving this goal has been by conducting training and refresher courses.

Staffs of the registry, from the Principal Investigator to the Office Assistant/computer operator will need to be trained in their respective fields by exposure

to many training programmes in epidemiology, cancer registration, computer system with linkage programme etc. as may be applicable.

With the assumption of cancer a notifiable disease in Mizoram, death registrars which are manned by School Teachers will be trained for better and uniform reporting of deaths due to cancer as well as uniform data reporting procedures. The Medical Officers in all PHC/CHC as well as a responsible Senior Medical Officer will be trained ii various aspects of cancer registration, for overall supervisory activities within their respective jurisdiction. Cancer death reporting as reported by death registrars will also be made to be submitted to the PHC/CHC Medical Officers for clarity, consistency, accuracy and completeness of data that is being reported.

2.2.6 Legal aspects, Data security and confidentiality:

As of present, reporting of cancer cases will be voluntary from Private Institutions and Laboratories, but will be made compulsory from Government Institutions by an administrative order from the Ministry, and plans are made to this effect. To make cancer a notifiable disease in the state is advocated and planned for future.

The availability of an aggregated cancer incidence database could be useful to meet the needs of cancer patients, their families, the public and facilitate clinical, epidemiologic and health services research. It would be useful for planning and evaluation of cancer control interventions.

But access to data and data files would be strictly regulated and monitored. Confidentiality and protection of an individuals' information will be strictly followed. Public use of data sets would be compiled in a fashion to minimize risk of disclosure of personal identities. Any analysis of data from public use data sets for the intended purpose of determining the personal identity of a person represented in the database would be strictly prohibited.

2.2.7 Data sources

The main source of information are usually from hospitals, private laboratories, private general practitioners, medical records, Referring board, Old age homes, Registration of births and deaths and screening programmes. Use of all these sources will ensure completeness of data as well, as enhance the quality of data that is thus collected, because every possible items relating to the patient is brought together from every possible source in a single file. However, to minimize duplications that is bound to occur due to multiplicity of data sources, procedures for linking data on the same individual is

very important. Presence of duplicity or double entry will be regularly cross checked by registry staff, with overall supervision by the Assistant principal investigator.

Hospitals

They constitute the main data source as patients eventually come to hospitals for diagnosis and treatment. Outpatient clinics as well as patients admitted in hospitals (private hospitals including) should be regularly covered. Radiology (Radiodiagnosis and Radiotherapy) department will also be covered as an important data source. They will lbe visited weekly by registry staff for data collection.

Laboratories

Wherever possible, registries should obtain copies of histology reports from pathology laboratory and should be sent to the registry. All types of pathology reports should be screened. Haematology laboratories are another important source of haematopoietic malignancies such as leukemias and lymphomas. Therefore, it is important that haematology reports are regularly screened and if possible, an arrangement should be made so that haematology reports are sent to the registry. Other biochemical and immunological tests that are of value in the diagnosis of cancer will be sought. If voluntary reporting is difficult to maintain, registry staff will visit monthly for data collection.

General practitioners

General practitioners are often the first to see cancer patients and therefore arrangements will be made for data report towards this. However, information available to general practitioners are limited, except for that concerning the first symptoms of the illness. In spite of it, arrangements for patient or data referral will have to be made. Reporting of cases or data collection from registry staff may be conducted as and when cases are available, keeping communications open.

Medical records

These contribute to cancer registration and are an important source of data. Therefore records should be regularly screened with minimal frequency of once in six months.

Referring board

A referring board is instituted at Civil Hospital. This board refers at an interval of once weekly, all cases across state borders for further diagnosis or treatment. They will be requested to send data of all patients referred so that missed cancer cases are minimized. The registry staff will also regularly visit the board for referred patients.

Old age homes

In view of epidemiological transition that is apparent in many developing countries, they are becoming increasingly important and therefore may form an important source of cancer data. However, this data source has limited use in Mizoram, considering low levels of occupancy at such homes. But nevertheless, it should be a component of data source in the registry and arrangements should be made for notification of patients from them.

Screening programmes

Such programmes have to be set up to detect cancer as early as possible. Therefore programmes such as screening services, surveys and special studies, as applicable will be conducted from time to time.

Community

The community will be encouraged and motivated to voluntary report of cancer cases to the registry through Information, Education and Communication (IEC) activities.

Registration of births and deaths

All death cases are reported to the Department of Economics and Statistics. The whole state of Mizoram has about 700 Registrars of Births and Deaths, and each are manned by local Primary school teachers, appointed by the government. Their jurisdiction encompasses mainly one Village Council (Panchayat) area. They are required to submit their reports monthly to the said department. Registrars are also identified in all major Hospitals in the state. The death certificates submitted will be monthly checked by the registry staffs.

They will provide supplementary information on the number of cancer deaths. All deaths certificates, which mention cancer or tumour as a cause of death will be carefully examined. This information can then be sought to match against cases entered on the registry files. Every cancer deaths, not traceable to an entry in the file will be labeled as 'an unmatched death' and will be registered separately for the corresponding year. Death register may be visited by registry staff for collection of data once monthly.

Autopsy services, Health insurance, Hospices

These are important data source in a registry. However, their relevance is, at present absent as they are absent in Mizoram. Nevertheless, efforts will be made towards their incorporation if and when they come into effect.

2.2.8 Measures for strengthening

A PBCR, particularly in developing countries is an arduous task, owing to shortages of medical facilities and personnel. The problems of identification of individuals case finding and definition of reference population are most difficult to solve and the risk of bias is always present. In this registry too, in spite of adequate funding, dedicated personnel and cooperation with support from the medical community, problems in case identification are expected, in particular, cases that are being referred to other medical centers for treatment and diagnosis. However, networking with major hospitals where cancer cases are usually referred to from Mizoram, in particular, Baruah Cancer Insititute, Guwahati, TATA Memorial Hospital, Mumbai, AIIMS, New Delhi, CMC Vellore has been started. Their cooperation would greatly increase the completeness of coverage of cancer cases.

For enhanced completeness of coverage, inclusion of cancer as one of the notifiable disease of the state will require intense advocacy and planning. In the eventuality of it taking effect, training of lay persons i.e. Teachers who are reporters of death cases is a challenge. But given time and effort, this is not expected to be a major hurdle.

2.2.9 Standard Case Definition

Standard case definition is a pre-requisite of any surveillance system. Definition of cancer or methods of diagnosis is devided into two categories, microscopic, non-microscopic and Death Certificate only. Coding of primary site of tumour will be as per ICD-O classification. The methods of diagnosis are as given below

I. Non-microscopic diagnosis

1. Clinical only
2. Clinical investigation (including X-ray, ultrasound etc)
3. Exploratory surgery/autopsy
4. Specific biochemical and/or immunological tests

II. Microscopic diagnosis

1. Cytology or haematology
2. Histology of metastasis
3. Histology of primary
4. Autopsy with concurrent or previous histology
5. Unknown

III. Death certificate only

Registration on the basis of information included n the death certificate alone, for which no other information can be traced must be distinguished from cases first coming to the registry's attention by means of a death certificate mentioning cancer and where diagnosis is based on other information.

2.2.10 Data Variables

The data collection tool will be as per the format enclosed in Annexure I. Collection of complete information is critical to the programme but only relevant information will be collected. The required information are as given below:

1. Name, name of father/ mother/ husband/ wife/son (s)/ daughter (s), place of residence (permanent address, native place address), place of birth, mother tongue, religion, cultural group or background, marital status, education and occupation are needed for identification of the patients, presence of clustering of cases in terms of place, families, cultural group, identify high risk areas and presence of environmental risk factors that would facilitate etiologic studies. They are also required for basic identification of cases and for further follow up studies.
2. Age is an important entity, as some cancers are known to affect certain age groups. Most cancers are also present in older age groups. It is also important for identification of age groups at the highest risk. It would enhance the understanding of the dynamics of the disease and enhance formulation of control strategies.
3. Gender is recorded as one of the basic identifying factor. It would aid in the determination of the sex differentials which is common in some cancers, with either males or females being more prone, depending on the risk factors. It may also reflect the disparity of medical attention given to males and females.
4. Date of first diagnosis and diagnostic status at registration is essential for determining the course of the disease, in epidemiological investigations and aid in understanding it's implications. It is important for ascertaining the state of the disease at first diagnosis, so that any needed preventive measures can be targeted

towards early seeking behaviour/ early diagnosis. Resources can be better planned and targeted to areas of need.

5. Methods of diagnosis is required to provide useful information for evaluation of progress towards cancer control. While it is optimally desired that diagnosis of cancers are to be microscopically confirmed, for high specificity in the diagnosis and in the data collection, knowledge of the diagnostic status and methods of diagnosis will enable public health professionals to better understand the problem. It will also help in directing affective cancer prevention and control programmes, such as the value of screening and early detection. It would also give information regarding the quality of cancer diagnosis.
6. Details of microscopic diagnosis (histology, cytology, heamatology) are essential for overall in depth knowledge of the patterns of cancer. It would reflect the comprehensiveness and accuracy of the data thus generated. It can be a guide for planning and evaluation of cancer control programme, while re-stating the importance of quality in the data generated.
7. Data sequencing, laterality and clinical extent of disease before treatment would provide information not only on details of the cancer status at the time of diagnosis, but also for further follow up studies on the progress of the disease. It would also provide information on the behaviour and practices towards early screening programmes.

   It would enable public health professionals to direct needed actions towards control programmes, the value of early screening and detection programmes and would overall help in developing, implementing and evaluating new models of comprehensive integrated approaches to cancer prevention and control.
8. Anatomical site of the specimen/ biopsy/ smear is necessary to give data regarding the patterns of the disease and the quality of cancer diagnosis.
9. Complete pathological diagnosis, coding of primary site of the tumour (by ICD-0-3), topography, morphology and secondary sites of the tumour are necessary so that high quality cancer data are available. It would increase the completeness and accuracy of information about the status of cancer at the time of diagnosis. It would also aid in scientific control and intervention programmes and facilitate studies in areas such as rare cancers, occupational related cancers, cancers among children or minority populations.

10. Cancer directed treatment would give a picture on the optimum treatment for cancers as well as the presence of any deviations from standards of cancer care. It would aid to identify geopraphic variability in cancer treatment practices, as many of the cancer cases are referred across state borders for treatment. It could describe and interpret the costs of providing medical services for the diagnosis and treatment of cancer.

'If patient is dead', is another important variable that is needed as it would reflect the sensitivity of the programme for detection of cases. It would also facilitate for survival/mortality trend analysis. It would also help in evaluating the end results of cancer therapy in terms of survival analysis.

2.2.11 Methods of data collection

The methods for data collection will be as follows:

Passive reporting

Due to the institution of a monthly reporting system in all government institutions, all government institutions will be under passive reporting system, using newly designed reporting formats as enclosed in Annexure II. Even suspected cancer cases will also be encouraged for reporting from peripheral institutions so that cases are minimally missed. At the same time, it would encourage and facilitate voluntary reporting of cancer cases from individuals, NGO's and the community.

The data flow will be from the peripheral levels to the district levels, and the consolidated report to the state headquarters. A copy of the consolidated report will also be sent to the Cancer Registry. The final compiled report from the state headquarter will also be sent to the Cancer Registry. An Office order to this effect will be obtained from the Secretary, Health and Family Welfare, Government of Mizoram.

Laboratory support at the peripheral level is weak, particularly for cancer diagnosis. So passive reporting system is not sensitive and have low specificity, but this has to be included as part of the system, for strengthened completeness and coverage of cancer cases.

Active reporting

The objective of active surveillance is to generate reliable data on the magnitude and patterns of cancer. Base line data on cancer is critical for assessing the cancer burden and hence formulating policy and setting priorities. Data collected by registries can be used to describe the cancer burden, identify populations at risk for certain cancers, to

help plan, implement and evaluate cancer control activities. Active case reporting will utilize forms as per enclosed in Annexure I.

Data collection of PBCR is also active in India, in that the workers in the registry visit the reporting units/hospitals on a routine basis and scrutinise the records in various departments that include Pathology, Radiology, Radiotherapy, Medical Records, in-patient and out-patient clinics to elicit the desired information on reported cancer cases. They actively pursue and collect information on reported cancer and interview the patients whenever possible. Death certificates or death reporting due to cancer, are also verified from the Registration of Births and Deaths, Department of Economics and Statistics. Every attempt will be made to register all cancer patients in Mizoram.

Reporting units for data sources identified by the registry with cancer diagnostic facilities and the Medical Board (a referring board that refers cases across state borders for further diagnosis and treatment, including cancer) will be requested to send their reports on cancer cases directly to the registry. They will also be periodically visited by the registry staffs for cases, as well as for further details of their reports.

The requisite details obtained for each patients, will be crosschecked, with information collected from various departments, to ensure completeness of reporting. Full information on every cancer patients, registered at various reporting units should be obtained, irrespective of whether the patients is receiving treatment or not. Additional information will be collected every time a cancer patient is re-admitted or re-examined.

Care will be taken not to duplicate an entry in the files of such cancer patients by carefully examining the name and address of each.

Depending on the number of cancer cases that an institution caters will determine the frequency of data collection by registry staffs. Overall, registry staff will pay a weekly visit to Civil Hospital and Referring Board for collection of data. Other institutions identified as data sources will be paid monthly visits by registry staff for data collection. In the event of increased number of cancer cases from an institution, frequency of visits will also be increased accordingly. Information will be collected by interviewing patients wherever possible.

Behaviour surveillance

Information about lifestyle choices and screening practices is critical to the fight against cancer, because large percentage of cancers are associated with personal behaviours. Over half of all annual cancer deaths in the US are attributable to behaviour: one third to tobacco use and another third to unhealthy diets [3]. Furthermore, the World

Health Organization (WHO) estimates that one-third of all cancers are preventable (WHO-AT-A-Glance).

Reducing the burden due to cancer requires the reduction of the prevalence of behaviour and environmental factors that increase cancer risk. It will identify problem, needs and opportunities related to modifiable and other risk behaviours. It can then recommend priorities for health promotion, health education and cancer reduction activities, both for the professionals and the public.

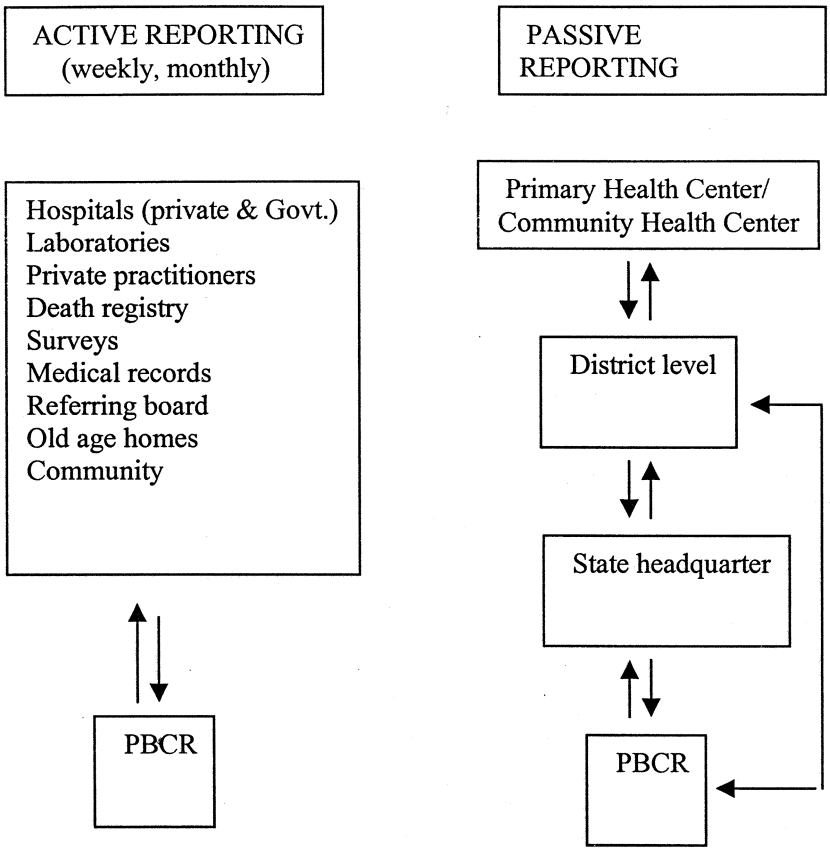
Monitoring, assessing and evaluating behaviours related to cancer risk factors will be accorded an importance similar to that of cancer monitoring mechanism. It will also pursue the building of local coalitions and community networks, and the implementation of grass root activities to reach the target populations of persons at increased risk for developing cancer.

2.2.12 Data flow

Data from the peripheral institutions such as PHC and CHC will submit data on a monthly basis to the District Headquarters, which will further send compiled reports too the State Headquarters and to PBCR. The State Headquarter will also send consolidated report to the PBCR.

Other identified institutions such as Hospitals, laboratories, death register, private practitioners, Referring board, Medical records, old age homes etc will be regularly visited by registry staff for active case identification.

Figure I. Data flow and feedback



2.2.13 Compilation of data

Data will be compiled to describe the cancer pattern in terms of place-geographical area/ residential area; by persons such as age, sex, marital status, religion, mother tongue, cultural group/background, education and occupation. Compilation can be done by cases such as site of cancer, stage at diagnosis, method of diagnosis, detailed microscopic diagnosis, by treatment, by cancer deaths, by childhood deaths, by presence of secondaries, and clinical extent of disease. It can be further compiled by source of registration. Data will be compiled monthly and further aggregated to yearly compilation.

Data may be compiled by tabulations or drawings such as graphs, charts or maps. After group wise tabulation, frequencies and characteristics can be presented by charts and graphs. They show the number of cases during a reporting period and it is easy for visualising the number of cases which occurred in each reporting period. Maps can be used to monitor the location of cases during a given period. It enables us to determine the disease situation in terms of different reporting units and by geographical distribution.

