

A STUDY OF LEPRO REACTIONS

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The purpose of this study of lepra reaction occurring in the Purulia Leprosy Home has been to find out whether there are any other factors besides individual susceptibility which tend to precipitate reaction. For this reason a careful record of all reactions occurring in the Home was kept for twelve months from March 1948 to February 1949 together with the atmospheric temperatures and humidity.

Patients undergoing sulphone treatment have been excluded from this study as this group of drugs tends to precipitate reaction particularly during the first few months of use. Three patients have also been excluded as, although they had one or two lepra reactions, their bouts of fever were later found to be due to co-existent pulmonary tuberculosis and it was difficult to say how many of their reactions were leprotic. All the reactions noted below occurred in active lepromatous cases.

ENVIRONMENTAL CONDITIONS.

Purulia lies in the southern half of Bihar within the area in which the incidence of leprosy is high. This area includes the provinces of West Bengal, Orissa and Madras. The climate in Bihar is much drier than in Bengal or Madras. The rainfall during the period under consideration was 63.76 inches. Two-thirds of this occurred between the last half of June and the first half of September during the rains. The winter is cold and dry but early in March the weather becomes almost suddenly intensely hot. During May the heat is intense and sudden sand storms occur followed by a rapid drop in temperature and often by rain. Purulia is nearly 700 feet above sea level, the soil is sandy and after heavy rainfall the ground soon dries.

The busiest seasons for the patients are in July when the rice seedlings are transplanted and late in November when the harvest is reaped. All patients who are able are expected to go out and do their full share of the work.

During the very hot weather in May patients are given no injections, work is reduced to a minimum and all who are physically able are allowed to visit their homes for a week or fortnight. About one hundred avail themselves of this privilege. There is another rest from injections and work at the Christmas-New Year season.

NUMBER OF PATIENTS.

The number of patients in the Purulia Leprosy Home, excluding about 30 in the cripples' wards, during the period under review was 637.

TABLE I. NO. OF PATIENTS IN HOME ACCORDING TO TYPE-GROUPS.

	<i>Men</i>	<i>Boys</i>	<i>Women</i>	<i>Girls</i>	<i>Totals</i>
L ₁ Bacillus pos.	38	12	7	6	63
L ₂ Bacillus pos.	148	25	101	11	285
L ₂ plus T.B.	5	1	—	—	6
L ₃	34	—	33	—	67
L now Bac. neg.	13	—	16	2	31
N ₁ Early Neural	6	—	9	10	46
N ₃ Terminal Neural	34	1	101	—	139
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Active lepromatous Bac. Pos. Cases	225	38	141	17	421
Bac. Negative Cases	53	22	126	15	216
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	278				
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Active Lepromatous Cases No. having Lepra reactions during year	225	38	141	17	421
	83	14	37	6	140
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% having L.R.s					

It will be seen in Table I that the number of women patients almost equals that of the men, whereas there are twice as many boys as girls. The reason for this is that although many more men are admitted than women there is considerable difficulty in discharging the women even when symptom-free if they have the slightest deformity. The result is the presence of a large number of residual neural (N₃) cases in the Home.—101 compared with only 34 amongst the men. After deducting all these N₃ and early neural and lepromatous cases that have become bacillus negative there were 263 men and boys and 158 women and girls with active lepromatous disease in the Home. The percentage of these 421 lepromatous cases that developed lepra reactions during the year was 33·7%; that is approximately one third. The men, boys and girls reacted almost equally—33%, whereas the reactions amongst the women was only 26%. This is what one would expect as leprosy tends to run a milder course in women. It is, however, surprising that two-thirds of all the active lepromatous cases had no reactions at all during the twelve months although thousands of millions of bacilli were present in their bodies. Their health remained good and they were able to do a full day's work like normal individuals.

Why did some get lepra reactions and others not?

TABLE II. NO. OF LEPRO REACTIONS PER PATIENT DURING THE YEAR.

<i>No. of Reactions</i>	<i>Men</i>	<i>Boys</i>	<i>Women</i>	<i>Girls</i>	<i>Totals</i>
1	46	6	22	3	77
2	20	3	9	3	35
3	8	1	2	—	11
4	4	—	2	—	6
5	4	—	2	—	8
6	1	—	—	—	1
Over 7	—	—	—	—	—

In Table II the number of lepro reactions the individual patients had is recorded. Of the 140 patients who had reactions 77 only had one reaction during the year and 112 had not more than 2 reactions.

Thus 7/9ths had two or less reactions and 2/9ths i.e. 28 cases had 3 or more reactions during the year.

Reactions varied in intensity and duration. Some had rose-red spots with only slight fever, some had high fever, some severe joints pains, nerve pains or iritis. Those who had repeated reactions tended to have them more severely though this was not always the case.

TABLE III. NO. OF LEPRO REACTIONS DURING EACH MONTH OF THE YEAR.

	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
Men ...	23	24	6	17	14	14	11	7	9	7	13	7
Boys ...	5	6	3	3	3	2	4	4	2	3	3	4
Women ...	10	4	8	5	6	6	5	4	7	1	5	3
Girls ...	—	2	1	1	1	—	1	—	2	1	—	—
Totals ...						22	2					

* During the second half of May which is very hot many patients go home for a few days. This probably accounts for the small number of reactions in May. There is however no reactionary rise in June and July showing that neither the holiday nor rest from injections did any harm.

