J. Nep. Med. Ass. (1973) 11-5 & 6

A Brief Study On The Epidemiology Of Filariasis In Nepal

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1. Introduction

No study on the prevalence of Filariasis and much less on the epidemiology of the disease has so far been undertaken in Nepal. What little data is available regarding the occurrance of the disease is culled from hospital attendance in Kathmandu, Birganj, Biratnagar and Nepalganj In these urban areas, and perhaps in other areas too, the disease might be prevalent; if so. its occurrance, transmission, extent and distribution, epidemiological, entomological, socio-cultural and environmental aspects involved have to be understood. Hence, the snbject was taken up for study

It was proposed to cover various ecological environments to encompass urban, semi-urban and rural conditions. Areas of study were therefore taken up to include high and low hill valleys as well as terai plain. The population studied included varying social, cultural, occupational and economic levels. The period of field study was from August to October, 1972

2. The Study Area (See Map 1)

BARA BISHE – Altitude 4100' MSL, hill-river-valley, semi urban, commercial / agricultural occupation, economic level average (map ref. 1)

DOLALGHAT – Altitude 2600' to 3000' MSL, hill-river-valley, rural, mainly agricultural occupation, economic level average, considerable migratory population passing through. (map ref. 2)

BANEPA – Altitude 2000' to 2500' MSL, hill-valley, semi urban, commercial / agricultural occupation, economic level above average (map. ref. 3)

GOKARNA – Altitude 4300' to 4400' MSL, hill valley, mainly agricultural occupation, economic level-above average. (map ref. 4)

PATAN – Altitude 4500' to 4600' MSL, hill valley, urban, commercial / industrial occupation, economic level above average. (map. ref. 5)

PALUNG – Altitude 5800' MS, hill valley, rural, mainly agricultural occupation, economic level above average, considerable migratory population passing through. (map ref. 6)

BHAISE – Altitude 1200' – 1800' MSL, hill – river valley, rural, agricultural occupation, economic level average, migratory population passing through. (map. ref. 7)

HETAUDA – Altitude 900'–1200' MSL, low hill-valley (inner terai) snrrounded by foot hill and forest, urban commercial / agricultural occupation, economic level above average, migratory population passing through. (map ref. 8)

BIRGANJ – Altitude 500' – 700' MSL, cultivated plain (terai), urban commercial / industrial economic level above average, migratory population passing through. (map ref. 9)

2 1 The temperature and rainfall data in respect of Patan and Birganj study areas pertaining to the year 1972 is given in graphs 1 and 2.

The temperature in mid-winter ranges from 2°C (min) to 18°C (max) and in mid-summer ranges from 16°C (min) to 28° (max); and, the rainfall in mid-winter is 2 cm and the height of monsoon season ranges from 25 to 50 cm in Kathmandu. (Patan study area).

The temperature in mid-winter ranges from 8°C (min) to 25°C (max) and in mid-summer ranges from 22°C (min) to 38°C (max); and, the rainfall in mid-winter is 3 cm and in the height of monsoon season ranges from 21 to 24 cms in Parwanipur (Birganj study area).

.3 The Survey:

Three indices were taken up for study. They were (i) crude disease rate (ii) human infection rate (iii) vector infection rate.

In all the study areas, house to house surveys were made between 8 to 12. p. m. in the night and all the inmates of each house were examined.

THE
AL ASSOCIATION

EDITORIAL

ULOSIS OF THE LUNG, (VIII)

Disease which should never be seen by the Surgeon. Patient with tuberculosis, including those with advanced Standard triangle therapy (Streptomycin, INH + PAS or thiacetazone when first seen. Why is it then that here in Nepal more of the disease or are, aequiring the efforts of the lung answer is drug resistance – and we physicians are at least

With the tuberculosis is first seen he must be started on a Continuous therapy:

1. gram I. M. daily for one month
2. 5–10 more months
3. daily for 12–24 months

than this, or if we do not impress the patient with the 36 months.

Or the emergence of drug-resistance strains of acid-fast bacillus.

This is of terrible significance not only to that particularly patient, who may have lost his only chance for health, but also to his entire society.

Surgery is indicated, then, only in those tragic cases where drug therapy has failed.

What are the specific anotomic indications for surgical therapy ?

(a) Open cavities with positive sputum.
(b) Bronchiactatic lung (especially if accompanied by recurrent hemoptysis)
(c) Destroyed lung,
(d) Trapped lung,
(e) Empyema,
(f) Tuberculoma.