2.2.14 Analysis of data

After compilation of data, analysis has to be done and interpreted for useful information. Analysis should be conducted monthly, as a minimal standard. Analysis should compare the morbidity, mortality in two different areas/ reporting units over a period of time. Comparisions with previous week/month/year and with corresponding period of the previous years can be made.

Rates, rather than absolute numbers will be used to solve the problems of change in population. Cases should be analysed by age sex, residential status, cultural background, mother tongue, education, occupation, stage at diagnosis, site, method of diagnosis, detailed microscopic diagnosis, cancer death. It can monitor trends in the risk factors, incidence and mortality of cancers. Incidence rates, age adjusted rates, age specific rates, cumulative incidence rate, cumulative risks and truncated age adjusted incidence rates can be calculated, their methods of calculation is as enclosed in Annexure V.

2.2.15 Quality checks

While the goal of performance would be to improve the capacity of cancer prevention by enhancing existing performance of the registry, standards/quality checks have to be set so that performances are reached at levels that are minimally required. It

would also monitor compliance with the reporting units and reconcile errors and inconsistencies. Process of validation may occur several times until contempory data meet the minimal standards for completeness and quality of data. These procedures will be undertaken by the Principal and Assistant Principal Investigators.

The number of case completeness, basis of diagnosis, percentage (%) of death certificates only reports, the quality/completeness of case ascertainment/selected required data elements and the timeliness of reports would be strictly monitored. The proportion of duplicate reports and the proportion of records that pass standardized edits without errors would be monitored. In addition, the Registry staff will complete annual internal evaluation of programme success.

2.2.16 Conduct Investigations

1. There are various situations requiring investigations such as
2. Clustering of cases/ deaths in time and place
3. Unusual increase in cases/ deaths
4. Unusual increase in detailed microscopic diagnosis, even if total cases are not increased
5. Unusual decrease in cases or deaths
6. Shifting in age distribution of cases
7. Even one case which is not known/common to be present in an area

2.2.17 Actions

Action has to be undertaken to correct any problem encountered during routine reporting, routine search for cases, surveys or epidemiological investigations. The purpose of investigations and analysis is not only to determine the ground realities, but also to decide on future control or prevention programmes. Actions, where feasible and possible, is the logical follow up of every investigation and analysis.

2.2.17 Feedback

To ensure that reporting units at various levels remain motivated and involved in the process, there will be regular communication back from the Registry to all reporting units and public health agencies. Key to the success of cancer prevention and control is the timely dissemination of cancer data to the reporting units, public health agencies and scientists responsible for the reporting, designing, implementation and evaluation of cancer prevention and control activities (WHO. At- A- Glance, 1999).

This can be done through direct face to face discussion, or publication of a bulletin or through letters. Feed back should include comments on the performance in

recording and reporting of cases and suggestions in solving problems connected with collection and reporting of data. Institution specific report, as well as the total reports will be sent back to the contributing units. Feedback will enhance their motivation, by helping them understand that the information collected by them is important.

3. CHALLENGES

The PBCR is proposed to be instituted at Civil Hospital (district), Aizawl. It is the main referral center in the state, with all the basic specialities. Implementation of a PBCR in Mizoram is feasible, since the private laboratories and hospitals have a desire to participate in the programme, perhaps as a result the perceived high burden of cancer. All private institutions with diagnostic facilities, as well as all district hospitals will be designated as reporting units. Responsible persons will be identified for submission of reports to the Registry. They will be requested from the Director level or if necessary from the Ministry level for compliance. This is not expected to be difficult as they are all willing to participate, all private institutions are obliged one way or the other to the Government and they are aware of the importance of cancer in Mizoram. They will be paid a minimal monthly visit by the registry staff, for collection of detailed information on reported cancer cases, as well as any other 'missed' cases.

Studying the magnitude and patterns of cancer would be the first step in determining clues to the cause of cancer and having baseline data to plan and assess control measures. Epidemiologic studies based on these help in knowing what is happening and what can be done about it. Cancer registries provide the needed information to undertake such investigations. So they provide reliable data on the magnitude of the cancer problem and also about the patterns of cancer, the types and changes in the rates of these cancers over time. The Registry will facilitate the planning, designing and conduction of epidemiologic and clinical research. It will monitor the trends in incidence, mortality, risk factors, survival for cancer prevention and control. The Registry will be committed to fulfilling its cancer prevention and control objectives, public health responsibilities by creating new opportunities for receiving, assessing, enhancing, aggregating and disseminating cancer data.

By creating an infrastructure for central processing, enhancement and aggregation of high quality cancer incidence data in a timely manner the registry will enable new efforts to prevent and control cancer. Careful attention to data security and confidentiality will protect the privacy of cancer patients balanced appropriately with

society's and researcher's need to know and understand more about this deadly disease. This new cancer surveillance infrastructure will be an important tool in the state's efforts to reduce the morbidity and mortality from cancer and to improve the quality of life of patients, particularly cancer patients.

The state of Mizoram is in the process of implementing a PBCR. Funding has been provided by the Indian Council of Medical Research (ICMR), Cancer Registry Programme. This design has been closely discussed with the Principal Investigator of PBCR, Aizawl. Challenges identified above have been shared with the Principal Investigator who ohas promised to look into these issues

ANNEXURE I

POPULATION BASED CANCER REGISTRY FOR MIZORAM

Core Proforma

NAME OF PARTICIPATING ☐☐☐

_____ CODE:

HOSPITAL ☐☐☐☐☐☐

NUMBER:.....

(Source of Registration)

FULL NAME OF PATIENT:

_____

☐☐ ☐☐ ☐☐

DATE OF FIRST DIAGNOSIS

(Recorded date of first visit to Source of Registration) DD MM YY

NAME OF FATHER: _____ NAME OF MOTHER: _____

NAME(S) OF SON(S):

_____

NAME OF HUSBAND/WIFE: _____

NAME(S) OF DAUGHTER(S):

_____

PLACE OF RESIDENCE:

Permanent Address (Permanent Place of Usual Residence)

Urban Areas (Towns/Cities)

House No:

Road/street Name: _____

Non-urban/ Rural Areas

Name of Village: _____

Area/locality: _____ Name of Sub-Unit of District (Taluk/Tehsil/SDO/other)

_____

Ward: _____

Town/City: _____ Name of PHC/Sub Center: _____

Name of district (IN CAPITALS): _____

Postal Pin Code: _____

Duration of stay (in years) at Permanent Address: _____

Telephone No: Office: _____ Res: _____

Second/ Office Address: _____ Pin Code: _____

Native place Address (Third Address): _____Pin Code: _____

PLACE OF BIRTH: _____ Pin Code : _____

AGE (in years) ☐ DATE OF BIRTH: ☐☐ ☐☐ ☐☐

DD MM

YY

<1 year=00; 1-97=Actual age; 98 and more= 98; 99= unknown

SEX : ☐

(1) Male (2) Female (3) Others (specify) .....

☐

MARITAL STATUS:

(1) Unmarried (2) Married (3) Widowed (4) Divorced
(5) Separated (6) Others (specify) ..... (9) Unknown

MOTHER TONGUE: ☐☐

(01) Assamese (02) Bengali (03) Gujarathi (04) Hindi (05) Kannada
(06) Kashmiri (07) Malayalam (08) Marathi (09) Oriya (10) Punjabi
(11) Sanskrit (12) Sindhi (13) Tamil (14) Telegu (15) Urdu
(16) English (17) Others (specify) ..... (18) Bhutia (19) Manipuri
(20) Mizo (21) Nepali (22) Unknown

RELIGION: ☐

(1) Hindu (2) Muslim (3) Christian (4) Sikh (5) Jain
(6) Neo-Budhist (7) Parsi (8) Others (specify) ..... (9) Unknown

CULTURAL GROUP/ BACKGROUND: ☐☐

(01) Anal (02) Bhutias (03) Bru (04) Chakma (05) Gangte (06) Hmar
(07) Kachari (08) Kuki (09) Lai (10) Meitei (11) Mizo (12) Myanmarese (13) Nepalese (14) Paite (15) Pawih (16) Rongmei (17) Simte (18) Tangkhul
(19) Waiphei (20) Zou (88) Others (specify) ..... (99) Unknown

EDUCATION: ☐

(0) Not applicable (for children below 5 yrs) (1)Illeterate (2) Literate (3) Primary

(4) Middle (5) Secondary (6) Technical –after matric (7) College and above

(8) Others (specify) ..... (9) Unknown

INFORMATION OF ABOVE ITEMS WERE PROVIDED BY: ☐

(1) Patient (2) Family Member/Relative of Patient (3) Friend of Patient

(4) Medical Records (5) Physician In-charge (6) Nurse In-charge
(7) Others (Specify) .....

DIAGNOSTIC STATUS AT REGISTRATION AT SOURCE OF REGISTRATION/REPORTING INSTITUTION (RI)

(0) Not registered at RI (1)Microscopically confirmed ☐ (2)Suspected (Microscopically/Radiologically)

(3) Unequivocal Clinical Diagnosis (4) Suspected Clinically/To rule out Malignancy

(5) Others (Specify) (6) Unknown

METHOD OF DIAGNOSIS (most valid final basis)

(01) Clinially only (02) X-Ray (03) Isotopes (04) Endoscopy (05) Angiography

(06) Exploratory surgery or autopsy without Histology (07) Specific Biochemical and/or Immunological tests

(08) Cytology (09) Blood film (10) Bone Marrow (11) Histology of Primary (12) Histology of Mestasis

(13) Autopsy with concurrent or prior Histology (14) Death Certificate Only (15) Others (Specify)....

(16) All other Diagnostic Imaging Techniques (Specify) (99) Unknown

DETAILS OF MICROSCOPIC DIAGNOSIS (for microscopically confirmed cases only) ☐

A. **Histology**

(0) Histology not attempted (1) Histology not contributory (negative for malignancy/unsatisfactory)

(2) Suspicious of malignancy (3) Biopsy/Frozen section only (4) Biopsy and subsequent histopath of surgically resected specimen (5) Excision biopsy/surgically resected specimen (6) Histology of metastasis only

(8) Histology uncertain whether primary or metastatic (9) Unknown

Slide No (s) .....Date of Report: ☐☐ ☐☐ ☐☐

DD MM YY

B. Cytology ☐

(0) Cytology not attempted (1) Attempted but not satisfactory (3) Cytology negative for malignancy

(4) Cytology of pleural/ascitic fluid/ sputum/ urine/ vaginal smear/ other exfoliative cytology (specify)

(5) Brush Cytology (6) FNAC of primary site (7) FNAC of metastatic site

(8) FNAC uncertain whether primary of Metastic (9) Unknown

Slide No (s) .....Date of Report: ☐☐ ☐☐ ☐☐

DD MM YY

C. Haematology ☐

(0) Haematology not contributory or applicable (1) Peripheral smear only (2) Bone marrow aspiration

(3) Bone marrow aspiration and biopsy (4) Bone marrow biopsy (5) Metastatic (not a maemopoietic malignancy)

(8)Haematology uncertain whether primary (haematopoietic) or metastic (9) Unknown

Slide No (s) .....Date of Report: ☐☐ ☐☐ ☐☐

DD MM YY

SEQUENCE

(0) one primary only (1) first of primaries (2) second of primaries, etc ☐

☐

LATERALITY

(0) Not a paired site (1) Right (2) Left (3) Only one site involved, right or left, unknown

(4) Bilateral involvement, lateral origin unknown (9) Paired site, but no information concerning laterality

ANATOMICAL SITE OF SPECIMEN/BIOPSY/SMEAR:_____

COMPLETE PATHOLOGICAL DIAGNOSIS

Primary Site of Tumour – Topography: _____

(include sub-site if any)

Morphological Diagnosis: _____

CODING ACCORDING TO **ICD** – 0- 3

PRIMARY SITE OF TUMOUR- TOPOGRAPHY: ..... ☐☐☐☐

PRIMARY HISTOLOGY- MORPHOLOGY: ..... ☐☐☐☐☐☐

If morphology is that of metastasis, mention Primary Site above

SECONDARY SITE OF TUMOUR- (SITE OF BIOPSY/SMEAR): ..... ☐☐☐☐☐☐

MORPHOLOGY OF METASTASES: ..... ☐☐☐☐☐☐

If the morphology diagnosis is only that of metastatic site, mention the Primary Site as taken by the treating clinician either through discussion or from case record.

SITE OF TUMOUR (ICD-10) ☐☐☐☐☐☐

CLINICAL EXTENT OF DISEASE BEFORE TREATMENT ☐☐

(01) In-situ (02) Localised (03) Direct extension (04) Regional nodes (05) Direct extension with regional nodes (06) Distant Metastasis (07) Not palpaable (08) Too advanced (09) Not applicable

(10) Treated else where (11) Unknown primary

CANCER DIRECTED TREATMENT GIVEN ☐

(a) (1) Yes (2) N0 (3) Treatment advised but not accepted (4) Incomplete treatment (9) Unknown

(b) If yes, type of treatment given:

(01) Surgery (S) (02) Radiotherapy (R) (03) Chemotherapy (C) (04) S+R (05) S+C

(06) R+C (07) S+R+C (08) Hormone Therapy (H) (09) S+H (10) R+H

(11) C+H (12) S+R+H (13) S+C+H (14) R+C+H (15) S+R+C+H (16) others (specify)...

(17) No treatment (18) Treatment advised but not accepted (99) Unknown

IF PATIENT IS DEAD

Date of death ☐☐ ☐☐ ☐☐

DD MM YY

Cause of death ..... If Cancer ICD-10 ☐☐☐☐

Death certified by ☐

(1) Allopathic Practitioner (2) Non-Allopathic Practioner (3) Autopsy/ Coroner

(4) Others (specify).....(9) Unknown

Place of death ☐

(1) Hospital (2) Nursing Home (3) Place of Residence (4) Others (specify).....

(5) Information on death through Letter (9) Unknown

NAME OF PERSON COMPLETING FORM (IN CAPITALS): _____

SIGNATURE: DATE: ☐☐ ☐☐ ☐☐

DD MM YY

ANNEXURE II: PROFORMA FOR PASSIVE REPORTING

1. NAME OF PARTICIPATING CENTER: _____ ☐☐☐

2. HOSPITAL REGISTRATION NUMBER:..... ☐☐☐☐☐☐

(Source of Registration)

3. FULL NAME OF PATIENT:

_____

4. AGE (in years) ☐☐

5. SEX : ☐

(1) Male (2) Female (3) Others (specify) .....

6. NAME OF FATHER: _____ NAME OF MOTHER:

_____

NAME(S) OF SON(S):

_____

7. NAME OF HUSBAND/WIFE: _____

NAME(S) OF DAUGHTER(S): _____

8. PLACE OF RESIDENCE:

Permanent Address (Permanent Place of Usual Residence)

Urban Areas (Towns/Cities) Non-urban/ Rural Areas

House No: Name of Village: _____

Road/street Name: _____

Area/locality: _____Name of Sub-Unit of District (Taluk/Tehsil/SDO/other)

_____

Ward: _____

Town/City: _____ Name of PHC/Sub Center: _____

Name of district (IN CAPITALS): _____

Postal Pin Code: _____

Duration of stay (in years) at Permanent Address: _____

Telephone No: Office: _____Res: _____

Local Address (if any, for non- resident patients) – record below as per details above

9. INFORMATION OF ABOVE ITEMS WERE PROVIDED BY: ☐

(1) Patient (2) Family Member/Relative of Patient (3) Friend of Patient

(4) Medical Records (5) Physician In-charge (6) Nurse In-charge

(7) Others (Specify) .....

10. TYPE OF MICROSCOPIC SLIDE (Tick one)

(1) Histopathology ☐ (2) Family Member ☐

(3) Friend ☐ (4) Others (specify) ☐

11. ANATOMICAL SITE OF SPECIMEN/BIOPSY/SMEAR:_____

12. COMPLETE PATHOLOGICAL DIAGNOSIS

Primary Site of Tumour – Topography: _____

(include sub-site if any)

Morphological Diagnosis: _____

13. CODING ACCORDING TO **ICD** – 0- 3

PRIMARY SITE OF TUMOUR- TOPOGRAPHY: ..... ☐☐☐☐

PRIMARY HISTOLOGY- MORPHOLOGY: ..... ☐☐☐☐

If morphology is that of metastasis, mention Primary Site above

SECONDARY SITE OF TUMOUR- (SITE OF BIOPSY/SMEAR): ..... ☐☐☐☐

MORPHOLOGY OF METASTASES: ..... ☐☐☐☐

If the morphology diagnosis is only that of metastatic site, mention the Primary Site as taken by the treating clinician either through discussion or from case record.

7. DATE OF THIS REPORT: (DD/MM/YY) ☐☐☐☐☐☐

If there is an earlier report of malignancy in the same patient, mention that date as well or attach another form.

15. NAME OF PERSON COMPLETING FORM (IN CAPITALS): _____

16. SIGNATURE: DATE: ☐☐ ☐☐ ☐☐

DD MM YY

ANNEXURE III. QUESTIONNAIRE TO KEY HOSPITALS AND LABORATORIES:

Name of Hospital:

Name of Respondent:

Designation:

1. What is the bed strength of your hospital? ☐☐☐

2. How many cancer patients do you have on an average in a month? ☐☐

3. How many of them are newly diagnosed? ☐☐

4. How many come as out- patients ☐☐

   as in-patients? ☐☐

5. What facilities are available for cancer diagnosis? _____

6. What facilities are available for cancer treatment? _____

7. What are the manpower availability for cancer diagnosis? _____

8. What are the manpower availability for cancer treatment? _____

9. Would your hospital be willing to participate as one of the reporting units in a cancer registry? ☐ (1-yes, 2-no)

10. What would be your available resources for participation in a registry? _____

ANNEXURE IV. QUESIONNAIRE ADMINISTERED TO CANCER PATIENTS:

Name of patient:

1. Would be willing to answer a few questions regarding some aspects of your health status? ☐ (1-yes, 2-no)

2. Administers the Core Proforma questions. Do you have difficulty in answering the question that I have asked you? ☐ (1-yes, 2-no)

3. Do you think the questions were too lengthy? ☐ (1-yes, 2-no)

4. Do you find any questions that are difficult to answer or that you wished had not been asked? ☐ (1-yes, 2-no)

5. Do you think the questions that were asked were intruding on your privacy? ☐ (1-yes, 2-no)

ANNEXURE V. METHODS OF CALCULATION FOR ANALYSIS:

Cancer Case: All neoplasms with a behaviour code of '3' as defined by the International Classification of Diseases- Oncology, First Edition are considered reportable and therefore registered.