TABLE IV. PERIOD OF YEAR IN WHICH SINGLE REACTIONS PREDOMINATE.

Seventy-seven patients only had one reaction during the year.

<i>Two-monthly Periods</i>	<i>Men</i>	<i>Boys</i>	<i>Women</i>	<i>Girls</i>	<i>Totals</i>
Mar. and April	19	3	4	—	26
May and June	6	0	4	—	10
July and Aug.	9	1	8	—	18
Sept. and Oct.	4	1	3	1	9
Nov. and Dec.	4	0	3	2	9
Jan. and Feb.	4	1	0	0	5

THE EFFECT OF ATMOSPHERIC TEMPERATURE AND HUMIDITY ON LEPROSY REACTION.

In Table III which shows the total number of reactions each month, and in Table IV which shows the distribution of reactions in those patients who only had one reaction during the year, it will be seen that the majority occurred during the hot dry weather between the cold weather and the rainy season.

OTHER FACTORS WHICH TEND TO ENCOURAGE LEPROSY REACTIONS.

A few years ago there was a sharp rise in leprosy reactions following the vaccination of a number of patients against smallpox. This year although most of the children were vaccinated and also had T.A.B. injections we had no increase in reactions.

It was noted however that other illnesses such as pneumonia and dysentery were followed by a severe reaction. Associated tuberculosis did not actually increase the liability to reaction although at first the rises in temperature were thought to be due to reaction.

Practically all the twenty-eight patients who had three or more reactions during the year had had leprosy for several years and had shown a tendency to get reactions easily from the beginning. Most could not stand more than a few cc. of Hydnocarpus oil injections without getting a reaction. We did not find that these particular patients stood large injections better as some writers have stated. Some patients who had previously not been subject to reactions after 2 or 3 years of twice-weekly large injections developed severe reactions and injections had to be reduced or stopped altogether. These patients who react to small doses have also tended to get reactions easily with soluthiazole and sulphones. They seem to have a marked sensitivity. These patients are often afraid of injections and also of doing any manual labour for fear of getting a reaction. On the other hand by judicious coaxing or urging some of them have lost this sensitivity when they have worked in the gardens. There is no doubt that regular exercise in the sun and open air is a very important factor in the treatment of leprosy, as Muir pointed out many years ago.

DISCUSSION.

Leprosy reactions are an interesting and rather baffling study. Probably they are not all due to the same cause or all similar in nature. Some, as has been pointed out, are later found to be due to some associated disease and are not true leprosy reactions.

Some authorities differentiate reaction in tuberculoid leprosy

from that occurring in lepromatous cases because in the former the patients are better and on the way to recovery after a reaction, whereas they are definitely worse after a bad reaction or a series of reactions in lepromatous disease. The writer, however, considers that true lepra reactions occur in both types of the disease and that they are allergic in nature. The theory that the reaction is due to a metastatic dissemination and multiplication of bacilli does not seem at all likely, as in lepromatous cases in which such reactions occur the corium already contains millions of bacilli everywhere and the addition of a few more bacilli through the blood stream would hardly cause such a flare up. Some writers claim that they have noted an increase in the number of bacilli in the rose-red nodules but such an increase must be very difficult to estimate. In the biopsy sections examined by the writer the chief thing noted was a marked increase in intercellular exudation. The rose-red nodules seen in the majority of cases of lepra reaction are transient in nature and seldom turn into permanent firm nodules seen in nodular leprosy. They seem to have more the appearance and character of erythema nodosum of tuberculosis which is probably also an allergic reaction. The swollen painful nerves also seen in lepra reactions are not due to cellular infiltration but to an oedematous condition, and an incision of the nerve capsule often causes marked relief of pain.

The diseases which tend to precipitate a reaction—pneumonia, dysentery etc. cause a general leucocytosis, whereas wasting conditions are seldom associated with reactions.

Two very interesting cases of major tuberculoid leprosy were seen during the year. Leprosy suddenly appeared where there had been no previous sign of the disease. There was a sudden flare up with considerable fever and oedema and scattered reddish areas. Bacilli were numerous. A few months later no bacilli could be found on careful examination. These reactions seemed very similar to reactions in lepromatous cases but the body seemed to be able to react quickly to the stimulus and destroy the invader. Usually in major tuberculoid leprosy there is a rather violent response with oedema but the prognosis is good and the resultant deformity is slight. In minor tuberculoid leprosy the tissue reaction is slight and slow in catching up with the invader. The spread goes on for months or years and ultimate deformity may be considerable unless due precautions are taken. In the of lepromatous cases unfortunately there is no tissue response and no reaction. Not all who did develop reactions were worse after them. The fact that several of these patients eventually got over the lepra reaction tendency, although in the meantime the leprosy

itself had definitely become worse, seems to point to the allergic nature of the reactions.

SUMMARY.

A study of lepra reactions was made in Purulia to find out what factors tended to cause these reactions.

It was found that the majority of reactions occurred during the hot dry season of the year.

Diseases like pneumonia and dysentery frequently precipitated reactions in susceptible patients.

It is suggested that lepra reactions are allergic in nature.