Of these, only some cases of open cavity or of empyema can be treated by collapse therapy –the reminder requiring resection.

The physiologic indications for surgery require that the patient have adequate pulmonary reserve to withstand the temporary limitation of that accompanies any thoracotmy. In general clinical examination is as valuable in determining physiologic risk as the more sophosticated methods of determining pulmonary function. If the pulse rate, and, the rate and character of respiration are determined pre and post standard exercise (at Bir Hospital we walk the patient two flights of stairs) the risk fo thoractomy can be quite accurately predicted.

Surgical procedures, in general, play their part in re–treatment rather than initial treatment. This is because the second–line drugs are much less likely to cure the disease than the first line drugs.

Chemotherapeutic control may also determine the type of surgery to be carried out. In general, resectional therapy should be carried out when chemotherapeutic control is complete (the sputum is negative) collapse therapy is necessary in case of incomplete control (the sputum is positive for AFB).

An additional indication for surgical therapy is that groups of psychologic, social and economic factors which indicated that the patient will not or cannot afford or be relied upon to take his medication as directed. In such situations, where the patient becomes a danger to himself, to his society, surgical therapy must be considered.

What types of surgery are we considering ? Basically three: resection, collapse and decortication.

Resection: ideally resectional therapy should be carried out when the disease pro-

cess appears stable by X-ray examination and the sputum is negative for AFB. The complications in resectional surgery carried out with positive sputum is prohibitive (in lobectomy, for instance, the complication rate with negative sputum is 1/20 that where the sputum is positive). For this reason resection should generally be considered only when the sputum is negative. The conversion of sputum to negative is probably the outstanding use of the "second-line drugs, which are usually not curative themselves. Often the second line drugs will temporarily convert the sputum to negative usually one to two weeks after being started. This is the time that resection should be carried out. If too much time is allowed to go by after starting second-line medications the sputum may revert to positive and the chance for curative resection lost.

Collapse therapy is indicated where an open cavity is associated with positive sputum; it is effective only when the cavity is located above the level of the posterior aspect of the fifth rib.

The basic type of collapse therapy are thoracoplasty. phrenic nerve crush, pneumothorax and pneumoperitonium. The last three are rarely used today but may be considered in patients with severe hemorrhage who do not appear well enough to tolerate resection or thoracoplasty. Thoracoplasty is usually of the type where the posterolateral positions of the seven ribs are removed in three stages (one to two weeks appart). Tailoring throcoplasty may also be done when future resection is to be carried out and residual surface is effected; in this case usually the major three ribs are removed and the resection carried out about three weeks later.

Throcoplasts, where a prosthetic matarial (parafin, etc.) is placed within the chest wall to collapse the lung, is becoming a more popular method as it is carried out in one stage and is less deforming than the thoracoplasty.

Decortication involves removal of fibrin peel from the surface of collapsed lung. Every attempt should be made, as soon as possible, to expand collapsed lung with the use of large chest tubes. If this is unsuccessful decortication will expand the lung increasing pulmonary function: and also obliterating the pleural space where empyema is otherwise almost inevitable.

The results of surgical therapy are most encouraging, in particularly considering that the patients are usually those most seriously ill with the disease. At the present time, of all patients treated in the United States by surgical means only 3% will require readmission to the hospital for further treatment. The overall mortality rate is approximately 2½%. The success rate, then, is in the range of 94–95% a remarkably fine record in a group of patients most of whom would otherwise have ramained hopelessly ill

with the disease.

To reiterate, the important message here is that the patient who contacts tuberculosis is curable with medical means alone if he is treated with triple therapy for 18–36 months. If he is not properly treated and develops resistant organisms and the complications of tuberculosis surgical therapy as described here, is available and offers good hope of success.

(Michael L. Small)

REGIONAL MOBILE MEDICAL TEAM FOR NEPAL (IX)

The concept, the purpose and the objectives of the national health service very in different countries depending on their different level of social and economic development. The concept of our health service is still in the fluid state, though our objectives to provide basic health care and our emphasis in the public health measures are clear and explicit. Any future planning of this service should cosider these basic objectives aim at broadining the scope of application of these objectives, and visualise the state of our health service seen in prospective over next 20 years or so on the background of our present state of affairs, the possible inputs, variables and constraints. This long term plan then should be phased out over 3 to 5 years term, no change at the basic plae is done at random unless there is good reason for doing so.