Age-Group: The age groups used for estimating populations as well as grouping cancer cases is as per the WHO guidelines which is 0-4, 5-9, 10-14....75+. According to the same definition the age group 0-4 constitutes childhood cancer.

Incidence: Cancer incidence denotes new cases diagnosed in a defined population in a specified time period. For this report all cancer cases diagnosed from 1 January to 31 December of the calendar year in different geographic areas covered by the six population based cancer registries.

Rates: Rates for cancer are always expressed per 100,000 population. For childhood cancer this may be expressed as per one million.

Crude Incidence Rate (CR): This refers to the rate obtained by division of the total number of cancer cases by the corresponding estimated population (mid-year) and multiplying by 100,100.

$$CR = \frac{\text{New cases of cancer of a particular year}}{\text{Estimated population of the same year}} \times 100{,}000$$

Age Specific Rate (AspR): This refers to the rate obtained by division of the total number of cancer cases by the corresponding estimated population in that age group and sex/site/geographic area/time period and multiplying by 100,000.

$$\text{AspR} = \frac{\text{New cases of cancer of a particular year in the given age group}}{\text{Estimated population of the same year for the given age group}} \times 100{,}000$$

Age Adjusted or Age Standardised Rate (AAR): This is calculated by obtaining the age specific rates and applying these rates to the standard population in that age group.

$$\text{AAR} = \frac{(\text{AspR}) \times (\text{No. of persons in Std. World population in that 5 yr. age group})}{100{,}000}$$

Cumulative Risk: This refers to the probability that the person will develop a particular cancer during a certain age period in the absence of any other cause of death. It is obtained by adding the annual age specific incidence rates for each five year age interval, multiplied by 5 (representing the five year age interval) times 100/100,000.

$$\text{CuR} = \frac{5 \times (\text{AspR}) \times 100}{100{,}000}$$

and Cumulative Risk is expressed as **Cumulative Risk** = 100x[1-exp (-cumulative rate/100]

Truncated Age Adjusted Incidence Rate (TR): This is similar to the age adjusted rate except that it is calculated for the truncated age group 35-64 years of age.

SECTION: 3

OUTBREAK INVESTIGATIONS AND RELATED STUDIES

3.1 OUTBREAK INVESTIGATION REPORT AT SAMLUKHAI VILLAGE, JUNE 2003.

1. INTRODUCTION

I received a phone call from the Personal assistant of the Assistant Director i/c Public Health, DHS Office on the evening of 22.6.03 that two deaths due to unusual symptoms associated with fever had occurred at a village in Samlukhai, 60 km from Aizawl. I was informed to report to the office of the DHS on the first hour of 23.6.03.

A letter had been received from the president of the Village Council of the village on 20.6.03 that death of a male child, aged 5 years and a female child aged 5 years had occurred on the 16.6.03 and 18.6.03 respectively. Both the cases had sudden onset of fever with death occurring within 24 hours. An unconscious patient had also been brought to Aizawl for further medical treatment. He also reported that there were many 'ill health' in the village. Due to the seriousness of the report, as deaths had occured, a need for an epidemiological investigation was felt. A rapid response team was formed. The team members consisted of Myself and the Medical Officer, Sialsuk PHC, which is 5 km. away from the affected village.

A provisional diagnosis of the reported epidemic that was initially made was a case of severe malaria and a suspected case definition was developed – "all cases having fever, headache, rigor, with or without unconsciousness". A rapid response kit was prepared consisting of lab equipments, drugs, stationeries etc. Information about the constitution of the team equipped with the available drugs etc. and the departure for the said village was conveyed to the district headquarters. We then left for the village and arrived on 23.6.03 at 7 pm.

Objectives

- To confirm the occurrence of an epidemic and ascertain its causes
- To search for cases and treat accordingly
- To institute control measures for preventing further spread and future outbreaks.

Description of the setting

The village lies among a hilly-forested area at about 60-km from Aizawl, the capital of the state of Mizoram. It is connected by road and a 'World Bank' road construction project has been started from March 2003 around the affected area, which

passes through this village. The total population of this village is 1470 (MPW reports June, 2003) with 216 households. All the people engage in agricultural activities for their livelihood, except a few Government servants, who are working as Teachers and Health Workers. The weather in this village is cool throughout the year and at the time of the investigation of the outbreak; the monsoon rains had started heavily. The outbreak occurred during the monsoons and even at the time of the investigation, the weather was cold with heavy rainfall.

2. METHODS

Establish the existence of an outbreak:

On arrival, the two deaths that occurred were confirmed and both the deaths occurred within 24 hours of the onset of fever. The death that occurred on the 16th of June, 2pm was a case of a 5 year old male child who had fever with cough and running nose on 15.6.03 at about 11 am and was given an analgesic of half a tablet of Magadol. He was initially responding, his fever decreased and he could again play outside with his friends. But the next day just before he died, he suddenly developed high fever and within an hour he died. The second death was a 5-year-old female child who was noticed to have fever on 18.6.03 at 1pm and died at 2pm on the same day with symptoms of respiratory distress before death. The report that an unconscious patient brought to Aizawl for medical treatment was false.

Though data was not available about the occurrence of similar cases in previous years or months, it was learnt from members of the community and the Health Workers that similar cases had occurred in the previous year. Those mainly affected were adults and young adults and the affected cases were less severe and the numbers were less compared to the current situation.

Nearly all households were affected with the 'disease' , children being the most affected. It was thus established that an outbreak had occurred.

Verifying the diagnosis:

A talk was held with the Health workers and the local leaders and it was thus realized that most of the patients at the village had complaints of fever, headache, severe cough, sore throat, running nose with some abdominal symptoms like nausea, vomiting and diarrhea. They seemed to have been affected from the first week of June 2003. Two neighbouring villages, which were 5 km and 12 km away from this village, were not affected with the same disease. No laboratory tests besides the routine blood smear examination of fever cases for malaria parasite was done.

The register of the Health Workers was checked and found that all the children were immunized against BCG, Polio, DPT and measles as per the schedule. However, immunization status of the children was not fully achieved as per the UIP schedule.

Establishing a case definition

It was therefore concluded that an epidemic had occurred and a probable case definition was thus formed- all cases with fever, cough, cold, running nose, sore throat, rigor, myalgia with or without abdominal symptoms like nausea, vomiting or diarrhea, from the month June 2003 at Samlukhai village.

Identifying and counting cases

A house to house survey with the help of the Health Workers and the president of the Village council was thus made. Each were trained on the administration of the pre-prepared questionnaire which contained information about the identifying information, demographic information, information on clinical signs and symptoms and risk factor information. Cases meeting the case definition was systematically collected and recorded in a line listing form. Cases meeting the case definition but found positive for malarial parasite from peripheral smears was excluded.

Descriptive Epidemiology

The cases meeting the case definition from the line listing form was abstracted and described in terms of person, place and time characteristics.

Person

The total household attack rate was 88.4% and the case fatality rate was 0.4%. At the time of the investigation, 301 (62.8%) of the affected cases were well and had fully recovered from the symptoms. It was seen that all age groups were affected, females in age group above 14 years were more affected than males. Children ≥ 14 years of age were worst affected, which can be seen from Table I as given:

Table I: Age and sex specific attack rate of suspected outbreak, Samlukhai, June 2003.

Age	Male		Female		Total	
group	No	%	No	%	No	%
≤1	14	56	11	40.7	25	48.1
≤14	145	60.4	130	58.3	275	59.4
≤45	58	17.1	89	26.2	147	21.6
>46	17	12.1	15	11.1	32	32.1
Total	234	31.4	245	33.8	479	32.6

The secondary attack rate was 40.9%.

All cases had fever. Cough was the 2nd. most frequent complaints of those affected. Abdominal symptoms like diarrhea and vomiting were encountered only among children below 14 years of age. Myalgia was more encountered in age group above 14 years. The common signs and symptoms that were encountered can be seen from Table II as given

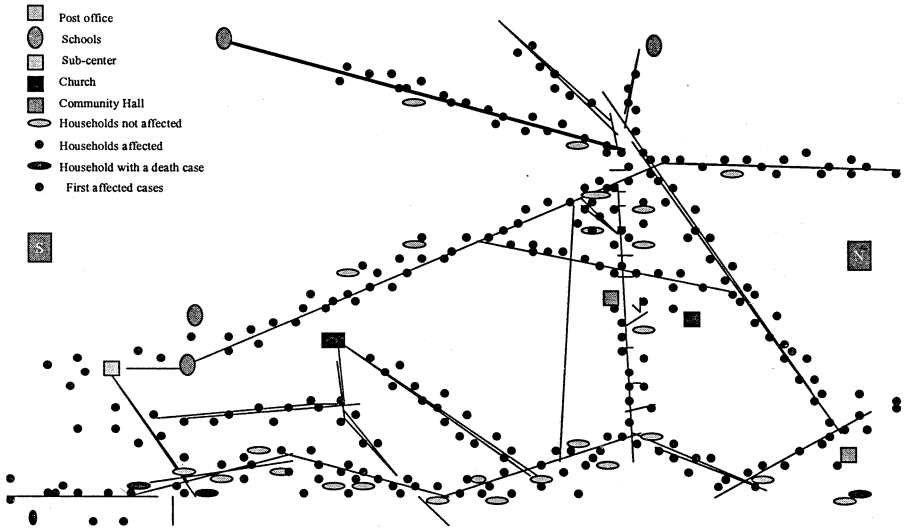
Table II. Frequency table of signs and symptoms of suspected outbreak, Samlukhai, June 2003.

Signs & symptoms	No. of cases	%
Fever	479	100
Cough	462	96.5
Cold/running nose	392	81.8
Headache	196	40.9
Sore throat	187	39
Myalgia	125	26.1
Diarrhea	67	14
Respiratory distress	33	6.9
Vomiting	31	6.5

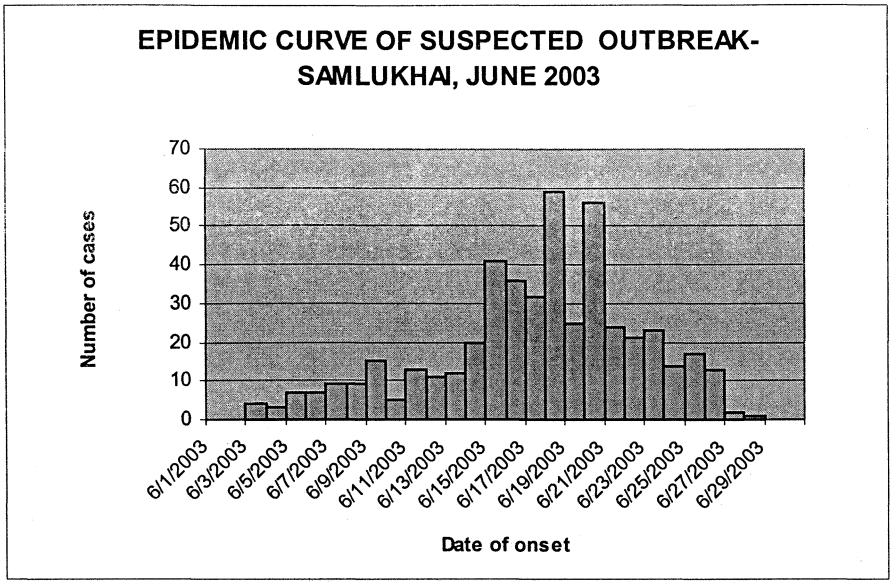
Place

The whole village was affected. It was also gathered that the initial cases were from the northern end of the village, spreading to the southern end and slowly encompassing the whole village. There were 4 cases that were initially affected and they were from different households. No clustering of cases was observed.

Spot map showing spatial distribution of a suspected outbreak- Samlukhai, June 3-29 2003



Time



From the epidemic curve it can be seen that there were multiple peaks at date 9.6.2003, 15.6.2003, with the maximum at date 18.6.2003 and another peak at date 20.6.2003. This demonstrates that the transmission of the disease was by person to person. The persons that were affected from date 19.6.2003 onwards could be suggestive of secondary attacks. The mean incubation period of the epidemic seems to be 2 days.

Developing hypothesis

Primary source of the outbreak could not be identified. The mode of transmission of the suspected outbreak was person to person, by direct contact. More women in the age group 15-45 years were affected. All ages were affected, thus their susceptibility from the infection, though the younger age groups seemed more susceptible as they were more affected.

From the household survey it was learned that many of the women affected were mothers who, perhaps, were infected from their young children that they were in close contact with. It could also perhaps explain the high number of cases among children. Firstly, it is known that children are more susceptible to respiratory infections, and secondly, affected mothers were transmitting the infection to their children that they were in close contact with.

From description of the outbreak in terms of place, person and time as well as the clinical symptoms of the affected cases, a hypothesis that this outbreak could be an Influenza like infection was developed.

Evaluating hypothesis

Analytic epidemiology to quantify relationships was not conducted, as the primary source of the outbreak nor the exposure factor could not be identified. The hypothesis of Influenza virus as the causative agent was supported by established facts about the clinical manifestation of the disease and the environmental condition of the affected area, supported by epidemiological findings of the investigation.

Executing additional studies

Blood samples were collected from 11 cases who were in the acute stage of the illness and serum separation conducted after 12 hours, under field conditions, due to the unavailability of a centrifuge etc. Throat secretion samples or nasopharyngeal aspirates were not collected due to the unavailability of a suitable transport medium. Clotted blood samples were not collected which was a lapse on the part of the investigator and is truly regretted. Though these serum samples were sent to the National Institute of Virology, Pune, and the preliminary results were suggestive of Influenza virus, full confirmation of the cause of this outbreak could not be done, as a final diagnosis cannot be made due to constraints faced in the collection of a second convalescence sera.

Implementing control measures

The suspected cause of the outbreak was hypothesized as Influenza virus, which is spread from person to person by direct contact. A health talk was held with the local leaders and the Health Workers for the need of home quarantine of cases, with minimization of movement of the general public until the outbreak was under control. Cases were treated accordingly. Basic personal hygiene was stressed. Danger of unprotected coughs/sneezes and hand to mucous membrane transmission was stressed. They were advised about healthy food habits for improvement of overall health.

Control measures were instituted on the 24th June, 2003. Continued surveillance of the population, as well as the surrounding villages was continued. The outbreak could be brought under control from the 28th of June 2003, as was intimated by the Medical Officer Sialsuk, though surveillance was continued. No additional cases were reported.

Communication of the findings

The findings of the investigation were communicated to the local leaders and the Health Workers of the Village. Advice was given about the need for strict adherence to

initiated control measures until the outbreak was fully under control. Suggestions for future references were also discussed.

A written preliminary report of the outbreak investigations was submitted to the Director, Health Services, Mizoram, with a copy to the Chief Medical Officer of the concerned district and to the Assistant Director i/c Public Health at the Office Directorate of Health Services.

Lessons learnt

1. Constraints that were faced while conducting the outbreak investigations were that the investigating team consisted of only the Principal Investigator and a Medical Officer. In light of the constraints faced as a consequence of the huge number of affected cases, a rapid response team for investigations of such public health emergencies be strengthened in terms of personnel. A Microbiologist or at the least, a Laboratory Technician should be in the team, so that the triple responsibilities of conducting the investigations, treating cases and handling the laboratory aspects of the investigation be more efficiently undertaken.
2. Due to lack of a suitable transport media, naso-pharyngeal aspirates or throat secretion specimens could not be collected. Laboratory capacity of the district hospitals in terms of acquisition of equipment is to be strengthened in order to meet the challenges of the changing scenario.
3. Whole blood samples for virus isolation was not collected which was a lapse on the part of the investigator, which is fully expected to be rectified in future. For tangible improvements in specimen collection, the Government should undertake overall re-orientation of Medical Officers or Personnel investigating such events.
4. Household enumeration of all population (which could have been conducted) was not done, even though household survey for cases was conducted. As a result, denominator data that was available from the Health Workers were used with the resultant age group classification that has not given a clear picture on the attack rates, in particular children below 5 years age group.

3.2 PREVALENCE OF DIABETES IN URBAN AIZAWL: A PILOT STUDY

1. INTRODUCTION

Diabetes mellitus (predominantly type 2 diabetes) is a major and growing health problem in most countries. It is an important cause of prolonged ill health and early death. There was an estimated 30 million people world wide in 1985. The prevalence of diabetes in adults aged 20 years and over was estimated to be 135 million in 1995, rising to 300 million by the year 2025. About 75% of these people will live in developing countries. In many countries, even in developed countries, there are a large number of undiagnosed and improperly controlled patients with diabetes. People with diabetes are prone to both short-term and long-term complications, which will be a tremendous increasing burden for health care systems.

Because of its chronic nature, the severity of its complications and the means required to control them, diabetes is a costly disease, not only for the affected individuals and his/her family, but for the health authorities.

Diabetes has become a major health care problem in India too. The WHO estimates that in 1995 there were 19.4 million persons with Diabetes in India and that this number is likely to be 57.2 in 2025. The Indian Council of Medical Research conducted the first authentic research based on the prevalence of Diabetes in India in the early seventies. According to this study, the prevalence of Diabetes was 2.3 % in the urban and 1.5% in the rural areas. Since then the prevalence of diabetes and impaired glucose tolerance in India has increased to 12.2% and 14% respectively in 2001 in the urban adult population. Studies in India estimates that for low-income Indian family with an adult with diabetes, as much as 25% of family income may be devoted to diabetes care. So the burden due to diabetes is high.

Rationale for the study

Mizoram is the southern most state in the North-eastern region of India, Myanmar in the east and south and Bangladesh in the west. Mizoram is a small state, 21,087 Sq.Km. only in area with a population of 891058 only as per the 2001 Census report. Aizawl is the state capital of Mizoram with a population of 229714. The tribal population constitutes more than 95% of the state population.

