

LEPROSY AMONG FOREIGN MISSIONARIES IN NORTHERN NIGERIA

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The authors, working as medical missionaries in the Northern Region of Nigeria, became interested in the occurrence of leprosy among missionaries in that area after several cases had come to their attention. We therefore thought that it would be of interest to gather as much information of an epidemiologic nature as could be obtained. As far as we know, no previous similar study has been made.

METHOD

After preliminary correspondence with the field secretaries of the Protestant missions working in Nigeria, questionnaires were sent out to these mission officials who distributed them in turn to their missionaries. After they were filled in, these forms were sent to the supervising doctors of the respective missions, who appended clinical information about the persons who had contracted leprosy. Since most of the missionaries and their families are examined annually by these doctors, the reporting of the disease is relatively complete. Furthermore, these doctors have seen many African leprosy patients in the country, and many of the missionaries themselves have some knowledge of the disease.

The questionnaires sent out were entitled "Work Study of the Missionaries." This title was used in order to disguise the nature of the study sufficiently so that the individuals who had contracted leprosy would not fear to fill in the forms. The questionnaires gave information on the following matters: name, sex, date of birth, place of birth, marital state, age on arrival in West Africa, Region(s) of Nigeria and/or French West Africa where each mission has worked, and number of years residence in each area. Type(s) of work done on the mission field (i.e., general medical, leprosy, pastoral and evangelistic, administrative, educational, building, etc.). Number of years engaged in each type of work (broken down into two separate categories: full-time work and part-time work). Inquiry was also made about the professional qualifications of the missionaries: ordained ministers, teachers, doctors, nurses, etc.

The special questionnaire filled in by the doctors for each leprosy patient covered the following information: time of onset of the disease, time of diagnosis, type and stage of disease, diagnostic criteria (skin smears, skin biopsy, lepromin test), treatment, time of arrest of disease, present status of patient, and contact history in home country and West Africa.

In tabulating the material from the questionnaire we applied the following assumptions:

All time periods were worked out to the nearest calendar year. Thus, any period under 6 months was disregarded while any period over 6 months we calculated as a full year.

Missionaries who had been in West Africa less than 2 years were not included in the study. We assumed that the minimal incubation period of leprosy is 2 years and therefore excluded this group. These people composed 7 per cent of the total number of persons.

In working out the number of person-years of work spent in each type of work, we allowed a full year for each year of "full-time" work and a half-year for each year of "part-time" work. Many missionaries spent part of their service in one type of work and part of it doing another. Therefore there is considerable overlapping of the number of persons engaged in the several types of work (in Table 3).

In all the other tabulations, however, each person was counted only once. In order to avoid duplications, we disregarded residence in several different areas of West Africa, and counted only the years spent in the area where the person spent the largest number of years. Thus, if a man spent 1 year in the Western Region of Nigeria and 5 years in the Northern Region, only the residence in Northern Nigeria was counted. The number of these persons with residence in more than one area of West Africa was small.

We decided not to concern ourselves about the periods of time spent by the missionaries in the home countries on furlough between periods of service in West Africa, because it would have made the questionnaires too complicated. Nor have we made any corrections in our tables to take furlough time into account. In some of the missions, this period amounts to one-fifth of the service in Africa, in others it is one-sixth. Thus, it can be assumed that the time periods of residence and work in West Africa in the tables are overstated by 13 to 20 per cent.

All 9 of the Protestant missions working in Northern Nigeria cooperated in this study. Out of the 7 Protestant missions working in the Eastern and Western Regions of Southern Nigeria, 3 cooperated; they represent more than one-half of the Protestant missionaries there. While the numbers of missionaries in Northern Nigeria is large (907), in this study there were only 190 in Southern Nigeria. The total number of foreign missionaries there is smaller than in the Northern Region of the country, because in the former area the indigenous churches are better established and have been able to replace many foreign pastors, teachers and nurses with African people trained in these fields of work. In Northern Nigeria, however, the work of missions is more recent and the African Christian community has not yet developed to the point that the African Christians have been able to replace the foreign missionaries.

There is also included in this study a small group of missionaries in French West Africa. This group represents people working in the territories neighboring on Nigeria—Volta, Dahomey, Niger and Cameroun—under the sponsorship of missions having their headquarters in Nigeria.

We also have collected information on the children of missionaries of school age attending two schools in Northern Nigeria. It was too difficult to obtain information about children of pre-school age living with their parents on the various mission stations, and this has not been done. The school children range in age from 6 to 16, but only 7 are over the age of 13. Older children are sent to the home countries for further education, and have therefore not been included. Also, those school children who have been in the country less than 2 years have been excluded (15 out of 238 children), because we assume that the incubation period of leprosy is at least 2 years.

FINDINGS

POPULATION STUDIED

Number of persons in the study.—The figures of Table 1 show that there was a total of 1,209 adult persons in this study, and that most of them (907, or 75%) lived in Northern Nigeria. Also of interest in the fact that the number of women was almost equally divided between married and unmarried, while only 6 per cent of the men were not married.

