

A REPORT ON KALA-AZAR IN ASSAM

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Introduction

NATURAL calamities, such as earthquakes, famines, etc., have at times been followed by epidemics of kala-azar. The earthquake of 1934 that caused great devastation in North Bihar was followed by an outbreak of kala-azar during the next few years. Mitra (1938) calculated that there were 90,000 cases of kala-azar in North Bihar. The earthquake of 1918 which affected Bengal and Assam was followed by an epidemic wave of kala-azar in these two provinces that continued till almost the end of the nineteen twenties. Earthquakes, if severe, cause the accumulation of rubble and debris of demolished houses and a general increase of insanitary environments suitable for shelter and multiplication of the insect vector of kala-azar, viz, the sandfly *Phlebotomus argentipes*, in large numbers. The population living in the midst of these ruins of dwelling places are very liable to be bitten by the infected sandflies, and thus have increased chances of developing kala-azar. It may be recalled that another leishmanial disease transmitted by the sandfly *Phlebotomus papatassii*, viz, oriental sore, occurred in an epidemic form in Quetta soon after the earthquake of 1935. The severe earthquake that occurred in Assam in 1897, in the midst of an epidemic in Nowgong district, was followed by spread of kala-azar to Golaghat subdivision in Sibsagar district during the next two years and in the Nowgong district itself the epidemic of kala-azar accounted for the death of about 30 per cent of the population. The investigations on which the present report is based were undertaken in order to determine the effect of this earthquake of the 15th August, 1950, on the incidence of kala-azar in that State, and to assess the effect of the control measures adopted so far on the incidence of kala-azar in Assam. The present report thus includes all these aspects of kala-azar problem in Assam and is divided into the following sections: historical considerations; the incidence and distribution of kala-azar in Assam; the trends of incidence of kala-azar in the endemic districts; the epidemics of kala-azar in Assam and their features; the recent earthquake and the incidence of kala-azar in Assam; the problem of drug-resistant kala-azar; control of kala-azar in Assam; and conclusions.

Historical considerations

The first epidemic outbreak of kala-azar occurred in the Garo Hills district between 1875-83, the epidemic form of the disease being very probably introduced into the south-western part of the district from Rangpur district in North Bengal where there had been a terrible

epidemic between 1871-76. It is, however, possible that kala-azar was present in a sporadic form in the Garo Hills district as early as 1869. The spread of this epidemic of kala-azar into Assam has been described in detail by Rogers (1908) (see map I, p. 269). Kala-azar affected Goalpara between 1882-87, extended southwards to Kamrup and to some villages on the north bank of the river Brahmaputra and then reached Gauhati in 1888. There was a road connecting Gauhati to Mangaldai subdivision in Darrang district and kala-azar appeared in this area during the next year. The spread of kala-azar eastwards along the north bank of the river was slow because of the lack of good roads. But the neighbouring district of Nowgong that was in direct communication with Gauhati (Kamrup district) by the Assam Trunk Road was badly affected by kala-azar during 1892-98. There was an outbreak of kala-azar in Golaghat subdivision in 1899 and the extension of the disease to other parts of Sibsagar district took place during the first two decades of the present century.

This first epidemic wave of kala-azar had disastrous consequences on the population of Assam. In the Garo Hills district large numbers of villages were abandoned and thus ceased to exist. In Goalpara deaths due to fevers rose from 9,000 to about 13,000 per year and in Kamrup district from 5,000 to 7,500 per year at the height of the epidemic. It was estimated that about one-third of the population lost their lives during the Nowgong epidemic of 1892-98. In the affected areas the land lay fallow and tall grass and weeds covered what had once been rich rice fields.

During the last fifty years other epidemics of kala-azar have occurred in Assam, and kala-azar is still widely prevalent in the province.

The incidence and distribution of kala-azar in Assam

Table I shows the total number of fresh cases of kala-azar occurring in the different districts of Assam during the ten years 1940-49, along with the population of the districts. The average population of the districts has been calculated as the mean of the populations in 1941 and 1950. The specific morbidity rate, i.e. the number of cases (of kala-azar) per 100,000 population per year, has also been worked out for each district. Map II (p. 269) shows the distribution of kala-azar in Assam and the specific morbidity rate for the different districts.