In Mizoram, as in other parts of India, the number of diabetic patients seems to increasing for the past few years and diabetes is emerging as a major health care problem. But reliable data is lacking in this regard. The Mizos, the inhabitants of Mizoram are a hilly people and till recently, diabetes was not a common disease. However, there has been increasing dialogue about the rapid rise in the number of diabetic patients. While reports regarding the prevalence of diabetes are available from the southern, the northern parts of India and neighbouring Assam state, there is no proper data in this regard in Mizoram.

So, conducting a study in order to obtain proper and reliable data on the prevalence of diabetes in Mizoram is urgently needed. This study will be the first of its kind to be conducted in Mizoram and will serve as a reliable record for which future references and further studies can be based upon. It will also enable the Government and other agencies to take necessary public health actions.

Objectives

1. To determine the prevalence of Diabetes and Impaired glucose tolerance in the urban adult population of Thakthing Village Council area, Aizawl, Mizoram, among the ethnic Mizo group.
2. To measure the association of the various known risk factors to diabetes

2. METHODS

Study design

Cross sectional community based study was adopted, with a house to house approach. The study was conducted during the months of May and June 2003.

Study area

For administrative purposes, Aizawl city is divided into different Village Council areas. Thakthing Village Council area lies along the Main road of Aizawl city, the capital of Mizoram and these areas are the more urbanized areas in Aizawl and their socio-economic status and lifestyles are observed to be more or less homogeneous. It is also a small compact area and was expected to be operationally convenient. Therefore, the purposive selection of the area

Study population

There were 498 persons, 20 years of age and above, living in the study area. All consenting persons above the age criteria were included in to the study.

Data collection

A structured questionnsaire (enclosed in Appendix I) in the local language was used in the selected area for data collection. The investigators used standardized procedures for administering the questionnaires and eliciting information. A workshop was held where intensive training programme of the Field Investigators was undertaken. The exact method of administering the questionnaire was practiced. Pilot studying of the procedures for verification of feasibility and efficiency in following the protocol was undertaken.

Field procedures

The Investigators first informed the local leaders about the aims, objectives and study procedures, for their information and enhancement of their co-operation. The investigators along with the support of the local leaders then conducted a house to house survey of the families in the study area, and basic demographic particulars was sought.

The field investigators/ Research Officers systematically went to every households. Identified households were visited the previous day by the local leaders, the purpose and procedures were explained to them in detail and in particular the need for an overnight fast. The households approached the previous day were taken up for data collection the next day, and once the subjects were comfortable and written consent obtained, field investigations was proceeded. Households or members who were not available were re-approached and given opportunities to participate in the study according to dates and time of their convenience. If some reservations continued, they were labelled non-respondent though basic information were sought.

The variables that were used for data collection were as per the questionnaires, attached in Appendix I. The questionnaires was divided into 8 sections and they are

1. Demographic information
2. Socio-economic status
3. Smoking/ Tobacco use
4. Alcohol use
5. Nutrition/ dietary information
6. Physical activity
7. Physical measurements
8. Biochemical measurements

Blood pressure measurements were taken after administration of the questionnaire. Hypertension was defined as BP140/9 mmHg. Biochemical measurements (fasting glucose) were taken after ascertainment of fasting hours $\geq$8 hours. A drop of

blood with lancet was taken from the 4 th finger of the participants and blood sugar measured using glucometer (Johnson & Johnson pvt). All measurements were taken in the morning between 6 am and 10 am.

Every 10th sample of blood was sent for quality check at the quality control center in a reference laboratory, which adopted regular quality control measures. The readings at the quality control center and the readings at the field not differ by more than 5. The Investigator reviewed every questionnaire for verification and accuracy of the information filled in.

All data were pre-coded and entered in a password operated computer,(after the team co-ordination and members had rechecked all records for consistency and completeness). Data entry and analyses was done using Epi info 6.04d .

Univariate analyses was done to study the association of variables with diabetes.

Ethical considerations

The study subjects were included in the study after obtaining their written consent in the presence of a witness , after full explanation of the study procedures. The use of personal information is limited to the purpose for which it was collected, except with the consent of the person.

Full confidentiality of the subjects was maintained.. No names or addresses were kept with the analyzing data set- these are stored separately. No further contact of the subjects or their information released is planned except with the subjects consent. Only aggregated and anonymised data are reported and release of any individual identified information is not done except with the subjects consent.

No monetary incentives or other inducement tactics were practiced.

3. RESULTS

Overall, there were 386 participants. 56 persons did not participated because of unavailability during the study. There were 158 (40.9%) men and 228 (59.1%). Some of the general characteristics of the study population are given in Table I:

Table I. Age and sex distribution of the study participants, Aizawl 2003:

Age group	Men		Women		Total
(years)	n	%	n	%	
20-29	36	31.9	77	68.1	113
30-39	38	41.8	53	58.2	91
40-49	35	49.3	36	50.7	71
50-59	21	42.9	28	57.1	49
60-69	16	48.5	17	51.5	33
≥70	12	41.4	17	58.6	29
Total	**158**	**40.9**	**228**	**59.1**	**386**

More women participated in the study as compared to men. But there was no over presentation of sexes in the study.

Table II. Base line characteristics of the study participants, Aizawl 2003:

Variables	Diabetes			Non Diabetes		
	M	F	P	M	F	P
Age	58.6	55.4	0.4	42.9	39.7	0.1
	(15.2)	(10.7)		(15.8)	(16.4)	
BMI	23.2	25.2	0.1	23.2	22.7	0.2
	(3.6)	(3.5)		(4.1)	(3.3)	

*figures in parentheses indicate standard deviation

The overall mean age in years was 42.9 (15.7) and 40.2 (16.1) for men and women respectively. The difference in mean age among sexes was not significant ($p=0.09$). There was no significant difference in the mean age of the study participants between sexes. The mean BMI between sexes among diabetes were not significant. The mean BMI in diabetes was significantly more than in non-diabetes ($p<0.01$). Overall, there were 29.4% overweight participants in the study population. There were more overweight men (34.2%) then women (26.8%). And 180 (46.6%) of the study participants reported to current smoking, 93 (24.1%) reported to current alcohol consumption and 267 (69.2%) to current use of tobacco in any form.

Prevalence of diabetes

Diabetes was defined as fasting glucose ≥110 mg/dl. The overall prevalence of diabetes in the study population was 10.4%. Increasing age was correlated with diabetes ($\chi 2$ for trend=42.02;p=<0.01) but sex was not associated with diabetes ($\chi 2$=0.52;p=0.47). There were 26 known cases of diabetes in the study population and 14 (35%) were newly detected. No diabetes was seen among participants >30 years age group. Overall, men were affected more -19 (12%) as compared to women- 21 (9.2%)

Table IV. Age and sex specific prevalence of diabetes, Aizawl 2003:

Age group (years)	Men (n=158)	Women (n=228)	Total
20-29	0	0	0
30-39	2 (5.3%)	1 (1.9)	3 (3.3%)
40-49	3 (8.6%)	7 (19.4%)	10 (14.1%)
50-59	4 (19.0%)	5 (17.9%)	9 (18.4%)
60-69	5 (41.7%)	6 (35.3%)	11 (33.3%)
≥70	5 (41.7%)	2 (11.8%)	7 (24.1%)
Total	**19 (12.0%)**	**21 (9.2%)**	**40 (10.4%)**

*figures in parenthesis indicate percentages

Diabetes correlates with other selected variables

The correlation of diabetes with selected variables such as smokeless tobacco, alcohol, education, occupation, marital status, basal metabolic index (BMI), physical activity and nutritional profile based on the number of consumption of non- vegetarian food stuffs showed no positive correlation with either diabetes mellitus. Univariate analysis of positive correlation with diabetes are given in Table V:

Table V. Univariate analysis of positive correlation of selected variables with diabetes, Aizawl, 2003:

Variables	n	%	OR*	95%CI	p
Hypertension	13	27.1	3.16	1.02-9.68	0.03
Smoking (current)	28	15.6	2.98	1.39-6.48	<0.01
Family history	22	16.7	2.62	1.28-5.39	<0.01

*Odds Ratio

WHR was positively correlated with diabetes in men with an OR=4.7 (95%CI=1.34-17.8; p=0.01) and in women, an OR of 3.68 (95%CI=1.18-11.93; p=0.02).

4. DISCUSSIONS

To our knowledge, this is the first population based study that is conducted in Aizaw and the overall response and cooperation was good. The overall prevalence of diabetes is high, though lower when compared with other urban cities in India. The prevalence was more in men (12%) then in women (9.2%) and a positive correlation with age was seen in both sexes, reaching its peak (41.7% in men) in the >70 years age group, whereas among women, the peak prevalence of 35.3% occurred in the age group 60-69 years.

The association of diabetes with variables such as education, occupation, non-vegetarian food items, alcohol, smokeless tobacco and marital status were not significant. The association with BMI and physical activity that is correlated in other studies was not found in this study. Furthermore, the association of diabetes with affluence or higher socio-economic status was not correlated in this study. However, a positive association of hypertension, smoking, family history and WHR was found in this study.

Limitations

Some of the acknowledged limitations of the study are:

It was only a pilot study, therefore the sample size was perhaps inadequate. The study populations were purposively selected from one ward, thereby limiting the external validity of the study and the findings cannot be generalized to the urban population of Mizoram. Statistically significant associations for variables were limited. Another reason for non significant association is that the study population were from one compact area, with similar back ground and lifestyles. The inherent limitation of the study design that was adopted does not permit to causally interpret the associations. Blood pressure that was measured to was conducted with only one standard sized cuff. BP was also measured on one occasion only. This may perhaps lead to an overestimation of the number of hypertensives. Another factor that has to be considered is the definition of hypertension that was used. Only uncontrolled hypertension (140/90 mmHg) for known cases, as well as the same criteria of 140/90 mmHg for those newly detected was used to define hypertension in the study. This may perhaps had led to underestimation of the true association between hypertension and diabetes. However, the association of diabetes with hypertension in this study was significant (p=0.04) and only after stratification for sex, the association was not significant in men.

Recommendations

In light of the high prevalence of diabetes in this study, a large scale epidemiological study that is representative of the people of Mizoram needs to be conducted. This has strong public health implications. And with knowledge gained of the costs of treating diabetes, the complications and the preventive measures available, needed public health actions can then be initiated.

The correlation of risk factor(s) with development of diabetes is never 100%. However, the greater the number of risk factors present in an individual, the greater the chance of that individual developing or having diabetes. Conversely, the chance of an asymptomatic individual without any risk factors having or developing diabetes is relatively low. Considering the high prevalence of risk factors of diabetes in this study such as smoking (46.6%), alcohol consumption (24.1%), smokeless tobacco (69.2%), obesity (BMI) [29.4%], hypertension (12.4%) and family history (34.2%), health education and motivation of the community towards risk factors of diabetes has to be initiated. And since diabetes is frequently not diagnosed until complications appear, and approximately one third of all people with diabetes may be undiagnosed [16], the community has to be educated towards the benefit of early screening for diabetes as the prevalence of family history for diabetes is high in this community (34.2%).

SECTION: 4

CRITICAL REVIEWS OF

SCIENTIFIC LITERATURE

JOURNAL CRITIQUING

Critical review of medical literature

4.1 Effectiveness of the direct observation component of DOTS for tuberculosis: a randomised controlled trial in Pakistan.

4.2 Work stress and risk of cardiovascular mortality: prospective cohort study of industrial employees.

4.3 Randomised controlled trial of aminosidine (paromomycin) *v* sodium stibogluconate for treating visceral leishmaniasis in North Bihar, India.

Introduction

In the context of researchers not operating in an ideal world, control of all potential sources of contamination, confounding or bias is not possible. In spite of peer review and review of published articles in medical journals by the Editors, it is important to maintain a clear and realistic view of the constraints that may impact the researchers' ability to plan and conduct an investigation. There fore it is important to acquire necessary knowledge to critically review articles on their own.

Objectives

To critically review the paper

4.1 Effectiveness of the direct observation component of DOTS for tuberculosis: a randomised controlled trial in Pakistan

Abstract

DOTS is the control strategy for tuberculosis promoted by WHO. This randomised control trial was conducted to assess the effectiveness of different types of direct observation of treatment, under operational conditions that is appropriate for local conditions in Pakistan.

497 new sputum positive tuberculosis were enrolled- 170 assigned DOTS by health workers, 165 assigned DOTS by family members and 162 were assigned self administered treatment. The main outcome measures were cure and cure or treatment completion. Analysis was by intention to treat.

Within the strengthened Tuberculosis services, the cure rates for the health worker DOTS, family member DOTS and self administered treatment were 64%, 55% and 62% respectively and the cure or treatment completion rates were 67%, 62% and 65% respectively, demonstrating that non of the three strategies tested was superior to others.

The results of the strategies tested was not significant though the sample size was adequate, and more or less equal number of cases were assigned for each of the strategies tested.

The study is important and worth knowing about as DOTS strategy has been adopted by WHO in a campaign against TB. It is claimed to be the most effective strategy for TB control. It has been implemented in India and therefore would be most helpful to know the most effective component of direct observation of treatment.

Introduction

Tuberculosis remains the commonest cause of death in adults in developing countries. Patient's compliance with treatment is commonly poor and non-completion of a course can lead to relapse, possible with drug resistant bacilli. WHO advocates the DOTS strategy with operational components like diagnosis and follow- up through sputum microscopy, use of standardised short course drug regimens, regular uninterrupted supply of drugs, accurate cohort recording and analysis, and direct observation of treatment by people responsible to the health services.

The direct observation of treatment component is intended to address patient's non-compliance. However there is some doubt as to whether direct observation of treatment is essential or indeed effective in reducing patients compliance as it imposes burdens on patients and health services through prolonged admissions or frequent attendance at clinics. These burdens can be defended if direct observation of treatment improves cure rates and is not a barrier to care-seeking, though there is little evidence to suggest that his is the case. While there is currently little evidence to suggest that this is the case, published results from the only 2 Randomised controlled trial of direct observation of treatment documents opposite outcomes in terms of its effectiveness. Therefore this study was undertaken in Pakistan where DOTS has been adopted as a policy although the specifics have not yet been addressed.

The literatures reviewed in the paper establishes a clear need for the study as the DOTS strategy is promoted by WHO for control of TB. Current data points towards poor patient compliance with treatment and non-completion of course can lead to relapse, possible with drug-resistant bacilli and multi drug resistance is an increasing problem. Studies in Thailand documents that DOTS gives significantly higher cure rates than self-administered treatment, but the DOTS included home visits by the Health workers, a strategy that is not feasible in most developing countries.

Within the strengthened TB treatment, this study aims to assess the most feasible type of directly observed treatment that will be appropriate for their local situations.

The research question is stated clearly. The hypothesis is stated clearly and developed from sound clinical observation. Indeed the study is needed as doubts to the usefulness/ effectiveness of direct observation of treatment in reducing non-compliance of the patients present. The study is also needed in the context of financial constraints with stigmatization of TB patients particularly in third world countries and these factors can impede DOTS strategy. So to optimize the DOTS strategy in the midst of all its doubts and its constraints, this study is needed.

Methods

3 diagnostic centers were selected mainly for convenience but were regarded as typical of tuberculosis treatment centers in Pakistan. All sites served a mix of urban and rural patients, were aged 15 years or older and the patients were enrolled from September 1996 to June 1998, after meeting the eligibility criteria which was given, though not in detail.

Three strategies were adopted which were which was previously assessed with as exploratory qualitative study based on observations and interviews of patients and accompanying relatives and found to be locally acceptable. The three strategies adopted were the self- administered treatment, health worker direct observation of treatment and family member direct observation of treatment. All the patients were randomized to the three strategies and all the three groups received the same case management approved by WHO and the National Tuberculosis Programme including uninterrupted supply of free drugs. The definitions of sure, treatment completion and treatment failure was given and followed standard WHO definitions. Outcome assessment was laboratory examination of sputum by technicians unaware of treatment allocation, The doctor, health educator, laboratory technicians and other regular staff providing health education, monitoring the clinical aspects of case, side effects, and sputum conversion followed the same procedures and were unaware of the trial group.

The study design is a randomised controlled trial and is appropriate for this study as it aims to find the most effective component of DOTS. The sampling methods are clearly described. The study participants were all new sputum (+) Pulmonary TB, above 15 years old, with no history of previous treatment for TB and who also lived in the trial area. The study subjects were randomly assigned to the three study strategy of direct observation of treatment. The sampling methods was not explained in detail and the

number of subjects assigned to the three study groups were not same-170, 165 and 162 for health worker DOTS, family member DOTS and self- administered groups respectively.

Study participants gave informed consent and no inducements were offered. No eligible patients refused to participate. Eligibility criteria were described well. The subjects were representative of the study population. Relevant baseline characteristics of the study subjects in terms of age, gender, rural/urban were described. Their education status, disease or health status at diagnosis were not made. Description of the methods/instruments used for data collection was a short questionnaire on demographic characteristics which was not elaborated on. The operational variables of outcome assessment and the different treatment protocol was provided and is satisfactory. Outcome assessment was laboratory examination of sputum and the measures used were cure and cure plus treatment completion. A cure patient was confirmed sputum negative at 7 or 8 months and on at least one previous occasion and having completed treatment but smear results were not available on at least two occasions before completion of treatment. Treatment failure indicated patients who remained smear (+) at 5 months or later during treatment.

The study is appropriate given the objectives of the study which is for assessing the effectiveness of different packages for TB treatment for the adoption and implementation of DOTS as a policy.

The staffs like the doctor, health educator. Lab. Technician, other regular staff of diagnostic centre providing health education and monitoring the clinical aspects of case, side effects and sputum conversion were all unaware of the trial group of the patients.

Statistical analyses were described fully and a chi square test was used for comparison of outcomes between each direct observation of treatment group and self-administered treatment. An explanatory logistic regression model to control for multiple factors was used. The analyses were appropriate given the study design and hypothesis. Statistical significance/ non-significance was well defined. Confounding variables were not mentioned in the paper.