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The biggest constraint in our development, and in our effort to make avaliable to the people the effective basic social services like education and health at economic price is our geography – the mountainous terrain with defficult communication and the widely and thinly scattered pattern of habitation in the hills. Because of it anything being done in the hills – providing developmental potantials, schools or health facilities becomes uneconomical in terms of the number of people benifited by these. The concept of Regional Development Centres have focused and underlined the need of the multicentric and parallel development in different regions. The resettlement areas like Khajura in Nepaljung has made possible for concentration of the people from widely

4.4 The mosquito infection rate in culex fatigans is given in Table VII.

Table VII

Mosquito infection rate by area surveyed

	All Culicires		Culex fatigans				
	Number collected	Man-hour density	Number collected	Man-hour density	Number dissected	Number Positive	Infection rate per cent
1. Barabise	1011	39	975	35.6	326	22	6.74
2. Dolalghat	7	.03	5	0.25	5	0	0.00
3. Banepa	1164	30	1069	30.3	508	48	9.44
4. Gokarna	379	31.5	421	31.8	408	37	9.06
5. Patan	649	49.5	351	28.08	87	3	3.42
6. Palung	279	12.1	239	10.26	227	0	0.0
7. Bhaise	16	1	1	0.06	2	0	0.0
8. Hetauda	200	6	152	4.6	143	20	13.98
9. Birganj	422	15.5	389	14.4	389	33	8.48

5. Findings of the study

5.1 Study areas and Population

Of the 9 areas selected at random for the study which are distributed in the hill valleys and terai plain, 3 are of urban environment, 2 are of semi - urban environment and 4 are of rural environment. The urban population approximately ranges from 3,000 to 16,000 the semi-urban from 1000 to 5000 and the rural from 250 to 2000.

Prior to commencement of the study, Wada Panch and socially minded people were contacted to discuss its objective and purpose and to request their participation. On the whole, the participation of the people was encouraging especially in the rural areas. It is unfortunate that in Birganj only a part of the outer fringe of the town could be covered which in reality should be considered as of the semi-urban type.

The percentage of the population surveyed to total was, urban - 5 to 30 %, semi-urban 15 to 61 % and rural 17 to 94 %.

5.2 Crude disease rate

Only one of the visible fanifestations of the disease, namely, elephantoid condition of the lower and upper limb, genital and breast was taken into consideration as it was realized that identification of filarial fever, lymphangitis, lymphadenitis, chyluria etc would not be feasible due to the limitations of the field staff employed. Also, due to lack of women surveyors enlargements recorded in women were confined merely to lower and upper limbs. The overall crude disease rate in all the age-groups, and both the sexes ranged from 4.99 to 6.15% in the urban population, 6.6 to 10.3% in the semi-urban population and 1.2 to 17.8% in the rural population.

The coverage of the urban population was minimal in Birganj (5.6%) intermediate in Patan (10.3%) and maximal in Hetauda (30.5%). In regard to the semi-urban and rural population, the coverage was maximal where they are compactly situated - for instance 61.8 % in Barabishe and 94. % in Dolalghat and minimal where the houses are scattered - for instance 15% in Banepa and 17% in Palung.

5.3 Microfilaria rate

The microfilaria rate ranged from 7.1 to 9.16% among the urban population, 10.03 to 11.13% among the semi-urban population and 0.8 to 17.69% among the rural population.

As can seen from Tables IV to VI, the reflexion of the quantum of human infection would appear to be somewhat related to the extent of coverage of the population concerned. Human infection was detected to a lesser or greater extent in all the 9 areas taken up for study among all the age-groups except the lowest category and among both the sexes.

5.4 Mosquito infection rate

Entomological investigations were undertaken during the period August to October 1972, starting with Bara Bishe in August, moving southwards through the different study areas and ending in Birganj in October. Thus, the entomtological activities were carried out in the northern hill valley locations during the late monsoon season and in the southern hill valley locations and the terai location during the post-monsoon season.

Culicire mosquitoes were recorded in all the 9 study areas, the overwhelmingly

predominent species being **culex fatigans** –the vector responsible for transmitting W. bancrofli. The findings did not reveal the presence of any **Mansonioides** species. Man – hour density of **culex fatigans** ranged from 4. 6 to 28.08% in the urban setup, 30.3 to 35.6%in the semi–urban setup and 0.06 to 31.8% in the rural areas.