From the map, it will be apparent that the districts where kala-azar is highly endemic are Cachar in Lower Assam and Garo Hills district, Goalpara, Kamrup, Darrang, Nowgong and Sibsagar districts in the Brahmaputra valley. Lakhimpur district shows slight degree of endemicity. The few cases that are reported from other areas in Assam are not indigenous but are imported from the different endemic districts.

Kala-azar being a house, site and family infection, its distribution in a district is in the form of many intensely endemic foci separated from each other by healthier or relatively free areas. This is illustrated from the fact that in Sibsagar district, there are areas where the specific morbidity rate is very much higher than the district taken as a whole, e.g. specific morbidity rate for Sibsagar district is 265.5, while that of an area in Sibsagar subdivision, viz, Namtiali area, is 1,140 per 100,000 population per year. The disease is often more prevalent in rural areas than in towns, e.g. at Jorhat town very few indigenous cases occur but there are numerous cases from several villages within a few miles of the town.

From a study of the figures relating to the incidence of kala-azar, it will be found that the total number of cases of kala-azar occurring in the highly endemic districts of Assam was 155,147 during the period 1940-49. The average total population of these districts was 6,229,614.

Thus, about 1 in 40 people of these highly endemic districts of Assam got kala-azar during the decade 1940-49. As second attacks are known to be extremely rare all the attacks must be considered as fresh.

the number of such cases in some random samples, viz, obtained from the returns of some dispensaries and other sources in the districts, provide useful data for ascertaining the trends of incidence of kala-azar in these endemic districts :

1. Lakhimpur district

Except for a few indigenous cases reported from certain villages adjacent to Sibsagar district, the cases of kala-azar reported from this district are all imported from other kala-azar endemic areas and are treated mostly at the hospitals at Dibrugarh and at the various tea estates and oil company hospitals and dispensaries. All the cases of kala-azar seen by me at the hospital of the Assam Medical College, Dibrugarh, were imported from other districts, particularly Sibsagar. In one group of tea estates with a population of 40,000, there were only six cases of kala-azar during a period of the last five years and all these were imported cases.

The figures relating to the number of fresh cases of kala-azar during the last fifteen years

TABLE I
Incidence of kala-azar in Assam, 1940-49

Districts	Population, 1941	Population, 1950 (expected)	Average population	Number of kala-azar cases between 1940-49	Specific morbidity rate
Cachar*	641,181	933,414	787,297	11,056	140.4
Goalpara*	1,011,285	1,137,047	1,075,666	24,969	232.1
Kamrup*	1,264,200	1,532,487	1,398,343	15,005	107.3
Darrang*	736,799	878,630	807,714	21,516	266.3
Nowgong*	710,800	849,130	779,965	33,600	430.7
Sibsagar*	1,074,741	1,206,724	1,140,731	30,296	265.5
Lakhimpur	894,842	1,053,751	974,296	572	5.8
Khasi and Jaintia Hills	118,665	127,404	123,034	1	< 0.1
Lushai Hills	152,786	181,168	166,977	3	< 0.1
Naga Hills	189,641	200,438	195,040	39	1.9
Garo Hills*	223,569	256,227	239,898	18,705	779.7
Sadiya Frontier Tract	60,118	65,705	62,612	1	< 0.1
Balipara Frontier Tract	6,512	8,262	7,387	0	< 0.1
Manipur State	512,069	578,532	545,300	3	< 0.1

* Indicates the highly endemic districts.