Results

The main result was that the 3 strategies gave similar outcomes and that none of the strategies was superior to others.

Results of the study relate to the objectives and hypothesis and summary data like mean, SD are not presented. Only statistical test results/ findings and CI derived from the study were mentioned. No presentation of data by graphs or charts were made but only

presented by tables and was appropriately presented. P values were presented and CI constructed where appropriate and calculated values of tests statistics reported. Similarity on groups on baseline characteristics in terms of gender, age, rural or urban population were made. Characteristics of their baseline in terms of educational status in terms of educational status, disease status and the general health status of the subjects prior to the study were not made nor analyzed.

Are the results likely to be affected by bias?

Measurement bias and data quality of the outcome measures were controlled by following the same standardized procedures for all patients. The eligibility criteria states that only newly diagnosed sputum positive patients with no previous treatment history were enrolled. As all the sputum positive cases were not included in the study, selection bias can occur.

The distribution of the enrolled patients to the three strategies was randomly assigned. The enrollment officer had no role in care provision. Outcome assessment was by laboratory examination of sputum, conducted by technicians unaware of treatment allocation. The doctor, health educator, laboratory technicians and other regular staff of the diagnostic center providing health education, monitoring the clinical aspects of care, side effects, sputum conversion followed the same procedure for all the patients and were unaware of the trial group of the patients. Therefore the results being affected by bias is minor.

Are the results likely to be affected by confounding?

Patients demographic characteristics, rural/ urban residence were similar across the three strategies tested .No data is available about their educational status, general physical and health condition of the patients and whether the cases were newly diagnosed cases or in advance condition of the disease. The eligibility criteria stated that only newly diagnosed cases of sputum positive pulmonary tuberculosis of adults aged 15 years or older were recruited. The newly diagnosed sputum positive cases may vary in terms of being newly infected or in advanced stage and these factors could confound the results of this study. The other supportive treatments given or not given were not mentioned and these could vary between patients, thereby affecting the results.

These factors can influence the outcome of any disease and in this study too, the outcome of the cure from tuberculosis and the treatment completion rates.

Are the results affected by chance variation?

The outcome measure assessed was cure or cure and treatment completion. Cure was measured by specific criteria based on laboratory examination. The analysis was by intention to treat. The overall cure rates were 64%, 55% and 62% respectively for those assigned the health worker DOTS, family member DOTS and self administered treatment which was more or less equal. The overall cure or treatment completed was 67% (60-74) compared with 41% (36-46) before strengthening.

In the results section, it states that 27 patients assigned to the health worker DOTS and 3 patients assigned to the family member DOTS changed treatment. But in spite of these factors regarded as defaulted, the overall treatment outcome among the enrolled patients for the health worker DOTS strategy was 87(51%) were cured, 3(2%) completed treatment, 6(4%) died, 1 was treatment failure, 69(41%) defaulted and 4(2%) were transferred out. Of those on the family member DOTS strategy, 90(55%0 were cured, 12(7%) completed treatment, 7(4%) died, none were treatment failures, 54(33%) defaulted and 2(1%) transferred out. Of those on the self -administered treatment 100(62%) were cured, 5(3%) completed treatment, 3(2%) died, none were treatment failures, 53(33%) defaulted and 1(1%) was transferred out.

There was improved overall cure rate and these results which are statistically significant could not have been affected by chance.

Internal validity:

Is there a correct time relationship?

This is a randomised controlled trial where cases are enrolled and cure or treatment completion was the outcome measure. Tuberculosis patients were treated with 2 months of isoniazid, rifampicin, pyrazinamide, and ethambutol followed by 6 months of isoniazid and ethambutol supplied as loose pills. The cure or treatment completion could have occurred only after the drugs were taken for a period of 8 months, thereby establishing a correct time relationship with the treatment.

Is the relationship strong?

The relationship is strong as cure and cure/ treatment completion was better than before strengthened of services.

Is there a dose response relationship?

The cases were all given the same treatment, the same dose of anti- tuberculer drugs. So the dose response relationship is not established as data presented gave similar defaulter and cure percentage.

Are the results consistent within the study?

The results were similar for the three strategies that was assessed and in spite of the patients who changed treatment analysed as defaulted, the results still gave similar results.

Is there any specificity within the study?

Specificity in this study is difficult to establish as other factors like diet etc. are also important factors for cure besides the drugs given to bring about cure.

Conclusions in regard to internal validity of this study as given in the results states that there was no significant difference between cure rates for self administered treatment or for the health worker DOTS or the family member DOTS strategy. This persists even after the 30 patients who changed treatment were not included in the analysis, validating the consistency within the study. The odds ratios of the diagnostic center and the trial group were adjusted for demographic factors (age and sex) and no factor other than sex had an odds ratio significantly different from 1. The overall cure rates and cure or treatment completion rate were significantly higher for women (21% difference [95CI 13-30], $p<0.0001$) and (9% difference [95%CI 10-27, $p<0.0001$) respectively. The cure rates and cure or treatment completion were consistently higher for women than men in each diagnostic centers, the differences being 25%, 20%, 18% and 18%, 20%, 17% for the Rawalpindi, Gujranwala and Schiwal centers respectively.

External validity:

Can the study results be applied to the eligible population?

497 patients were enrolled in this study and no eligible patients refused to participate. The number of patients enrolled at the three participating centers were more or less the same, at 165, 155 and 177 respectively at the Rawalpindi, Gujranwala and Schiwal centers. The study patients were randomised to the 3 treatment groups and the numbers enrolled in the health worker DOTS, family member DOTS and self administered groups were 170, 165 and 162 respectively and these same number of patients were analysed as it was based on intention to treat. Therefore the results can be applied to the eligible population.

Can the results be applied to the source population?

As stated in the methods section, the sited selected were regarded as typical of a tuberculosis treatment center in Pakistan. The study center represented a mix of urban

and rural patients. Question, however arises about the use of other private institutions by the local populace and this data is not given in the paper and therefore generalizing the results to the source population should be done with caution.

Can the results be applied to other relevant populations?

The objective of this study is to assess the effectiveness of the different packages of DOTS strategy for treating tuberculosis in Pakistan. The study sites selected were regarded as typical of any tuberculosis treatment center in Pakistan and the sites represented both a mix of rural and urban population. Both sexes were equally represented in the study (M=51%, F=49%). This study was conducted in Pakistan under operational conditions with no more inputs that were expected in the (as yet not implemented) National Tuberculosis Programme plan in Pakistan.

No data is not available about the educational qualifications, socio-economic status nor the general physical and health conditions of the participating patients. Therefore generalizing the results to other relevant populations is debatable and will need to explore these issues.

Are the results consistent with other evidence, particularly evidence from studies similar or more powerful study design?

As stated in the discussion section, WHO DOTS strategy for strengthened control of tuberculosis has been shown to he effective. In the introduction section, it states that results from the only 2 randomised controlled trial of direct observation of treatment published to date paint a confusing picture, one study was shown to give significantly higher cure rates than self- administered treatment and the other study showing no additional benefit. Within the strengthened tuberculosis services, the overall cure rate that is resultant from this study were higher. But generalising the result in terms of consistency with other studies is not conclusive.

Does the total evidence suggest any specificity?

Specificity of the results to the strengthened services with DOTS has been established with increased cure rates in this study. However, suggesting the improved cure rates to the direct observation component is controversial from this study and further operational research at local levels is needed.

Are the results plausible in terms of a biological mechanism?

The results are plausible in terms of biological mechanism as an uninterrupted supply of free drugs in the DOTS strategy is a very important factor for achieving improved cure provided, the uninterrupted supply of free drugs is properly utilized by the patients which

can be channelized through various direct observation of treatment strategies which is being assessed in this study.

If a major effect is shown, is it coherent with the distribution of the diseases and the outcome?

The outcome of DOTS strategy is in line with other evidence, although the relation between observation treatment component and enhanced cure rate is controversial.

Conclusions

The research questions posed in the study were adequately addressed in the discussion and the conclusions drawn were justified from the data in the results section. The findings have been extended to the appropriate population. Findings of relatively high proportion of patients unable to comply with Health Worker DOTS has been generalised for the whole of Pakistan, stating the unsuitability of the approach. For generalization to other settings, further research has been recommended.

Competing or alternative explanations for the findings have been made and suggested that it was done in a field situation typical of a south Asian country and not done as a demonstrative study or in an area for demonstration. Short comings and limitations of the study were addressed i.e. the study settings were typical field conditions of a typical south Asian country and constructive suggestions for further research given. Characters of the study subjects in the three groups were not same in all aspects.

Our understanding of the problem has been enhanced by the study. Direct observation of treatment for TB control, though the present strategy adopted by WHO, is not the all important and magical factor for control of TB. Various aspects like strengthened services, financial conditions of the patients, proper health education, decentralization of services to name a few are equally important.

Assessed on its own, this study has shown that enhanced strategy of WHO DOTS for control of Tuberculosis improves cure rate and cure/treatment completion rates. Since DOTS however gives particular emphasis to direct observation of treatment, the effectiveness of which remains unclear, further operation research with control of other potential confounding factors is needed.

4.2 Work stress and risk of cardiovascular mortality: prospective cohort study of industrial employees

Abstract

The association between work stress according to the job strain model and the effort-reward imbalance model and the risk of death from cardiovascular disease was examined in this prospective cohort study and follow up at 5 years and 10 years were undertaken by measuring biological risks. There were 812 employees of a metal industry in Finland (545 men, 267 women) who were free from cardiovascular disease at baseline. Outcome measure was cardiovascular mortality, from the year 1973-2001 from the National mortality register. After adjustment for age and sex, employees with high job strain, a combination of high demands at work and low job control had a 2.2 (95%CI 1.2-4.2) fold cardiovascular mortality risk compared with their colleagues with low job strain. The corresponding risk ratio for employees with effort reward imbalance (low salary, lack of social approval and few career opportunities relative to efforts required at work) was 2.4 (95%CI 1.3-4.4). High job strain and effort- reward imbalance seem to increase the risk of cardiovascular mortality.

The study is important and worth knowing, as non-communicable diseases are increasing and are becoming a major public health problem. Knowing about the association between work stress and risk of cardiovascular mortality is important as the trend of industrialization is increasing even in a India. The results are statistically significant and current medical knowledge also associates work stress and cardiovascular mortality.

Introduction

While concern for adverse effects of work stress on health is increasing, two models identifying stressful components of psychosocial work environment have received attention: the job strain model and the effort reward imbalance.

The job strain model points that a combination of high work demands and low job control at work is a health risk for employees. Few studies conducted, partly support this association with cardiovascular mortality. While other studies have linked cardiovascular mortality to a combination of high demands, low income and low resources, to low control only and to neither job control, work demands nor their interaction.

Direct evidence of cardiovascular mortality has been lacking with the effort reward imbalance model, while its association with the incidence of coronary heart disease, precursors of cardiovascular disease such as hypertension, high concentrations of low density lipo protein cholesterol, low vagal tone and impaired fibrinolytic capacity is available. This study there fore aims to test the extent to which work stress models can explain deaths from cardiovascular disease so that it may offer promising opportunities for theory based intervention. The literature review establishes a clear need for the study.

Direct evidence of cardiovascular mortality with the dual job strain model and the effort- reward imbalance has not been done. This study differs from previous studies as it aims to find the relationship with the two models. The problem and the purpose are stated clearly and the hypothesis developed from practical clinical observation. The hypothesis is plausible. Therefore the need for the study.

Methods

The study design is a prospective cohort study from the staffs of the Valmet factory in central Finland. The target population are industrial employees and the study populations are people who had been employed in the factory for at least 15 months in January 1973. Systematic sample of 902 participants in strata by sex, age, and occupational group were selected. The work tasks in this factory varied from foundry work, heavy/ precision engineering and clerical/ administrative work. After exclusion of people with cardiovascular disease at baseline, the study cohort comprised 812 employees. The sampling methods were clearly described. Inducements were not offered, participants who refused were not included. Their informed consent was taken for those enrolled. Data was gathered by interviews using questionnaires and clinical examination. Follow up examinations included measurement of blood pressure, cholesterol concentration and body mass index in 1978 (n=674) and in 1983 (n=594).

The exposure in this study that was assessed was work stress according to the job strain model and the effort reward imbalance model and the risk of death from cardiovascular disease. The adverse effects of work stress on health, particularly cardiovascular disease have been highlighted in the Introduction. However, the two models that is to be assessed simultaneously in this study which have not been tested previously. The outcome was due to cardiovascular disease which was obtained from Statistics Finland that coded according to the international classification of diseases. The study design is a prospective cohort study.

The eligibility criteria was detailed and excluded employees who worked for less than 15 months at the factory. It did not consider whether these employees were previously working in similar environment and occupational group. So selection bias can occur but the overall inclusion and exclusion criteria were satisfactory.

No control group was included. Sample size was adequate and represents the target population (17%). The methods/ instruments used for data collection was adequately described and they were questionnaires, interviews and clinical examinations and mortality data from the Statistics Finland National Mortality Register using the participants' personal identification codes. Dates and cause of death for all participants, from the date of their clinical examination and 1st. November 2000 were taken. Information to indicate death due to cardiovascular disease based on the basic cause of death was collected.

Operational definitions of the variables used for data collection were not adequately provided as it was said that the data sources for this study were appropriate. The use of standardized methods for follow up and collection of data was not specifically stated. So methods for ensuring data quality has not been adequately mentioned. Definitions of the terms given, measurement procedures and diagnostic criteria were appropriate.

The statistically analyses were described and was understandable and appropriate given the study design, objectives and hypothesis. Definition of statistical significance was not defined. Comparisons in analyses if different groups does not involve the same number of individuals. Multiple independent comparisons were done and adjustments made to the level of significance taking into account the total number, were done.

Results

There was an observed association between job strain and effort reward imbalance. Employees with high strain reported high effort reward imbalance more often than employees with intermediate or low job strain.

The results presented directly relate to the research objectives and hypothesis. Summary data in terms of percentages, risk ratio, mean (SE), confidence interval and level of significance (P value) were given. No charts or graphs were made, only tables presented. Calculated value of test statistics were reported. Similarity of groups on baseline characteristics like sex, age, occupational group, smoking status, physical activity, BP, cholesterol, BMI and work characteristics were made.

Potential source of bias in the analysis in terms of presence of other risk factor for cardiovascular mortality like diabetes were taken into account. Analyses were done on similar baseline characteristics.

Internal validity

Are the results likely to be affected by bias?

Not all the workers were selected for the study and the occurrence of selection bias remains a theoretical possibility but not a major issue. The key result is mortality due to cardiovascular disease which was obtained from the Statistics Finland National Mortality register using the participants personal identification codes which classified deaths using the International classification of diseases. Since these study participants outcome due to cardiovascular disease was studied, greater clinical awareness of the registry to the treating physicians can occur, resulting in diagnostic suspicion bias. But since the period of observation or follow up is long it is unlikely to be a major issue. The question of error in the reported mortality due to cardiovascular disease in this study participants may be more significant , but considering the long period of follow up, it is unlikely to be significant, there by the power of the study to detect the real association will not be grossly over estimated.

Are the results likely to be affected by confounding?

Apart from work stress, other factors that are known risk factors for cardiovascular disease mortality like age, sex, smoking, physical activity, systolic blood pressure, cholesterol and BMI have been examined and demonstrates an association. Association of work stress with CVD mortality shows excess risks for high job strain, low job control, high effort- reward imbalance and low reward. Adjustments for confounding factors have been examined that shows a positive association for job strain, job control and effort- reward imbalance. So, apart from the usual confounding factor for age and sex, the data presented does not seem to suggest any other causal agent which could confound the association.

Are the results likely to be affected by chance variation?

The results presented are compatible with other studies showing associations between job strain and CVD, as well as effort reward imbalance with precursors of CVD.

Is there a correct time relationship?

Subjects who had CVD at baseline were excluded from the study, so subjects who developed the disease resulting in death due to CVD mortality were exposed to the various risk factors of stress. Subjects were followed up for mean 25.6 years (range 0.9 –

27.8) with 73 deaths from cardiovascular causes. Therefore the time relationship to the causal factors seems to be correct. How ever the deaths that were stated did not mention the time frame, whether deaths had occurred within a few years of exposure or after several years of exposure, therefore firm conclusion about the time specificity of the risk relationship is not fully established.

Is the relationship strong?

The relationship is significant for higher age group (28-47years =3.37 HR; >47years =26.48 HR), Male (2.41 HR), Skilled workers (2.86 HR), Current smoker (2.17HR), Systolic BP >143 (6.21HR), Cholesterol (5.6-6.8= 3.68HR; >6.8= 5.94HR) and BMI (>25.5 =2.88 HR). After adjustment for occupational group and baseline covariates shows a two fold risk of death for employees scoring high on job strain and effort reward imbalance. So the relationship is strong.

Is there a dose response relationship?

Stratified analysis of employees whose occupational group remained unchanged 5 years after assessment of work revealed strong association (HR 2.90, 95%CI- 1.25-6.71). There was a dose response relationship for work stress and not for effort reward imbalance. Adjusted HR for CVD mortality for low job strain, high job control and low effort reward imbalance were 1.00, where as for intermediate and high job strain, job control and effort reward imbalance were significant, demonstrating a dose response relationship.

Are the results consistent within the study?

Consistency within the study has been demonstrated as the study participants have different levels of work strain as well as different demographic, behavioral and biological factors and these factors have shown to be applicable across the participants in the study.

Is there any specificity within the study?

Specificity of cardiovascular mortality to the work strain has been discussed and after adjustment for other factors like behavior, demographic and biological factors, HR are still significant and so is specific.

Internal validity

The study does not seem to be affected by systematic observation bias nor confounding as these factors were taken care of in the analysis. The statistical significance of these results, therefore can be regarded as causal explanation or due to chance.

External validity

Can the results be applied to the eligible population?