5·5 Discussion

5.5.1 Urban areas with a population coverage of only 5.6% in Birganj and 10.3% in Patan, the extent of the prevalence of the disease is still not determinable; however, the recorded crude disease rate of 4.99% and 6.15% respectively would indicate a status of endemicity. In Hetauda, a recently formed and growing township, the crude disease rate of 6.5% among the 30.5% of the population surveyed would indicate that the problem of filarial endemicity is bound to build up as true passes.

The man–hour density of **culex fatigans** and the mosquito infection rate were considerably high in Birganj and Patan, namely 14.4% and 28.08%, and 8.48% and 3.42% respectively. On the other hand, in Hetauda, even though the man–hour density of **culex fatigans** was only 4.6/., the mosquito infection rate was quite high, namely 13.98/. Thus, there is ample evidence to show that active transmission of filariasis is occurring in all the three areas.

5.5.2 Semi–urban areas

With a population coverage of 6.6/. in Banepa and 61.8/. in Bara Bishe, the crude disease rate in these two areas was found to be 6.6/. and 10.3/. respectively which would also indicate the existence of a status of endemicity.

The man-hour density of **culex fatigans** and the mosquito infection rate were considerably high in Banepa and Bara Bishe - 35.6/. and 30.3/., and 6.74/. and 9.44/. respectively – which again would indicate that active transmisson of filariasis is occurring in these two areas.

5.5.3 Rural areas

It is of great interest to note that in all the four rural areas studied there was evidence of the prevalence of filariasis, the crude disease rate being 1.20/. in Bhaise, 3.85/. in Palung, 12.63/. in Gokarna and 17.8/. in Dolalghat. Obviously, Dolalghat and Gokarna are highly endemic for filariasis and the disease is on the way to establishing

itself in Palung and to a leseer extent in Bhaise.

There is no doubt about the active transmission of the disease in Gokarna with a man-hour density of 31.8% of **culex fatigans** and a mosquito infection rate of 9.06%. The picture was rather different in Dolalghat; though the crude disease rate and microfilaria rate were significantly high (17.8% and 5.53%) the han-hour density of **culex fatigans** was quite low, (0.25%) and the mosquito infection rate was nil perhaps due to environmental factors not favouring vector breeding at the time of the study. In spite of the fact that Palung and Bara Bhaise are situated in sloping hill valleys, the man-hour density of **culex fatigans** was 10.26% in them former and 0.06% in the latter and the mosquito infection rate was nil build up of a low grzde endemicity had still been possible in these two rural areas, transmission obviously occurring in favourable seasons.

6. Conclusion

The data from the hospitals in Kathmandu, Biratnagar, Birganj rnd Nepalganj provided a porter to the existence of filariasis, but primarily related to these urban areas. Hence, an attempt was made to gather further information regarding the natural history of the disease in some parts of Nepal. However, it has to be admitted that the study was limited in its scope and extent, had its own limitations and was rather rapid

A randomized selection of the areas of study was made to include differing physiography, environment, developmental status aad socio-cultural and economic aspects. The selection of study locations encompassed hill areas, mid-land areas and terai plain and, mainly on the basis of environmintal factors, where divided into urban, semi-urban and rural types (See Map I and Table I). Meteorological data were gathered as far as available to corelate the entomological investigations to be carried out (See graphs I and II).

The epidemiology of filariasis in the study areas was revealing. No matter as to whether the area concerned is environmentally classifiable as urban type, semi-urban type or rural type, there was ample evidence to show that the disease was prevalent to a greater or a lesser extent in all the 9 areas studied and that there was a continuing active transmission going on. The prevalence

was noted in Birganj which is at an altitude of 500' - 700' MSL as well as in Palung situated at an altitude of 5400'-5800' MSL, irrespective of the variations in temperature and rainfall.

To the extent population coverage and entomological surveys had been possible, it can be considered that filariasis was found to be of low-grade endemicity in 2 areas, moderately endemic in 4 areas and highly endemic in 3 areas. Except infants and children below 2 years age all other age-groups among both sexes were affected. Crude disease rate (See Table II & III) and microfilaria rate (See Tables IV, V & VI) were found to increase with ascendency of age from childhood to adulthood in both sexes. The late manifestation of the disease had affected both sexes about equally - 8.2% of the males and 8.4 % of the females exhibiting swellings. As to the sites of the late manifestation of the disease in males swelling of the scrotum accounted for 54.9%, lower limbs 44.1% and upper limb 2.2%; in females swelling of the lower limb accounted for 92.2% and upper limb 7.8%. For obvious reasons, swelling of breast etc in females could not be properly ascertained and, therefore, particulars in this regard were not recorded.