The trends of incidence of kala-azar in the endemic districts

The total number of fresh cases of kala-azar in the districts per year for the last 30 years and

in this district indicate that there is a progressive decrease of kala-azar. The following figures showing the number of fresh cases per month since January 1949, also show the same trend :

Total number of kala-azar cases in Lakhimpur district in 1949

Months	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Fresh kala-azar cases.	0	0	5	0	1	4	5	1	11	4	0	2

Total number of kala-azar cases in Lakhimpur district in 1950

Months	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Fresh kala-azar cases.	0	0	0	0	0	1	0	0	0	0	0	0

2. Sibsagar district

Sibsagar district as a whole shows a high degree of endemicity. All the three subdivisions, viz, Sibsagar, Golaghat and Jorhat, are bad kala-azar areas. There are many intensely endemic foci of kala-azar in this district, e.g. the area served by Namtiali Public Health Dispensary with a population of 20,000. The total number of fresh kala-azar cases seen at this dispensary during the years 1937-46 are given below :

Total number of kala-azar cases at the Namtiali Public Health Dispensary

Year	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946
Fresh kala-azar cases	71	152	247	357	294	369	334	140	155	151

The total number of fresh cases during this ten-year period was 2,276, i.e. approximately one individual out of ten got kala-azar during this period in this area. The specific morbidity rate works out to be 1,140 per year per 100,000 population.

An attempt was made to estimate the incidence of kala-azar in the tea estates in this area. During the five years 1946-50, there were 164 cases of kala-azar in a group of nine tea estates (average population 13,500) in Dr. E. Burke's practice. The incidence (121.5 per 100,000 population per year) is lower than that of the district as a whole and the adjacent areas are served by Nazira Dispensary and Hospital (specific morbidity rate 159 for the same period).

The figures showing the total number of fresh cases of kala-azar per year during the last 30 years shows that there was an outbreak of kala-azar in this district taken as a whole during the period 1922-32 and again during 1938-48 and that the present trend of incidence is to a decrease. The following figures showing the number of fresh cases per month also indicate a similar trend :

Total number of fresh kala-azar cases per month in Sibsagar district

1949						1950								
Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
220	127	123	134	122	154	121	111	131	136	115	123	134	95	110

Figures were collected from two dispensaries in Sibsagar—Jorhat area.

(1) Jhangia L. B. Dispensary

Year	1945	1946	1947	1948	1949	1950
Fresh kala-azar cases	102	89	81	66	65	63

(2) Nazira Dispensary and Kala-azar Hospital

This is one of the oldest kala-azar treatment centres in Assam being opened in 1918. The

Total number of kala-azar cases at the Nazira Dispensary

Year	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940
Number of kala-azar cases	110	115	96	109	94	42	82	205	220	295
Year	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
Number of kala-azar cases	159	192	187	137	121	165	163	138	59	61

dispensary returns from this centre provide a representative sample of kala-azar cases in Sibsagar subdivision. It serves a population of 36,750.

It will be apparent from the figures that there was an epidemic of kala-azar during the ten-year period 1938-48 and that there has been a progressive decrease of kala-azar since 1949. The specific morbidity rate for the period 1940-49 was 439.7 and for 1946-50, 159 per 100,000 population.

The dispensary returns from these two treatment centres confirm the findings made from the figures relating to the district as a whole, viz, the incidence of kala-azar is showing a steady decrease at the present time.

Golaghat subdivision must be mentioned separately. As stated previously kala-azar has been prevalent in this subdivision for over fifty years now; and this is one of the highly endemic kala-azar areas in Assam still. This will be apparent from the returns of Baruaogaon L. B. Dispensary in the interior of this subdivision serving a population of about 9 to 10 thousand.

From the table on the opposite page it will be seen that during the decade 1940-49, 732 cases of kala-azar were seen in this area. This dispensary serves the population of one mouza and part of the population of another mouza (Ghiadari mouza, 5,098 people plus 4 to 5 thousand people of Atgaon mouza of population of about 7,000), making a total of about 10,000 people. The specific morbidity rate works out to be 732 per 100,000 people per year. This is almost as high as that of Garo Hills district, the worst kala-azar affected district of Assam. The