The study subject comprised of 31% participation rate in the factory and the loss due to follow up is given at about 17% at 5 years (n-674) and 27% at 10 years (N=594). However the analysis as shown on Table I & II depicts the baseline number at 812. Therefore generalization of the results to the eligible population is possible.

Can the study results be applied to other relevant population?

The objective of this study was to examine the association between work stress according to the job strain model and the effort reward imbalance model and the risk of death from cardiovascular disease and is explanatory. The work forces represented are of European background and setting and might not apply to other ethnic groups or other work settings.

Are the results consistent with other evidence, particularly evidence from studies of similar or more powerful study design?

In the discussion section of this paper it is stated that this is the first study on cardiovascular mortality that tests the validity of the two main stress models in a single working population. However, as stated in the introduction, other investigations linking job strain, high demands, low resources and low income to CVD mortality had been documented and is consistent with other studies.

Does the total evidence suggest any specificity?

Causes of Cardiovascular mortality have a multi-factorial eatiology. However, high and intermediate adjusted hazard ratios shows significant association for job strain, job control and effort reward imbalance

Are the results plausible?

The relationship is regarded as plausible as job strain and the effort reward imbalance elicit stress at work, and stress has adverse effect on health, particularly, risk of cardiovascular disease.

If a major effect is shown, is it coherent with the distribution of the exposure and the outcome?

Though work stress and effort reward imbalance is associated with cardiovascular mortality in this study, work stress and effort reward imbalance is one of the cause of the outcome in this study, cardiovascular mortality. Coherence is not established in this study, as the hazard ratio is not of the order of two only. This may not be the true estimate as confounding factors may play a role in affecting the results.

Assessment:

A. Description of the evidence

1. Exposure : work stress according to the job strain and the effort reward imbalance model

2. Outcome : cardiovascular mortality

3. Design : prospective cohort study. Mean follow up years 25.6

4. Study population : 812 employee of Valmet factory in FInland

5. Main result : 73 deaths from cardiovascular mortality

B. Non causal explanations

6. Observation bias :CVD deaths from Statistics Finland National register, unlikely to be biased.

7. Confounding : confounding by sex, age, smoking , BP, cholesterol, BMI, physical activity

8. Chance : chance unlikely as overall results significant

C. Features consistent with causation:

9. Time relationship : time frame for occurence of death not specified, so cannot be fully established

10.Strength : strong for high job strain and high effort imbalance

11. Dose response : strong, job strain and high imbalance at 5yrs. follow up with Hazard Ratio < 2

12. Consistency : high job strain and effort reward imbalance consistent

13. Specificity : behavioral and biological factors also responsible, specificity not significant

D. External validity

14. Eligible population : participants represent eligible population

15. Source population : may not represent industrial workers in Finland

16. Target population : may not be applicable ot other ethnic background

D. Comparison with other evidence

17.Consistency : consistent with other earlier theoretical models

18. Specificity : not possible to ascertain

19. Plausibility : plausible as stress are risk factor for CVD

20. Coherence : difficult to ascertain

Conclusions

Conclusions are supported by data and statistical analysis. The research questions posed in the study were adequately addressed in the discussions. The conclusions are justified from the date in the results section and findings have been not only extended fully to the appropriate populations but have been generally postulated . Our understanding of the problem has been enhanced by this study. Limitations and short-comings of the study have been addressed in terms of the effect of structural and psychosocial factors as important determinants of health.

The strengths of the study in terms of its long follow up, comprehensive questionnaires to indicate stressful work characteristics control for a large set of potential confounding factor. The use of reliable mortality registers has been mentioned. The use of comprehensive questionnaires might result in lengthy and tedious questions, giving rise to potential wrong answers by the respondents. Control for a large set of potential confounding factors has been mentioned but the methods for tackling them has not been discussed or elaborated. The percentage of loss to follow up in this kind of long follow up was not mentioned nor the methods for tackling them described.

Assessed on its own, this study has produced results which are consistent with the theoretical possibility of its association. The association, though plausible, is not specific. The role of confounders and chance variation affecting the results has to be considered.

4.3 Randomised controlled trial of aminosidine (paromomycin) *v* sodium stibogluconate for treating visceral leishmaniasis in North Bihar, India.

Abstract

The objectives of this randomised controlled trial (unblinded) conducted in Bihar is to assess the efficacy and tolerability of aminosidine compared with sodium stibogluconate for treating visceral leishmaniasis. Trial subjects were patients aged 6-50 years with symptoms and signs suggestive of visceral leishmaniasis and leishmania amastigotes detected in Giemsa stained aspirates of spleen or bone marrow. The interventions were aminosidine at 3 doses (12, 16 and 20mg/kg/d) for 21 days and sodium stibogluconate 20mg/kg/d for 30 days. Outcome measures were laboratory and clinical measures of efficacy. The results show that 16 and 20 mg/kg/d of aminosidine was significantly more efficacious in both laboratory and clinical measures of efficacy when compared to sodium stibogluconate.

The study is important and worth knowing about as visceral leishmaniasis is still a public health problem in India and particularly in Bihar. Optimum treatment is needed as resistance to standard treatment is becoming a common occurence. The results are statistically significant and exerts a medical significance as first line treatment for visceral Leishmaniasis in Bihar can be re-considered.

Introduction

Bihar caries the burden of half of the worlds annual cases of visceral leishmaniasis. In recent years they have become increasingly unresponsive to first line treatment with pentavalent antimony compounds, which is the treatment practiced . While daily dose of 20mg/kg/d of sodium for 20-40 days was efficacious in the 1980s, up to 25% unresponsiveness is now reported even with high doses and longer administration.

Aminosidine was shown to have anti-leishmanial activity in the 1960s and shown to act synergistically with antimony drugs. Clinical trials with injectable aminosidine combined with antimony compounds for treating visceral leishmaniasis were found to be efficacious and well tolerated.

The purpose of the study in this randomised unblinded controlled trial with 180 day follow up is for assessing the efficacy and tolerability of aminosidine alone, compared with sodium stibogluconate for treating visceral leishmaniasis. It also aims to establish

the optimum dose for a fixed duration of 21 days in comparison with standard treatment of sodium stibogluconate. The research question is stated clearly and the study is needed as these infections have become increasingly unresponsive to first line treatment with pentavalent antimony compounds. In consequence, as well as increased morbidity and mortality, treatment costs have risen because of increased doses (as 20 mg/kg of sodium stibogluconate for 20-40- days was efficacious in the 1980s, up to 25% unresponsiveness is now reported even with high doses and longer administration), prolonged hospitalisation and need for re-treatment. Alternative drug treatments for areas with endemic visceral leishmaniasis are needed.

Methods section

This randomised unblinded controlled trial to evaluate the ratio/risk to benefit of three doses of aminosidine given intramuscularly at 12, 16 and 20 mg/kg/d for 21 days compared with the standard sodium stibogluconate 20 mg/kg/d for 30 days. Patients were hospitalized and followed up at 30, 90 and 180 days after treatment completion and assessment taken. Inclusion and exclusion criteria were well established. The outcome measures were clinical improvement and parasitological cure persisting at 180 days after treatment completed and the measures for parasitological cure and clinical cure improvement well defined.

The study participants were patients 6-50 years with symptoms and signs of visceral leishmaniasis and aspirates of spleen or bone marrow positive for leishmania amastigotes. The method of assigning participants to groups were randomised. Baseline characteristics of the patients were described. Since seriously ill patients were excluded, their general health were more or less similar. 120 patients were enrolled, 30 patients in each treatment arm and analysis was by intention to treat.

Methods of tackling 'non- response' and 'non-compliance' was not specified and quality of data maintenance throughout the study was also not adequately described. Description of the sources of drugs was available. The study was unblinded and for this reason, bias can occur as the investigators and the patients will be fully aware of the drugs administered.

Instructions that were given to the patients was not summarized or quoted. The study acquired clearance from the WHO secretarial committee on Research Involving Human subjects and was also conducted in accordance with the Declaration of Helsinki. Description for minimizing procedural biases were (analysis was by intention to treat) not adequately addressed.

The analysis was described appropriately and statistically significance defined. χ^2 square test was used to compare dichotomous variables between group and one way analysis of variance for continuous variables. Changes within groups was assessed using paired 't' tests and a one way analysis of variance with post hoc multiple comparision using Tukey;s honest significance difference for comparison between groups. Comparisons involve the same number of subjects and multiple independent comparisons across the treatment groups and baseline characteristics were made.

Results

Final cure was achieved in 23, 28 and 29 patients given aminosidine 12, 16 and 20mg/kg/d respectively, compared with 19 of the patients given antimony (χ^2 p=0.003). Only 12mg/kg/d dose of aminosidine did not differ significantly from antimony treatment (p=0.26).

Parasitological cure was achieved in 27, 28 and 27 patients given aminosidine 12, 16 and 20mg/kg/d respectively compared with 22 patients given antimony. All the three dosed of aminosidine were significantly more effective than the antimony group (χ^2 p=0.002). Only 2 failures were recorded in the group given aminosidine 12mg/kg/d compared with 8 in the antimony group. Follow up results show 5,1 and 1 relapses given aminosidine 12, 16 and 20 mg/kg/d respectively compared with 3 in the antimony group.

Results presented relate directly to the hypothesis and the objectives. Data presented were statistical test results. Mean and SD were also presented. Tables were appropriately presented. Similarity of groups on baseline characteristics were examined before making comparisons and the findings are derived from analyses. Results were consistent from analysis to analysis.

Are the results affected by bias?

The outcome that was assessed in this study was final cure, which were well defined. The doctor assessing clinical efficacy was unaware of the dose of aminosidine given and the technicians assessing laboratory measures of efficacy were unaware of the treatment administered. Therefore the results of this study could not be affected in a major way by bias.

Are the results likely to be affected by confounding?

The baseline characteristics in each treatment arm for male:female ratio, age (years), weight (kg), duration of illness (no. of days with fever), spleen size (cm), white cell count (10^g/l) and parasite burden (grade) did not differ significantly between the

groups. Characteristics of haemoglobin concentration (g/l), platelet count (10^g/l) and albumin concentration (g/l) differed significantly between groups. Therefore these differences could possibly confound the results.

Analysis was by intention to treat, patients were followed up for 30,90 and 180 days after treatment. Data was not provided about the patients' compliance with prescribed treatment. As proper treatment compliance effects outcome, this factor could act as a confounding agent, thereby affecting the result.

Are the results likely to be affected by chance?

The outcome of this study was assessed by well defined parameters. The results are very significant at the end of 180 days of follow up, with 23 (77%), 28 (93%) and 29 (97%) cure for patients given 12, 16 and 20 mg/kg/d of aminosidine respectively, compared with 19 (63%) of patients given antimony (χ^2 p=0.003). Parasitological outcome due to treatment was also significantly effective for the three doses of aminosidine (p=0.002). Therefore the result of the study being affected by chance is very limited.

Internal validity

Is there a correct time relationship?

This is a randomised controlled trial where cases were recruited and treatment given. Patients were followed up for 30, 90 and 180 days. Cure must have occurred after treatment.

Is the relationship strong?

The relationship is strong for 16 and 20mg/kg/d of aminosidine on assessment of clinical and parasitological cure. Treatment failure was only 2 in the group given 12mg/kg/d compared to 8 in the antimony group. All three doses of aminosidine were significantly more effective than the antimony group (χ^2 p=0.002). So the relationship is strong.

Is there a dose-response relationship?

Effectivity of the aminosidine group is established in this study with significant association to cure, although the 12mg/kg/d dose of aminosidine did not differ significantly from the antimony group (p=0.26). Failure was also documented only for the group given 12mg/kg/d of aminosidine (2 cases) compared with 8 cases in the group given antimony. Therefore higher the dose of the intervention, treatment was more efficacious.

Are the results consistent within the study?

Consistency in the study has been established. Treatment with aminosidine was shown to be significantly effective to antimony by assessment of clinical and parasitological cure.

Is there any specificity within the study?

Specificity to a single causation to cure is not established although the effectivity to treatment with 16 and 20mg/kg/d was established.

Conclusions in regard to internal validity

The study seems to be open to influence by confounding factors. The overall results are however significant, documenting the effectivity of aminosidine as compared to the antimony group for treating visceral leishmaniasis.

External validity

Can the study results be applied to the eligible population?

The patients were randomly assigned to three treatment arm. Analysis of results was by intention to treat. So the results of the study can be applied to the eligible population.

Can the study results be applied to the source population?

Of the 507 visceral leishmaniasis diagnosed at the study center, which is situated in the center of the hyper-endemic area spread over a radius of 70km, only 120 (24%) patients met the inclusion criteria and were eventually recruited in the study, which is a rather small percentage.

As stated in the introduction section, Bihar carries the burden of about half of the world's annual cases of visceral leishmaniasis. The study was undertaken at the Kala-Azar Research center, which is at a hyper-endemic area. How representative are the patients who come to the center for treatment is open to question. What percentage of the patients who seek treatment at the center is not given in the paper. Therefore generalization of the results to the source population may not be truly applicable.

Can the study results be applied to other relevant populations?

The research center is situated in a hyper-endemic area. Many other patients may not be exposed to the same hyper-endemic area, nor resistance to sodium stibogluconate that is very prevalent in the area be applicable to other patients. So the result f this study may not be applicable to those relevant populations of different exposures or background.

Are the results consistent with other evidence, particularly evidence from studies of similar or more powerful study design?

Previous studies conducted in Kenya and Sudan documents that aminosidine, combined with antimony was at least 95% effective at end of treatment and significantly more effective than sodium stibogluconate alone. Two trials conducted in Bihar documents the effectiveness of aminosidine with sodium stibogluconate at 82-88%. On the other hand this study assessed the efficacy of aminosidine alone and shows significantly higher efficacy for aminosidine thereby suggesting that antimony played a minor role.

Does the total evidence suggest any specificity?

Both the drugs are effective in treating visceral leishmaniasis but results from this study demonstrates that aminosidine is significantly more efficacious at 16 and 20mg/kg/d for 21 days. Therefore evidence does not suggest total specificity to the interventions.

Are the results plausible in terms of biological mechanism?

The activity of aminosidine against leishmania has been known since the 1960s and has been shown to act synergistically with antimony drugs. In other words the relationship is regarded as plausible.

If a major effect is shown, is it coherent with the distribution of the exposure and the outcome?

The exposure in question is not a major cause of the outcome, although proven to be statistically significant in this study and also effective from other earlier studies.

Conclusion:

Conclusions are supported by data and statistical analysis. The research question posed in the study was adequately addressed. Conclusions have been generalised to the appropriate population and extrapolated. The sample size is small and extrapolation to the whole population of Bihar has been done which should be have been suggested only after further studies with larger sample sizes. Competing or alternative explanations for the findings have not been discussed, Short comings and limitations of the study in the form of it being unblinded is discussed but no constructive suggestions for further research was given. Our understanding of the problem has been enhanced by this study but to be more scientifically valid, unblinded studies with larger sample sizes may be considered.

Assessed on its own, this study has produced results which are consistent with other studies. The results are statistically significant although the possible role of confounding factors affecting the results cannot be overruled. The association is consistent within the study and plausibility is established based on the literature reviewed in this paper

LITERATURE REVIEW

4.4 Review of literature 'Prevalence of hypertension in adults 30 years and above in urban Aizawl, Mizoram, 2003.

Pathogenesis of hypertension

Hypertension is a measurable end-product of a complex series of factors including those which control blood vessel caliber and responsiveness, those which control fluid volume within and outside the vascular bed, and those which control cardiac out put. None of these factors is independent: they interact with each other and respond to changes in blood pressure. The multiple interactions of neural, hormonal, autocrine/paracrine, rheological, geometric and intracellular factors determining blood pressure obscure the role of any single effector system in hypertension. The role of factors influencing cardiac output and peripheral vascular resistance play a role in the pathogenesis of hypertension.

Neurohumoral control of blood pressure

The central nervous system plays a critical role in controlling circulation: it integrates most reflexes that regulate blood pressure, coordinates signals generated during behaviours with appropriate circulatory pattern, senses metabolic and hormone signals of importance in regulating blood pressure to elicit a specific circulatory response, and generates the tonic background vasoconstriction necessary to maintain a normal blood pressure. Common abnormalities in one or more signal transduction pathways may contribute to the functional and structural abnormalities in hypertension.

Baroreflexes

Baroreflexes have important interaction with the sinoatrial baroreceptor in the control of hypertension. Activation of these reflexes inhibit sympathetic and augment parasympathetic outflow to the heart and vasculature, affecting cardiac output and peripheral vascular resistance. It is tempting to attribute baroreflex abnormalities in the pathogenesis of hypertension; however, hypertension itself may be responsible for baroreceptor resetting and blunted baroreceptor control of hypertension. The role of baroreflexes therefore, may be in the facilitation of the persistence of hypertension.

Sympathetic nervous system

Sympathetic stimulation influences cardiac output by its effect on Myocardial contractility and relaxation, circulating volume, venous return and heart rate. Increased systemic flow from hyperkinetic circulation results in structural vascular changes that

lead to increased basal vascular resistance and vascular responsiveness to vascular stimuli, and eventually to the development of sustained hypertension.

Autonomic nervous dysfunction

Cardiac autonomic dysfunction is associated with prevalent hypertension and reduced vagal function, and the imbalance of sympathetic- vagal function are associated with the risk of developing hypertension. Catecholamines play an important function in cardiovascular function via a direct action on the heart, blood vessels and the central nervous system. However, most patients with established essential hypertension have normal levels of catecholamines.

Cardiac output

The pressure required to move blood through the circulatory bed is provided by the pumping action of the heart (cardiac output) and the tone of the arteries (peripheral resistance). An increased cardiac output has been found in some young borderline hypertensives who may display hyperkinetic circulation. The increase in cardiac output could arise due to increase fluid volume or from an increase in contractility from neural stimulation of the heart

Extracellular fluid volume

Fluid retention leads to an increase in cardiac output and a rise in blood pressure. The high blood pressure leads to excretion of the accumulated volume, so that a new equilibrium between intake and output is achieved at the expense of a higher blood pressure. Intravascular volume spans a broad range, from extremely low as in the elderly, to as high in obese persons. Intravascular fluid volume is often increased in the course of hypertension and one cause of the increased prevalence of hypertension.