The ubiqutors adult vector mosquito **culex fatigans** was found not only in urban type areas but also in semi-urban and rural type areas. During the period August to October, late monsoon to post monsoon season, the man-hour density of the vector was considerably high in 6 of the 9 areas studied. Not only was there breeding of the vector in all the areas but active transmission of filariasis could also be demonstrated in 6 out of the 9 areas (See Table VII). It is, therefore, clear that with the presence of the vector mosquito capable of active transmission and carriers of the disease, filariasis had stabilized in 7 of the areas studied and was in the procese of establishing itself in the other 2 areas.

It has to be considered as to where from the source of infection had originally reached these areas, and when and how. Though it was difficult to ascertain this information with any certainty, it is logical to assume that as a result of constant migration of people so common in the country, infected migrants from within and outside the country especially traders, artisans, professionals etc might have constituted the nuclei to initiate a gradual spread of the disease wherever they had settled. As the localities picked up population and began to

grow, the resultant worsening of environmental sanitation would have certainly favoured unabated breeding of the vector mosquito and the pace of transmission and establishment of the disease would also have increased ultimately leading to a build up of a status of endemicity.

Contraty to the common belief that filariasis is essentially a problem of urban area, the study has given an insight of the prevalence and incidence of the disease in semi-urban and rural areas as well. There is a fair indication that should the study be extended to cover other areas of the country the extent of the problem could be determined. There is no doubt that in due course of time as a result of increase in population, further lack of environmental sanitation and constant movement of great many infected persons there is a likelihood of extensive dissemination and stabilization of the disease in the community.

Owing to stagnation of sullage, sewage and organically polluted water collections not only in urban situations but also in semi-urban and rural situations already there is evidence of unrestricted breeding of **culex fatigans** which is bound to continue. An all the year round entomological survey would indicate a clearer picture in this regard. It is obvious that environmental factors will definitely influence the epidemiology of filariasis to a large extent and with no prospects of introduction of environmental sanitation in most areas in the near future, the course the disease might take could tax a burden on the health services of the nation later on. Hence there is an urgent need for planning environmental measures directed against **culex fatigans** and therapeutic measures directed against carriers of **W. bancrofti** to ensure that filariasis does not become a major public health problem sapping the vitals of production and economic development of the country.

Acknoweldgement

For encouraging to undertake a study of the subject, for designing and developing the study and for actively assisting and cooperating in the conduct of the study, the writer is extremely grateful to Dr. P. G. Kesavalu, W. H. O. Senior Malariologist. The writer is very thankful to Mr. Shambu Lal Shrestha and his team of workers for their help in carrying out the field work.