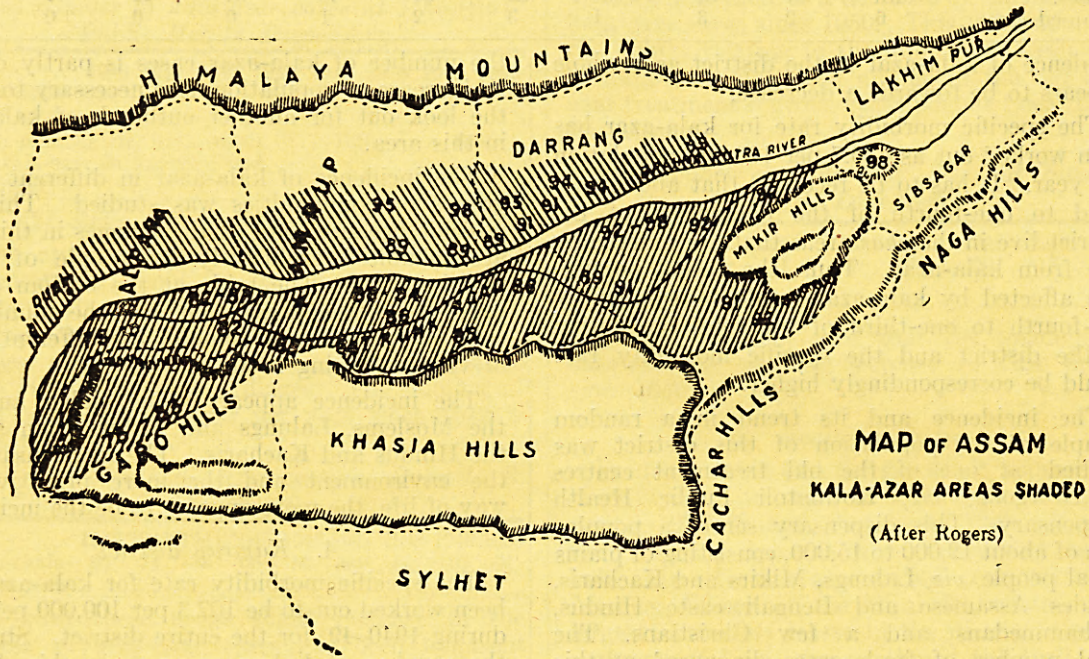
trend of incidence at the present time is towards a decrease.

3. Nowgong district

Nowgong has been a highly endemic kala-azar area since the eighteen nineties. Study of the number of fresh cases per year for the last thirty years shows that there was an epidemic outbreak that ended about 1928 and another began in 1938 and ended in 1948. In general the trend of

MAP I

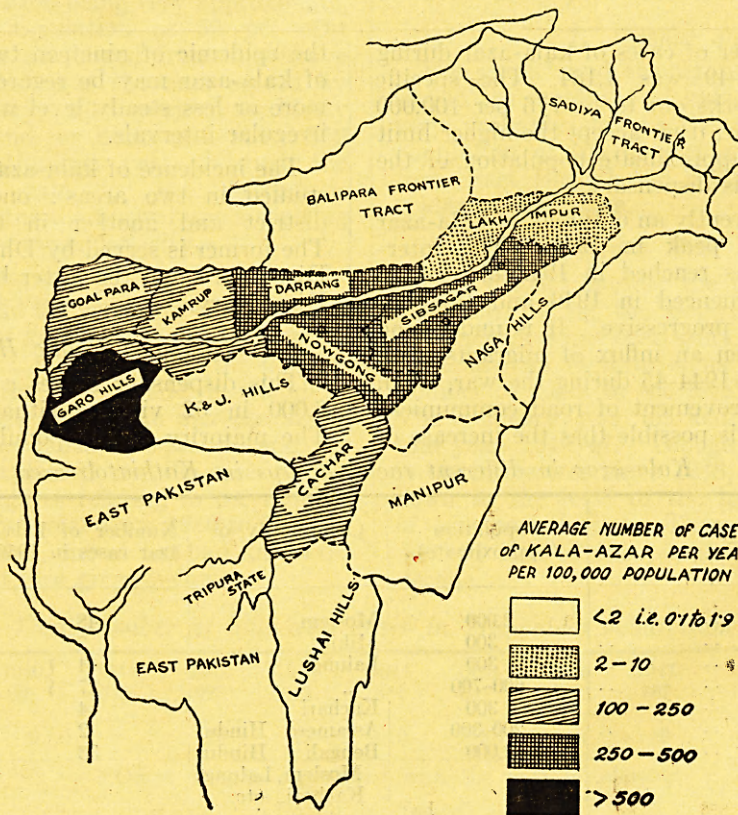
Showing the spread of kala-azar in Assam, 1875-98