Systemic and regional blood flow

The neurogenic theory predicts that excessive sympathetic nervous system activated vasoconstriction will cause centralization of blood flow, increased cardiac preload, and a tendency for inappropriately high cardiac output at any given level of arterial resistance.

Microvascular factors and hormonal mediators

Microvasculation is the site of much of the vascular resistance and exchange function. The vascular wall plays an active role in vascular homeostasis through a complex interplay of endocrine, neurocrine and auto paracrine mechanisms. The endothelial cells senses humoral and hemodynamic changes and responds by secreting a variety of metabolically active substances that act locally causing either vasodilation or

vasoconsriction. Disturbance of the delicate balance between vasodilators and vasoconsrictors may play a role in the development of hypertension.

Arterial and microvascular factors

An increase in tone or structural remodeling of arterioles narrows the caliber and results in an increase in calculated systemic vascular resistance. Mechanical wall stiffness, wall thickness, elastin and collagen content may vary along the arterial tree and genetic and environmental factors contribute to alter such structural properties. Furthermore, abnormalities, both intrinsic and extrinsic to the vascular smooth muscle can contribute to elevated peripheral resistance in hypertension. A positive correlation exists between hypertension and peripheral arterial disease.

Kidney in hypertension

Renal vascular resistance is constantly adjusted by the myogenic activation in the pre-glomerular arterioles and tubuloglomerular feedback to maintain a steady blood flow, despite changes in the mean arterial pressure. An abnormality in renal blood flow could participate in the pathogenesis of essential hypertension, either initiating or sustaining the arterial pressure. Whether the kidneys play a central role in hypertension is unclear but an increased renal nerve traffic may contribute to the initiation or maintenance of essential hypertension. But hypertension causes and is caused by renal parenchymal disease due to volume overload, increased sympathetic nervous and renin-angiotensin system activity.

Renin-angiotensin system

The renin angiotensin system is a major hormonal axis involved in both pressure and sodium homeostatis. Angiotensin is a potent vasoconstrictor, a potent stimulus for aldosterone secretion and can result in the elevation of mean arterial pressure and sodium and water retenton. Angiotensin II interacts synergistically with sympathetic nervous system augmenting each other's activity. Plasma renin levels are high in young hypertensives and tend to decrease with age.

Genetic control of hypertension

Hypertension is a common trait of multifactorial determination. It is possible for characteristics such as hypertension to show heritability and still be subject to important changes as a result of environmental variation. Environmental effects are most clearly shown between populations rather than individuals. Unless a major environmental effect has been overlooked, it is likely that blood pressure differences within populations are determined largely by genes. Familial aggregate of hypertension indicates a strong

genetic linkage. The aggregation of hypertension and familial lipid abnormalities are estimated to occur in 12-16% of all hypertensive persons and in 1-2% of the general population. Genes that increase a person's obesity tends to increase that person's blood pressure and increase the clustering of hypertension in that family.

Roles of electrolytes

Sodium has an essential role in hypertension. Acquired and genetic dysregulation of cellular sodium pathways may be important in the pathogenesis of hypertension. Older and diabetic hypertensives are often salt sensitive. Salt sensitivity is highest in persons with low-renin status, increased sympathetic nervous system activity or renal insufficiency. Sodium sensitivity may be the result of a defect in renal sodium excretion, higher level of sympathetic nervous system activity or due to reduced arterial distensibility. The effects of sodium are heterogeneous and not all hypertensives respond with elevated blood pressure to increased dietary sodium intake. But sodium sensitivity becomes greater with age, perhaps more in women than in men.

On the other hand, the relationship between blood pressure and the ratio of sodium/potassium is stronger than the relationship between blood pressure and either sodium or potassium on its own. In essential hypertension, the plasma potassium concentration is inversely related to blood pressure and this has suggested that potassium may be a factor in determining the blood pressure. Potassium channels regulate the membrane potential and reactivity of arterial smooth muscle and are unregulated in hypertensives.

Calcium plays a critical role in cellular communication, regulation and function. Defects in processes that permit calcium influx, mobilization from intracellular stores, and cellular stores and efflux may affect the cellular regulatory processes and functions and contribute to a variety of pathological states, including hypertension.

Demographics

Aspects of culture such as diet and other behaviour, population genetics, climetographic zones and influence of endemic factors in early years of life, can contribute to variations in the pattern of hypertension. Increased urbanization and associated economic and dietary changes contribute to the increased prevalence of hypertension. Hypertension occurs less frequently in children than in adults. Blood pressure tends to rise with age, however, this is not an invariable phenomenon and studies have shown that blood pressure can remain low throughout life.

Blood pressure is socially and culturally determined. Environmental stressors, difference in personality and susceptibility to stress are associated with blood pressure. The mechanism for this could be due to the lesser sensitivity of the baroreceptors in hypertensives patients and is likely the principal determinant of their increase in blood pressure variability. A decreased secretion of the anti-stress or dopamine and beta-endorphin probably also contribute to the progression of hypertension.

Regular physical activity/fitness are all associated with lower blood pressure levels. The nicotine in cigarette smoke acutely raises blood pressure, even in addicted smokers. No tolerance develops, so the blood pressure remains high as long as the person continues to smoke. Smokeless tobacco or cigars, if inhaled, also raises blood pressure.

Although considerable tolerance rapidly develops, some pressor effects of caffeine may be observed with repeated consumption. Alcohol consumption irrespective of the type of beverage, causes higher blood pressure, so that alcohol intake may be the most common cause of reversible hypertension.

Obesity is a recognized risk factor for the development of hypertension. Obese persons have a higher cardiac output and intravascular blood volume, but an inappropriately normal total peripheral resistance. An adverse body fat distribution, independent of obesity, is associated with hypertension.

White coat hypertension

The finding of persistently raised blood pressure in the doctor's clinic but normal at other times is referred to as white coat hypertension. It is generally thought to be attributable to acute stress in the presence of a doctor. The prevalence of white coat hypertension is perhaps higher than is generally though and studies have reported that 21% of patients with borderline hypertension had both systolic and diastolic pressures which were below this level during ambulatory blood pressure. For patients with more advanced hypertension, the prevalence was less at 5%. White coat hypertension has been found to be more common in women than men, although some studies have reported equal diagnostic incidents in men and women. White coat hypertension can occur at any age.

The mechanisms explaining white coat hypertension are that it is the exaggerated or orienting response and therefore a generalized hyper-activity to novel or stressful stimuli. Another postulation is that it is a precursor of sustained hypertension. While this cannot be excluded, the fact that it tends to be more, rather than less common in older patients would argue against this. The third postulated mechanism is the learned or

conditioned response, which is thought to originate as part of the defense reflex, which later becomes perpetuated through classical conditioning. On the other hand, opinions vary as to the significance of white coat hypertension. The majority of investigators believe that it represents a benign entity, whereas others have suggested that the risk in this condition is similar to that of patients with sustained hypertension. In the same line, opinions of treatment of white coat hypertension vary.

Complications of hypertension

High arterial pressure causes

- changes in endothelial cells
- remodeling and growth of smooth muscle cells
- alterations in the flow and velocity of blood in large arteries due to structural and functional changes.

The stress in the endothelial cells causes damage to the endothelium, intimal hypertrophy and focal of occurrence of atherosclerosis. Proliferation and migration of smooth muscle cells has been noted in hypertension. Endothelial cell dysfunction also stimulates the proliferation of smooth muscle. Besides the structural changes mentioned, hypertension causes alteration in the flow and velocity of blood especially in large arteries. The compliance of these arteries is reduced, increasing after load. The common vascular lesions that are found in hypertension are hyperplastic and hyaline arteriosclerosis, which narrow the lumen of the arteries and are responsible for most of the target organ damage. Aneurysms in the small cerebral penetrating arterioles which may rupture causing cerebral haemorrhages is seen typically in hyertension. Damage to the media of the arteries such as the circle of Willis causing subarachnoid haemorrhage. Cystic medial necrosis, which is responsible for aortic dissection also occurs more frequently in hypertension.

Hypertensive heart disease

Diastolic dysfunction, which is the earliest effect of hypertension on the heart causes reduced left ventricular compliance. This causes slow diastolic filling and decreased diastolic relaxation ultimately leading to heart failure.

Left Ventricular hypertrophy (LVH)-

It is one of the most common complications of high blood pressure and is a powerful predictor of serious cardiovascular sequelae. It increases the frequency of ventricular arrhythmias and myocardial ischaemia because of the greater resistance to microvascular perfusion.

Congestive cardiac failure (CCF)-

This is three times more common in hypertensives than in normotensives. Data suggests that antihypertensive treatment does not completely prevent CCF but postpones its development by several decades. The mechanisms are dilated cardiomyopathy and reduced ejection fraction, diastolic dysfunction, ischaemic cardiomyopathy and increased after load.

Coronary artery disease (CAD)-

Hypertension is the single largest risk factor for CAD. Factors accelerating CAD in hypertension are the acceleration of atherosclerosis in coronary arteries, high resistance of coronary microvasculature, systolic/diastolic dysfunction, which increases LVH resulting in impaired coronary blood flow and myocardial hypertrophy. Thus hypertensive patients may suffer from silent ischaemia, asymptomatic myocardial infarction (MI) and sudden death.

Diseases of the arteries

Hypertension is a risk factor for diseases of the large arteries as well as peripheral arteries.

Cerebrovascular disease (CVD)

Hypertension is a major cause of stroke and is predisposed by aggravating atherosclerosis in the aortic arch, carotid arteries and cerebral arteries; causing arteriosclerosis and lipohyalinosis in the end arteries of the cerebrum.

The risk of stroke is greater in hypertensives with other risk factors like diabetes, smoking, CAD, LVH, cardiac arrhythmias, hyperviscosity syndromes and a high haematocrit.

Prevalence of hypertension- review

Hypertension is a common disease and is considered as one of the leading noncommunicable diseases facing mankind. It is recognized as an important public health problem all over the world. It is often symptomless, but can lead to lethal complications, if left untreated.

It is well established that cardiovascular risk of high blood pressure is strong, continuous, graded, consistent, independent, predictive and aetiologically significant for those with and without coronary heart disease. Hypertension is a major risk factor for the development of cardiovascular disease (CVD). Its impact for stroke and end-stage renal failure is greatest. It is also one of the contributing factors for the development if coronary heart disease (CHD). Hypetensives, when compared to normotensives, develop

twice as much coronary heart disease, four times as much congestive heart failure and seven times as much stroke. While there is no critical value for blood pressure, the risk of CVD rises progressively with the level of BP. Cardiovascular risks in hypertensives are also markedly affected by other coexisting risk factors such diabetes, high cholesterol, smoking, obesity, physical inactivity etc.

Community surveys in industrialized countries have shown a prevalence of 15%-38% in people aged 30 years and above. The National Health and Nutrition Examination Surveys (NHANES) in the United States have reported a prevalence of 20% of the entire US population. The prevalence ranges from 4% in the age group 18-24 years to 60% in the age group 65-74 years.

While surveys carried out in most of the industrially developed countries have shown an almost similar prevalence, those in the lesser- developed countries have shown a lower prevalence. In spite of this, surveys of indigenous populations in a number of African countries indicated that hypertension is on the rise. In Seychelles, hypertension affects 20% of the total population (with a rate of 38.5% in men and 27.7% in women between age-group 25-64 years); in Mauritius- 14%; in South Africa- 16%; in Cuba- 34.5% and 27.1% in men and women respectively.

In India, there are no well co-ordinated national surveys of the prevalence of hypertension available. Several regional, small surveys with varying protocols have reported a prevalence, which varies widely from 3.8 to 15.63% in men and 2 to 15.38% in women in the urban areas. More recent surveys in urban areas have reported higher prevalence- Gupta et al (1995) found a prevalence of 30% in men and 34% in women, in the age group 20 years and above, using the criteria of $\geq$140/90; Anand et al (2000) reported a prevalence of 26.8% in men and 27.65% in women in the age group 28-65 years, using the criteria $\geq$140/90. Diagnosis of hypertension was based on the average of three readings on the 2nd occasion after initial screening. A survey conducted among the tea workers of Assam by Hazarika et al on the prevalence of hypertension and its risk factors reports an overall, high prevalence of 60.8%.

Various studies to assess the prevalence of hypertension, risk factors, controlled status as well as KAP studies have been conducted in different settings and with different study designs. A detailed review of studies on various aspects of hypertension are presented below:

Author	Year	Title	Place
S.L Chadha et al	1990	Prevalence, awareness & treatment status of hypertension in urban population	N. Delhi, India
Burt et al	1995	Trends in the prevalence, awareness, treatment and control of hypertension	USA
Sarref-Zadegen N et al	1999	Prevalence of hypertension and associated risk factors	Isfahan, Iran
Hypertension study group	2001	Prevalence, awareness, treatment and control of hypertension among the elderly: A Multi center study	Bangladesh & India
LS. Al-Sowielem et al	1997	Compliance and knowledge of hypertensive patients attending PHC centers	Al-Khobar, Saudi Arabia
Line Aubert et al	1998	Knowledge, attitudes, and practices on hypertension in a country in epidemiological transition	Seychelles
DS P res et al	2003	Arterial hypertension patients: attitudes, beliefs, perceptions, thoughts and practices	Ribeir o Preto Brazil
T Fahey et al	1994	General practitioner's knowledge of and attitudes to the managements of hypertension in elderly patients	Oxford
C Cuspidi et al	2002	Awareness of hypertension guidelines in general practice: a pilot study	Lombardy, Italy
David J. Hyman et all	2002	Poor hypertension control: Let's stop blaming the patients	USA

Prevalence, awareness & treatment status of hypertension in urban population of Delhi. ***Indian J Med Res.*** **1990;92:233-240**

S.L Chadha, S. RadhaKrishna, K. Ramachandran, U. Kaul and N. Gopinath

A community based survey for the prevalence of hypertension was carried out on a random urban sample of 13,723 adults in the age group 25-64 yr from Delhi. Hypertension was defined as systolic pressure greater than 160 mmHg and/or diastolic pressure greater than 90mmHg or a history of current anti hypertensive medication (JNC III report). The sampling design was based on probability proportional to size (PPS) with selection of 20 charges. From within each selected charges, threes blocks were randomly chosen.

The overall prevalence of hypertension was 127.5/1000 of which men had a prevalence rate of 116.6/1000 and women had a prevalence of 136.8/1000. The prevalence rate was higher in females except in age group 25-34 years. The prevalence rate increased with age in both sexes.

Those who were aware of their hypertension status or known cases were 49.5%, of which the awareness was slightly higher in women (51.8%) than in men (46.4%). The 'awareness' of hypertension showed an increasing trend with age in both sexes. Severity of hypertension showed an association with age, in both sexes and moderate and severe grades of hypertension increasing with age in both sexes. The awareness of hypertension increased with severity. Out of the known case, 20.1% had not received any treatment or had discontinued after initial medication. The percentage of men and women who fell in this category were 19.1% and 20.9% respectively. Approximately 30% of hypertensives were on medication. The proportion of hypertensives on medication in both sexes showed an increase with age. In women, the proportion of patients not taking medication decreased with age, though such trend was not apparent in men. A small percentage of all hypertensives (8.9%) had control of their blood pressure with little difference in sexes or age group.

Overall, the study emphasizes the enormity of the problem of hypertension in an urban population in India as well as poor control of blood pressure achieved in the community.

Prevalence, awareness, treatment, and control of hypertension in the adult US population. *Hypertension*. 1995;25(3):305-13.

(Data from the Health Examination Surveys, 1960 to 1991)

Vicki L. Burt, Jeffery A. Cutler, Millicent Higgins, Michael J. Horan, Darwin Labarthe, Paul Whelton, Clarice Brown, Edward J. Rocella

The National Health and Nutrition Examination Survey (NHANES) was conducted for information on the health and nutritional status of the civilian non institutionalized population of the United States. The III NHANES study (as all previous study) used stratified multistage probability sample designs. The sample population were adults above 18-74 years. BP measurements were taken with subjects in the seated position. Four sizes of cuffs were available. Three BP measurements were obtained on two occasions, the first set of three BPs were measured in the home by a lay interviewer and the second by a physician. Quality control measures were instituted with formal trainings and quarterly site visits, during which the accuracy of BP measurements obtained by field observers were confirmed by an experienced independent observer. The definition of hypertension was based on VI JNC report. Awareness was report of prior diagnosis of hypertension, treatment was defined as history of current antihypertensive drug therapy at the time of the interview. Control was defined as hypertension with systolic BP <140 mmHg and diastolic BP <90 mmHg.

The age adjusted prevalence of hypertension was 22.8% in men and 18.0% in women. The prevalence of hypertension increased with age. The mean systolic and diastolic BP was 119 and 73 respectively (123/76 in men and 116/70 in women). The level of awareness of hypertension was 73% (66% in men and 81% in women). The proportion of hypertensives on treatment was 55% (46% in men and 65% in women). People with controlled hypertension were 29% (22% in men and 38% in women). Treated people with controlled hypertension were 55% (50% in men and 58% in women).

Hypertension awareness, treatment and control have improved as compared to previous surveys but notes that many people with hypertension are unaware of their condition, and many more are untreated or inadequately treated.

Prevalence of hypertension and associated risk factors in Isfahan, Islamic Republic of Iran. ***EMHJ.*** **1999;5(5):992-100.**

Sarref-Zadegen N, Boshtem M, Mostefevi S and Refiei M.

A cross sectional study with a sample size of 8624, included participants from 19 years and above, who were randomly chosen from selected clusters in the mentioned city. Data was collected using questionnaires, containing variables about smoking habits, previous history of hypertension, diabetes, complaints of cardiovascular disease and current use of medication for hypertension and diabetes. Height and weight were measured and blood pressure was measured at home, three times from the right upper arm with a 14-cm cuff, after the participants had rested for 10 minutes. The mean value obtained from three readings was used in the analysis. A systolic reading of 160 mmHg and/or diastolic reading of 95 mmHg or the use of anti hypertensive medication were used to define hypertension.