Reference

Filaric survey in various states in India
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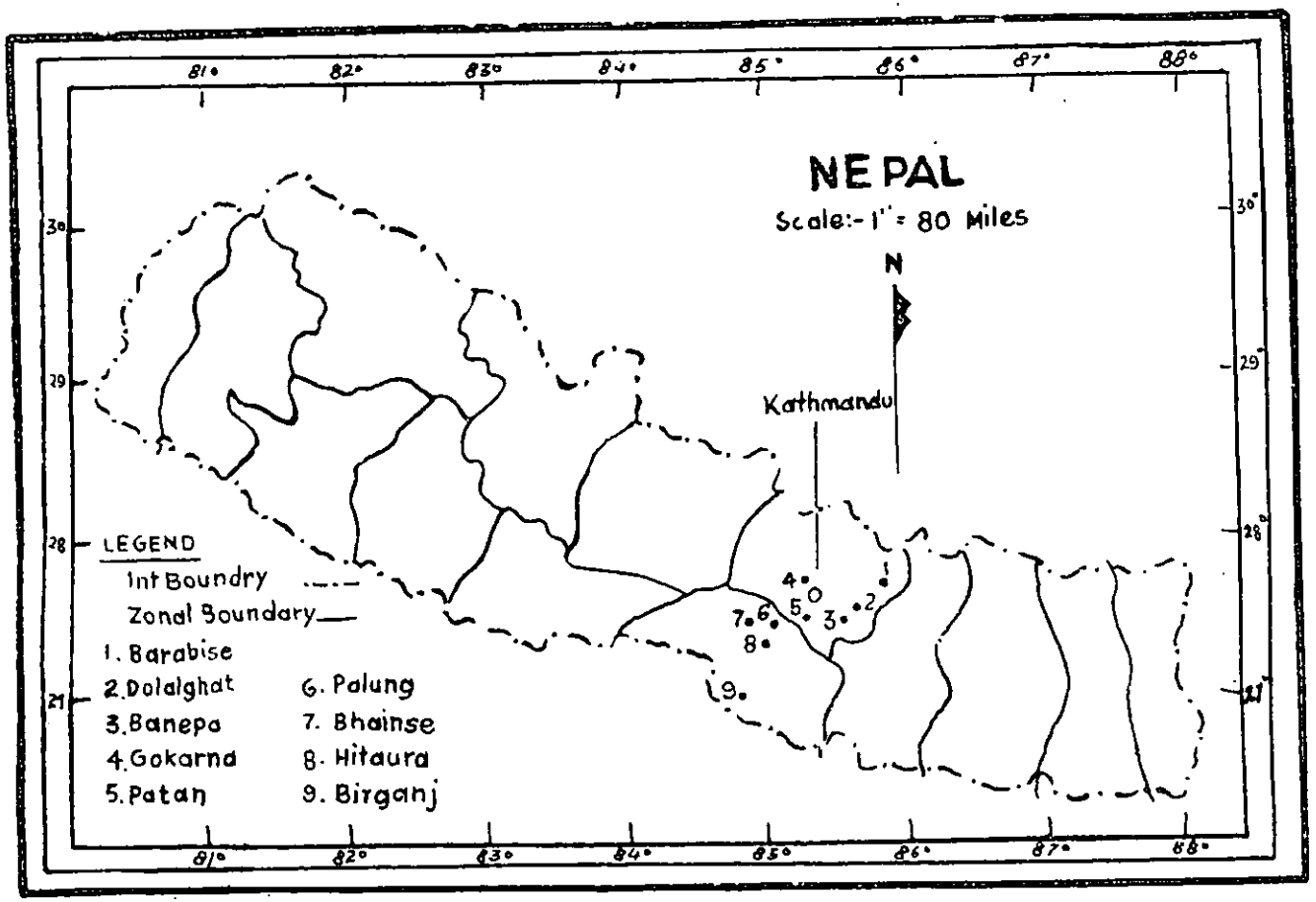
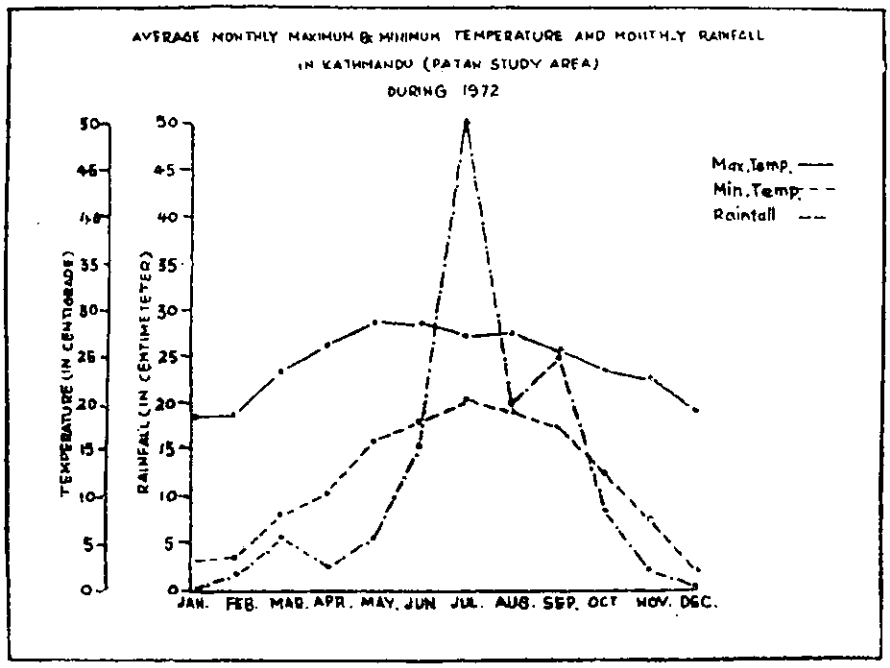
MAP I


NEPAL
Scale:- 1" = 80 Miles
N
Kathmandu
81°
82°
83°
84°
85°
86°
87°
88°
30°
29°
28°
27°
LEGEND
Int Boundry
Zonal Boundary
1. Barabise
2. Dolalghat
3. Banepa
4. Gokarna
5. Patan
6. Palung
7. Bhainse
8. Hitaura
9. Birganj

GRAPH I



GRAPH II