MAP OF ASSAM
KALA-AZAR AREAS SHADED
(After Rogers)

MAP II

Showing the distribution and incidence of kala-azar in Assam during 1940-49



Baruaaon Local Board Dispensary

Year	..	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
Fresh	kala-azar cases.	181	91	81	68	82	53	48	64	22	42	12
Relapsed cases	..	6	2	3	1	3	2	1	0	0	0	0

incidence of kala-azar in the district as a whole appears to be towards a decrease.

The specific morbidity rate for kala-azar has been worked out as 430.7 per 100,000 population per year. It has to be recorded that about one-third to one-fourth of the population of the district live in the *char* areas that are practically free from kala-azar. Thus, the actual population affected by kala-azar would be smaller by one-fourth to one-third of the total population of the district and the specific morbidity rate would be correspondingly higher.

The incidence and its trend in a random sample of the population of this district was studied at one of the old treatment centres of Nowgong, *viz*, Kothiatoli Public Health Dispensary. This dispensary serves a population of about 12,000 to 15,000, consisting of plains tribal people, *viz*, Lalungs, Mikirs and Kacharis, besides Assamese and Bengali caste Hindus, Mohammedans and a few Christians. The total number of fresh cases diagnosed at this dispensary during 1934-50 is given below:—

Total number of kala-azar cases at Kothiatoli Public Health Dispensary

Year	..	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
Fresh	kala-azar cases.	72	66	103	166	206	200	265	162	74	68	45	49	129	128	117	133	206

The total number of cases of kala-azar during the decade 1940-49 was 1,164. The specific morbidity rate works out to be 776 per 100,000 population per year, if we accept the higher limit of 15,000 as the approximate population of the area served by this dispensary.

There was apparently an outbreak of kala-azar that reached the peak in 1940. The inter-epidemic level was reached in 1942-43. But a distinct rise commenced in 1946 and this has been more or less progressive. It is understood that there has been an influx of migrants from East Bengal since 1944-45 during the war, when there was an improvement of road communications. Though it is possible that the increase of

the number of kala-azar cases is partly due to an increase of population, it is necessary to be on the look out for another outbreak of kala-azar in this area.

The incidence of kala-azar in different racial groups or communities was studied. This was possible because some of the villages in this area are inhabited exclusively by people of single racial groups. The table at the bottom of the page shows the population and the number of cases of kala-azar in some of the different types of villages during 1950.

The incidence appears to be higher amongst the Moslems, Lalungs and Mikirs than among the Hindus and Kacharis. The more insanitary the environment and the more primitive the way of life, the more appears to be the incidence.

4. Kamrup district

The specific morbidity rate for kala-azar has been worked out to be 107.3 per 100,000 per year during 1940-49, for the entire district. Study of the number of kala-azar cases in this district during the last thirty years shows that following

the epidemic of nineteen twenties, the incidence of kala-azar may be regarded as maintaining a more or less steady level with slight increase at irregular intervals.

The incidence of kala-azar and its trends were studied in two areas: one close to Goalpara district and another in Gauhati subdivision. The former is served by Dhupguri Public Health Dispensary and the latter by Boko Local Board Dispensary.

(1) Dhupguri Public Health Dispensary

This dispensary serves a population of about 6,000 in 52 villages situated in two *mouzas*. The majority of the population is made up of

Kala-azar in different racial groups in Kothiatoli area

Village	Population (approximate)	Community or tribe	Number of kala-azar cases in 1950	Kala-azar cases per 1,000 population
1. Rangalu	2,000	Moslem	48	24
2. Rangbing	300	Mikir	7	23
3. Bilasati	300	Lalung	4	21
4. Uparbari	600-700	"	17	
5. Kacharigaon	300	Kachari	4	13
6. Kothalguri	200-300	Assamese Hindu	2	10
7. Kothiatoli	2,000	Bengali Hindu, Moslem, Lalung, Kachari, etc.	33	16.5

plains, tribal people, viz, Rabhakacharis, Garos and Kochs. The total number of fresh cases of kala-azar diagnosed in this dispensary per year since 1943 is given below :