The length of residence of the missionaries in West Africa included in the study ranged from 2 years to 42 years, with a mean of 9.9 years. This mean was a good reflection of the experience of most members of

TABLE 1.—*Number of persons in study (1,209), by area, sex and marital status.*

| Area | Male | | | Female | | | Total |
|---------------------------------|--------|---------|-------|--------|---------|-------|-------|
| | Single | Married | Total | Single | Married | Total | |
| North Nigeria | 12 | 309 | 321 | 283 | 303 | 586 | 907 |
| South Nigeria ^a | 11 | 64 | 75 | 59 | 56 | 115 | 190 |
| French West Africa ^b | 3 | 43 | 46 | 26 | 40 | 66 | 112 |
| Total | 26 | 416 | 442 | 368 | 399 | 767 | 1,209 |

^aWestern and Eastern Regions, and South Cameroons.^bVolta, Dahomey, Niger and Cameroun.

the group, for 88 per cent of them had spent between 2 and 15 years in West Africa.

The mean age of these missionaries on arrival in West Africa was 29 years. Only one person was less than 20 and only 9 persons were over 40 years. There was a close clustering of the majority in the 25-34 years age range, reflecting the fact that most of the people had reached maturity and then had some sort of professional training before coming to West Africa.

The places of birth of the missionaries were as follows: 793 out of the total of 1,209 persons, representing 66 per cent, were born in Canada or the United States. Another 233 persons (19%) were born in the United Kingdom or Europe. The remaining 183 (15%) were born in various parts of Asia, Africa or Australasia. All of them were of Caucasian racial origin.

Occupations.—The occupations of the 1,209 adult persons in the study are shown in Table 2. The numbers of clergymen, medical personnel and teachers were approximately equal. The occupation categories are of course reflected in the work done.

TABLE 2.—*Occupations of the 1,209 persons in the study.*

| Area | Clergymen | Medical personnel ^a | Teachers | All others | Total |
|--------------------|-----------|--------------------------------|----------|------------|-------|
| North Nigeria | 192 | 214 | 204 | 297 | 907 |
| South Nigeria | 46 | 48 | 52 | 44 | 190 |
| French West Africa | 35 | 23 | 13 | 41 | 112 |
| Total | 273 | 285 | 269 | 382 | 1,209 |

^aMedical personnel includes doctors, dentists, nurses and laboratory technicians.

Work experience of the group.—The work experience of the missionaries was divided into "leprosy," "general medicine" and "all other" work. As has been explained, there is some overlapping here, so that the total number of persons indicated in Table 3 (1,516) is larger than the actual number involved in the study. Later, when we discuss the leprosy patients, we shall deal with this matter again.

TABLE 3.—*Years of work experience, classified by type of work.*

| Type of work | North Nigeria | | | South Nigeria | | | French West Africa | | |
|--------------|----------------|-------------|--------------|----------------|-------------|--------------|--------------------|-------------|--------------|
| | No. of persons | Total years | Years/person | No. of persons | Total years | Years/person | No. of persons | Total years | Years/person |
| Leprosy | 177 | 699 | 4.0 | 7 | 41 | 5.9 | 3 | 7 | 2.3 |
| General | | | | | | | | | |
| medical | 286 | 1,977 | 6.9 | 44 | 307 | 7.0 | 27 | 97 | 3.6 |
| All others | 727 | 6,733 | 9.3 | 148 | 1,348 | 9.1 | 97 | 705 | 7.3 |
| Total | 1,190 | 9,409 | 7.9 | 199 | 1,696 | 8.5 | 127 | 809 | 6.4 |

Proportions of leprosy work and general medical work.—Table 4 shows, in percentages, the years of leprosy work, and of general work, with relation to the total work years in each area. We wish to point out that the missionaries in Northern Nigeria did proportionately more leprosy work than those in the other areas. There was not so much difference in the general medical work done in the three areas.

TABLE 4.—*Proportions of years of leprosy work, and of general medical work, to total work years, in percentages.*

| Area | Leprosy | General medical |
|--------------------|---------|-----------------|
| North Nigeria | 7.4% | 21.0% |
| South Nigeria | 2.4% | 18.1% |
| French West Africa | 0.9% | 12.0% |
| Total | 6.3% | 20.0% |

School children.—Having completed the tabulation of the information on the adults in the study, we now proceed to analyze the material on the school children. The 223 children in the study ranged in age from 6 to 16 years, the mean being 9.0 years. There was 109 boys and 114 girls in the group. Of this group, 114 were born in Nigeria, the other 109 in the home countries of the parents. Even those born in the parents' home countries had spent more than one-half of their lives in Nigeria. This is reflected in the fact that for all the children the average number of years spent by each child in Nigeria was 7.7.

LEPROSY CASES

After this study of the population in which the leprosy cases were found, the data on the 13 cases which have occurred are given in Table 5.¹ These cases represent all of the persons known to have contracted leprosy in the last 25 years in the missions participating in this study. Inquiries in the United States, Canada and England from the doctors in charge of leprosy institutions and programs there have brought to light no other cases in missionaries from the missions covered in this study.