The crude prevalence for definite hypertension was 28.6%, 38.9% and 34.8% for men, women and the entire population respectively. The prevalence of hypertension increased with age in both sexes and women had a lower prevalence only in the third decade.

The number of hypertensive participants who were aware of their disease and were taking medication increased with age in both sexes. Generally, women had a higher rate of awareness and were more commonly treated than hypertensive men. However, among those treated, men had better control rate than women in the sixth and eighth decades. The overall awareness, treatment and control rates of definite hypertension were 55.2%, 50.9% and 12.3% respectively. Overall, the proportion of women who were aware of their hypertension and were being treated was higher than men. It is noted that the absolute association of risk factors and hypertension varies as a consequence of variable cut-off levels used to define such risk factors, the nature of the study and the ethnic composition of the population under study may affect the prevalence rates. However, it is noted that the prevalence of hypertension is high.

A study on the prevalence, awareness, treatment and control of hypertension among elderly in Bangladesh and India: a multicentre study. ***Bull World Health Organ.*** **2001;79(6):490-500.**

The objective of the study was to evaluate the prevalence, awareness, treatment and control of hypertension among elderly individuals in India and Bangladesh. The

study design was a cross sectional community based survey of non- institutionalized elderly individuals (>= 60 years) in five regions of the Indian sub-continent: three in India and two in Bangladesh. Selection of the study sites was based on convenience. The sample size was 1203. A random multi stage cluster sampling strategy for ensuring that the study samples at the chosen sites were representative of the communities in the geographical region studied was done. The filed investigators performed a door to door survey of the participant households and administered questionnaires in the local vernaculars.

JNC VI report was used as criteria to determine the status of hypertension in the study. Awareness of hypertension was based on the participant's report of a prior diagnosis of hypertension made by a health professional.

The overall prevalence of hypertension was 65%. The prevalence was similar for both sexes and did not differ in the different age groups. The mean systolic or diastolic blood pressure according to sex and place of residence did not vary by sex, but were higher among urban residents. Overall prevalence was higher in urban than in rural sites.

A multivariate logistic regression model to examine the cross sectional correlates found that higher BMI, self-reported diabetes and a higher educational level were associated with increased odds of being hypertensive. Only 45% of known hypertensive subjects were aware of their elevated status out of which 97% were on allopathic medications. However, only 10% of hypertensives had their blood pressure controlled and more over, 7% of all hypertensives had blood pressure indicative of severe hypertension. Women were more aware of their hypertensive status and more likely than men to be treated. Rural samples were less likely to be aware of their status than their rural counterparts. However, rates of control of hypertension did not differ between the two sexes, pooled urban or rural sites.

This study has shown a direct evidence of an increasing burden of hypertension among elderly population. The overall awareness, treatment and adequacy of control of hypertension was low. It concludes the emphasis of the need to implement effective and low cost management regimens based on absolute levels of cardiovascular risk appropriate for the economic context.

Compliance and knowledge of hypertensive patients attending PHC centers in Al-Khobar, Saudi Arabia. *J Hypertens*. 1997;15:561-5.

L.S Al-Sowielem and A.G Elzurbier

A cross sectional study in four randomly selected primary health care center from a total 10 centers serving the population of the said city. Patients were interviewed by trained interviewers, using structured questionnaires. Data that were collected comprised of age sex, marital status, educational level, positive family history of hypertension, smoking status, presence of other chronic disease, duration of hypertension, mode of diagnosis of hypertension, number of drugs taken for hypertension, regularity of taking drugs, presence of difficulties in complying with treatment, regularity of follow up and whether the patient was seen by the same doctor at each follow up visit. Patients were also asked their opinion on the possibility of a total cure for hypertension and whether treatment should be stopped if blood pressure were controlled. In addition, the patient's opinions on age and gender susceptibility, causes and complications of hypertension and if it was possible to prevent the disease were sought.

Weight, height and blood pressure were recorded during the visit and BMI calculated. Compliance was measured as the therapeutic outcome of DBP <90 mmHg as well as self reporting of compliance.

When compliance was assessed according to the therapeutic outcome (DBP method), 34.2% were found to be compliant. On the other hand, the self- reporting method revealed that 74.7% were compliant. With the therapeutic outcome method, compliance was significantly higher among patients over 55 yeas of age than those who were younger. There was no significant difference in compliance rates between males and females or between different nationals. Patients who were regular on follow-up (82.1%) had a significantly higher compliance rate than those who were irregular (37.8% and 17.6% respectively; =<0.02). A positive family history of hypertension was found in 49.5% of the patients.

Less than half (41.6%) of the patients thought that hypertension could have a permanent cure and 43.7% thought that medications could be stopped once control was achieved. Almost two-thirds of the patients (66.3%) thought that the main etiological factor of hypertension was emotional stress, while only 1.6% acknowledged the role of heredity in causing the disease. About one third of the patients (31.6%) did not know the complications of hypertension, while 42.1% knew that it might lead to neurological complications and 1.6% were aware that the disease might lead to renal complications.

The results of this study reveals the importance of regular follow up in achieving better compliance, emphasizing the need for health education to enforce this habit. It further stresses the importance of primary physicians in educating patients about hypertension, due to various misconceptions about the disease and low compliance. There is an indication of a need for health education on hypertensive patients.

Knowledge, Attitudes, and Practices on Hypertension in a Country in Epidemiological Transition. *Hypertension*. 1998; 1136-1145.
Line Aubert, Pascal Bovet, Jean-Pierre Gervasoni, Anne Rwebogora, Bernard Waeber, Fred Paccaud

Assessment of knowledge, attitudes and practices (KAP) is a crucial element of hypertension control, though little information is available from developing countries. A cross sectional study of the general adult population, aged 25 to 64 years on the island of Mahe, Seychelles was conducted. A total of 1067 were surveyed with a response rate of 87%. BP was measured with a mercury sphygmomanometer in three readings obtained at intervals of ≥2minutes, after the subject had rested for at least 30minutes. The subject was in a sitting position at the time of the BP measurements. Large cuff for persons with middle arm circumference ≥43 cm were used. The average of the last two readings was used for analysis. A face to face structured interview in the local language was administered to all participants. Awareness of hypertension was defined as prior information by a health professional that he had hypertension.

The age adjusted prevalence of hypertension (BP≥160/95 mmHg or taking medication) was 35.8% in men and 25.0% in women. Age and sex adjusted rates of hypertension were higher in men, older persons, obese, blacks and persons with high serum cholesterol. With regard to socioeconomic variables, the age, sex, and ethnic group-adjusted rates of hypertension were higher without paid work and in those owning a car. Hypertension rate was marginally higher in persons without versus with secondary education. No consistent trend was found across job categories. The proportion of aware was 50.3%, aware and treated were 34.0%, proportion of aware, treated and controlled were 10.3% and the proportion of controlled among treated were 30.3%.

Knowledge, attitudes and practices of the study participants on hypertension were assessed. A high proportion of participants, both aware (AH), and unaware of being of hypertensive (UH) showed good basic knowledge. In contrasts, specific knowledge was significantly better in AH than in UH subjects. Among UH, knowledge was generally

similar in persons unaware of being hypertensive and who are hypertensive (UHH) and persons unaware of being hypertensive and who are non hypertensive (UHN). Recognition of the detrimental effects of smoking, drinking, obesity, little physical activity were more than 70% for both AH and UH. Regarding attitudes, similar high proportions between (73% and 95%) expressed the wish to reduce the corresponding detrimental habit, though attempt to change was reported by smaller proportions of participants: 74% of smokers, 60% of heavy drinkers, 56% of overweight persons and 16% of persons with low physical activity. The KAP findings on concomitant risk factors did not differ substantially between AH and UH participants with few exceptions: more AH than UH heavy drinkers (96.3% versus 71.3%; p=0.20) thought that their alcohol consumption was harmful to their health, more AH than UH with low physical activity (79.9% versus 65.6%) considered themselves as getting too little exercise. In contrasts, fewer AH than UH smokers expressed the wish to reduce smoking (84.9% versus 95.2%; p=.027); and fewer AH than UH overweight persons knew that overweight causes hypertension (88% versus 97%; p=.001) or thought that lifestyle cab influence future health (12.2% versus 21.4%; p=0.29).

Overall, most persons, whether nonhypertensive, unaware hypertensive or aware hypertensive had good basic knowledge related to hypertension determinants and consequences. However favourable outcome expectation, positive attitudes, and appropriate practices for hypertension and relevant health lifestyles were found in smaller proportions of participants. Furthermore, hypertensive persons with other cardiovascular risk factors affecting the overall heart risk knew well the detrimental effects of these factors but reported making little actual change to control them (particularly regarding overweight and sedentary habits) These data point to the need to maximize the efficiency of hypertension prevention and control programs so that delay in achieving effective hypertension control is minimized in countries experiencing recent emergence of hypertension as a major public health problem.

Arterial hypertension patients: attitudes, beliefs, perceptions, thoughts and practices. ***Rev Saude Publica.*** **2003;37(5):635-42.**

DS P res, JM Magna and LA Viana

An exploratory study was carried out in 32 hypertensive patients seen at 2 health care units in the municipal district of Ribeir o Preto, Brazil with the objective of knowing arterial hypertensive patients through their attitudes, beliefs, perceptions, thoughts and

practices related to the disease. Subjects were interviewed in a single session and data were analyzed using Content Analysis method through categories not defined a priori.

About half the patients (49%) were not able to define hypertension. They believed the main symptoms were headaches and neck pain (18%) and the possible consequences of the disease were stroke and heart attack (39%). Emotional factors were mentioned as the ones that mostly impair hypertension control. To accomplish that, 40% said that there should be changes in lifestyle, such as walking and exercising. Regarding patients' practices, drug treatment and management by a health provider were most often referred. Psychological aspects and health beliefs seem to affect directly with patients' knowledge on hypertensive disease and their health practices. Given that all patients had already received some kind of information about arterial hypertension before the beginning of the study, it would be important to propose new forms of educating these patients.

General practitioners' knowledge of and attitudes to the management of hypertension in elderly patients. ***Br J Gen Pract.*** **1994;44(387):446-9.**

T Fahey and C Silagy

It is not known whether the results from randomized controlled trials influence general practitioners' knowledge of and attitudes to clinical practice. So the study was conducted with the aim of assessing general practitioners' knowledge of and attitudes to the management of hypertension in patients aged 65 years and over, after the publication of three randomized controlled trials. A cross sectional survey of principals in general practice was undertaken using self-administrated questionnaire. The study was confined to 35 randomly selected general practices whose patient catchment area lay within the boundary of Northamptonshire Family Health Services Authority. A total of 92 general practitioners from 27 practices responded. The main outcome measures were: the reported use of a protocol to manage elderly patients with hypertension; method and frequency of blood pressure measurement; influence of patients' age on diagnosing and initiating treatment of hypertension; and use of non-pharmacological and pharmacological therapies.

Eighty four percent of the general practitioners' reported starting treatment only after measuring blood pressure on three separate occasions; 99% measured blood pressure with the patient seated. Half of the respondents reported treating patients with isolated systolic hypertension once systolic blood pressure exceeded 179 mmHg. All the

general practitioners reported recommending non-pharmacological treatment prior to drug therapy; 83% would use a diuretic as their drug of first choice. This has illustrated that there is still considerable variation in the knowledge and attitudes of general practitioners towards hypertension.

Awareness of hypertension guidelines in general practice: a pilot study in Lombardy. ***Ital Heart J.*** **2002;3(1): 60-3.**

C Cuspidi, I Michev, B Severgnini, V Fusi, C Valerio, S Meani, A Vaccarella, G Palubo, ML Muiesan, F Magrini, A Zanchetti and Lombardy Regional Section of the Italian Society of Hypertension.

The aim of the study was to evaluate, in a local survey in the northern area of Lombardy, the general practioners' knowledge of the WHO/ISH hypertension guidelines. The method that was used in the study was a 10-item mail questionnaire based on the WHO/ISH hypertension guidelines, that was sent to a sample of 280 primary care physicians. The number of answers in agreement with the guidelines was used as a measure of guidelines' knowledge, that was considered if a correct answer to 6 out of 10 questions, in addition to an adequate definition of hypertension was provided. The analysis was based on 83 returned questionnaires, that means a 29% response rate.

Guidelines knowledge was adequate in 23.5% of the total study population and the mean score of correct answers was 5.5 points. A significant negative correlation ($r=0.27$, $p<0.05$) was observed between the mean score of knowledge and the physicians age. An adequate knowledge of hypertension guidelines by primary physicians is a fundamental step for the improvement of the diagnosis and treatment of hypertension in the general population. However, this study shows that in a sample of primary care physicians in the northern region of Italy, knowledge of hypertension guidelines is inadequate; the reasons and the extent of this poor knowledge requires further studies.

Poor hypertension control: Let's stop blaming the patients. ***Cleveland clin J of Med.*** **2002;69(10):793-99s.**

David J. Hyman and Valory N. Pavlik

Hypertension is not well controlled in the United States. In spite of extensive education campaigns for physicians and patients, only 27% of Americans with hypertension have their blood pressure controlled to the recommended target of less than 140 mmHg systolic and less than 90 mmHg of diastolic. The reason for poor control

have not been clearly delineated, but attention has focused primarily on patient factors such as poor compliance with treatment and lack of access to care. Patient noncompliance is frequently proposed as a major cause of the low control rate and is usually attributed to adverse effects of antihypertensive drugs, financial barriers to treatment, and lack of motivation on the part of the patient to treat a symptomless disease for an indefinite period.

Because hypertension is usually chronic, most hypertensive patients have established hypertension. And because the blood pressure levels of most patients are mildly elevated, the transition of most patients from being a nonuser to a long term user of antihypertensive medication may have some discontinuity at the start. The fact that many patients stop taking their medications (if indeed they do) is sometimes attributed to unpleasant side effects of the drugs. It is possible, however, that the contribution of drug side effects to patient noncompliance with antihypertensive therapy is misinterpreted as different studies demonstrates that side effects were few and had lower continuation rates than those receiving placebo. Furthermore, the variability in side-effect profiles among the active drug groups was relatively small.

Moreover, studies suggest that physicians are unlikely to diagnose and treat hypertension when systolic pressure is between 140 and 160 mm Hg and diastolic pressure is less than 90 mmHg. Many health care organizations now endorse blood pressure targets even lower than 140/90 mmHg for specific groups of patients, such as those with renal insufficiency. It is clear that practicing physicians have yet to adopt this paradigm. So it is time to stop blaming the patient or even blaming the drugs for the current state of hypertension control and to reflect on how aggressively we as physicians pursue treatment goals.

Summary of Literature review

The overall literature review highlights the high prevalence of hypertension and it's positive correlation with increasing age. The association of risk factors and hypertension varies as a consequence of variable cut off levels and different ethnic composition of the study population. There is an overall low awareness level (known cases) and poor control in populations. Compliance to treatment is sub-optimal. The need of regular follow up in achieving better treatment compliance is also noted. An emphasis of the need to implement effective and low cost management regimens appropriate for the economic context is made. Need for new forms of education for hypertensive patients are stated.

Another important aspect in the control of hypertension in populations is the need of uniform treatment guidelines. Different studies in different settings have noted inconsistencies in the treatment of hypertension among primary care physicians. The reasons and extent of poor knowledge/reluctant attitude to treat hypertensive patients needs further study. Overall, the level of poor control of hypertension in populations is not only a consequent of the patients but is also a consequent of physicians knowledge/attitudes/practices.

SECTION: 5

PAPER PRESENTATIONS

Disease surveillance systems in Mizoram

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Introduction

In the context of emerging and re-emerging diseases, as well as paucity of a reliable database on disease trends, the need for a sensitive Disease Surveillance System (DSS) cannot be overemphasized.

Objectives

The objectives of this paper are to:

(1) Describe the different types of DSS in existence in the North Eastern state of Mizoram
(2) Identify prevailing gaps / bottlenecks in the systems
(3) Suggest measures to bridge gaps and/or remove bottlenecks identified

Methodology

Information on the DSS were obtained through:
(1) Secondary data sources e.g. monthly reports, out – patient registers
(2) Primary data through discussions and interviews of health functionaries at different levels of the health system

In Mizoram, currently there are two types of DSS in existence viz., surveillance for individual diseases through national / vertical programmes and sentinel surveillance for selected diseases. Issues such as case definition, data collection, collation, and flow, feedback mechanisms, programme strengths and constraints, and suggestions to remedy gaps are discussed.

The Government of India has identified Mizoram as one of the 10 states for implementation of the Integrated Disease Surveillance Programme. Salient features of the same will be discussed in brief.

5.2 Disease Burden of Mizoram, 2002.

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Abstract

Background

In the context of absence of formal Disease Surveillance System in Mizoram, analysis of available secondary data is needed to know the disease burden. A clearly focused evidence based policy and strategy can be developed.

Mizoram, land of the 'Mizos' formerly just a district under Assam lies at the southern tip of North East India. It attained UT status in 1972 and Statehood in the year 1987.

Methods

A retrospective study of secondary data from all Government institutions in Aizawl district.

Results

Morbidity due to communicable disease-39.4%, non-communicable diseases-17.9%, Nutritional deficiency diseases-1.1% and Non-specific symptoms-41.2%. Mortality due to Non-Communicable Diseases-65.5%, Communicable Diseases-33.5%, Nutritional deficiency diseases-0.8% and Non-specific symptoms-0.2%. Overall, males were more affected than females.

Conclusions

Aizawl district is struggling under the burden of Communicable and Non-Communicable Diseases. Developing, implementing and evaluating new models of comprehensive, integrated health surveillance and promotion interventions for targeted prevention and control of disease burden is needed.

Government of India identifies Mizoram as onoe of the 10 states for implementation of Integrated Disease Surveillance Programme (IDSP). A Population Based Cancer Registry (PBCR) has been proposed by the Government of Mizoram to the Indian Council of Medical Research (ICMR).

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