Total number of kala-azar cases at Dhupguri Public Health Dispensary

Year	1943	1944	1945	1946	1947	1948	1949	1950
Fresh kala-azar cases.	19	39	26	49	39	55	58	80
Total number of fresh cases of kala-azar in January and February.					7			16

(2) *Boko Local Board Dispensary*

The approximate population served by this dispensary is about 14 to 15 thousand living in about 70 villages. Plains tribal people, viz, Rabhakacharis, Kochs and Garos, live in smaller villages and immigrant Moslems and Assamese caste Hindus in larger villages. The number of fresh cases of kala-azar per year since 1942 is given below :

Total number of kala-azar cases at Boko L. B. Dispensary

Year	1942	1943	1944	1945	1946	1947	1948	1949	1950
Fresh kala-azar cases.	64	73	82	66	86	66	65	105	96

In both these areas slight increase in the number of kala-azar cases has been apparent during the last two years. But so far the cases encountered have not been more severe or complications more frequent than during the previous few years.

The figures obtained from both the centres regarding the population being very approximate, if we regard the population as 50 per cent more, the incidence as judged from the above figures is quite high. For the area served by Dhupguri Dispensary, the specific morbidity rate is about 450 and for Boko area about 350 per 100,000 population per year. Though the specific morbidity rate for the district is comparatively low; there are rural areas showing high degree of kala-azar endemicity.

5. *Darrang district*

From the table and the graph* it would appear that the incidence of kala-azar is on the increase in this district. But if we consider the population trend during the last decade, it would be apparent that though there is an increase in the total number of cases during the last decade, the increase can be explained by the rise in the population. The figures relating to the number of kala-azar cases per year from 1940 to 1950, in Mangaldai subdivision, one of the bad kala-azar areas in the district, are given below :

Total number of kala-azar cases in Mangaldai subdivision

Year	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
Fresh kala-azar cases.	908	745	923	640	641	648	743	767	830	764	421
Relapsed cases ..	9	15	10	12	10	8	8	10	16	12	3

The population of the subdivision is 204,000 according to the census of 1941. The specific morbidity rate works out to be about 380 per 100,000 population per year during 1940-49. It appears that there is a decrease of the number of kala-azar cases since 1950. This is borne out by the figures relating to the number of fresh cases of kala-azar diagnosed at one of the old kala-azar treatment centres, viz, Sipaghar Local Board Dispensary.

Total number of kala-azar cases at Sipaghar L. B. Dispensary

Year	1945	1946	1947	1948	1949	1950
Fresh kala-azar cases.	51	53	35	22	18	12

It may be concluded that the incidence of kala-azar is on the decrease in this district since 1950.

6. *Goalpara district*

From the table and the graph* it appears that there was an increase of kala-azar during the period 1938-48 and that since 1949 there has been a steady decrease in the number of cases of kala-azar. It was ascertained from the Chief Medical Officer of the Bijni Raj Estates, the largest *zemindari* estate in the district, that the outbreak of kala-azar continued till 1947, since then there has been a marked decrease in the number of cases and that it was no longer necessary to maintain the special kala-azar hospital at the principal town of the *zemindari* estate, Abhoyapuri.

7. *Cachar district*

The graph* and the figures indicate a steady rise in the incidence of kala-azar. But this is very probably due to the marked increase of population of the district and influx of people from East Bengal and Sylhet, and not due to epidemic conditions.

8. *Garo Hills district*

This district showed the highest incidence of kala-azar during the ten-year period 1940-49. The incidence has been quite high since 1940 and there are no definite signs of decrease of the number of cases to the level before this period. The incidence was markedly high during the four years 1944-47. Though the number of cases is distinctly less since 1948, it has yet to come down to the level of the inter-epidemic period of nineteen thirties. There has not been any marked rise of the population during the last decade.

* Graph will be reproduced with the next instalment.