There is no significant difference in the frequency of leprosy between

¹Shortly after this study was completed another minor tuberculoid case was found in the population concerned, in an unmarried female teacher.

TABLE 5.—*Data on 12 missionaries and 1 child with leprosy.*

| Case No. | Sex and civil status | Birth ^a place | Age on arrival Nigeria | Years in Nigeria at onset | Year of onset | Interval onset/diagnosis | Type ^b of leprosy | First ^c skin smear | Type of work done | History of contact |
|----------|----------------------|--------------------------|------------------------|---------------------------|---------------|--------------------------|------------------------------|-------------------------------|-------------------------|------------------------------|
| 1 | Female single | Canada | 25 | 10 | 1934 | 6 mo. | L | P | Evangelist | None known |
| 2 | Female single | U.S.A. | 23 | 13 | 1940 | 7 yr. | L | 1+ (rare) | Teaching | None known |
| 3 | Male mar'd | U.S.A. | 30 | 14 | 1946 | 3 mo. | T | Neg. | Evangelist | None known |
| 4 | Female mar'd | U.S.A. | 38 | 12 | 1950 | 8 mo. | T | Neg. | Gen. med. | Leprosy ^d (nurse) |
| 5 | Female mar'd | U.S.A. | 24 | 14 | 1950 | 3 mo. | D | 1+ (rare) | Evangelist | None known |
| 6 | Male mar'd | U.S.A. | 28 | 10 | 1951 | 3 mo. | T | 1+ (rare) | Evangelist ^e | Leprosy work |
| 7 | Female single | U.S.A. | 28 | 5 | 1952 | 18 mo. | D | 4+ | Evang. & teach. | None known |
| 8 | Male mar'd | U.S.A. | 29 | 19 | 1953 | 12 mo. | T | Neg. | Evangelist | None known |
| 9 | Male mar'd | Canada | 28 | 4½ | 1954 | 9 mo. | T | 1+ (rare) | Evangelist | Yardman (L) |
| 10 | Female single | U.S.A. | 32 | 2½ | 1954 | 1 mo. | T | Neg. | Leprosy work | (Nurse) |
| 11 | Female single | U.S.A. | 30 | 2 | 1954 | 1 mo. | T | Neg. | Leprosy work | (Technician) |
| 12 | Male mar'd | Canada | 25 | 4½ | 1955 | 12 mo. | T | Neg. | Evangelist | None known |
| 13 | Male child | U.S.A. | 4 | 3 | 1956 | 1 mo. | I | Neg. | School child | None known |

^aAll Canadians were born in nonendemic provinces, and all U. S. citizens but one in nonendemic states (Case 5, born in central part of California).

^bL = lepromatous, T = tuberculoid (all minor), D = dimorphous (macular), I = indeterminate.

^cAll cases had skin biopsies done, except that this information is not available for Case 1. And Case 2 (lepromatous, but almost purely neural) is known to have had a lepromin test made; reaction negative.

^dThis nurse (Case 4) was in general medical work for 8 years, and in leprosy work for 1 year.

^eThis person (Case 6), an evangelist for 9 years, was in leprosy work for a few months.

TABLE 6.—*Summary of leprosy cases among missionaries in Northern Nigeria.*

| Group | Number of persons | Persons with leprosy | Leprosy rate (per thousand) |
|-----------------|-------------------|----------------------|-----------------------------|
| Male adults | 321 | 5 | 15.5 |
| Female adults | 586 | 7 | 12.0 |
| Total adults | 907 | 12 | 13.2 |
| Male children | 109 | 1 | 9.2 |
| Female children | 114 | 0 | 0 |
| Total children | 223 | 1 | 4.5 |

the adult males, with 6 cases, and the adult females with 7 cases, as shown in Table 6. The one case in a male child does not lend itself to statistical significance calculation.

It is a striking fact that all of the cases were found among the missionaries in Northern Nigeria; there was none among those in Southern Nigeria or in French West Africa. If the attack rate had been the same in these areas as in Northern Nigeria, we would have expected to find 4 cases in these two areas, judging either by number of persons or by person-years of life experience. The χ^2 test, using Yates' correction for small numbers, produces an χ^2 of 2.78. This difference might have been observed by chance once in 11 times.

There are several possible explanations for this difference. (1) The prevalence of leprosy in Southern Nigeria is lower than in Northern Nigeria ⁽¹⁾. Surveys done by the Northern Nigeria Regional Medical Department have shown prevalence rates ranging from 15 to 86 cases per thousand population in the various provinces. Some individual villages showed prevalence rates as high as 150 per thousand. The average prevalence in the Region is estimated at 35 per thousand population. The lepromatous rate of the leprosy patients ranged from 10 to 15 per cent ⁽²⁾. Such extensive surveys have not been made in the other Regions of Nigeria.

(2) Missionaries in Southern Nigeria do not do as much visiting in villages as those in Northern Nigeria. This is because the Nigerian Christian churches in the former area are more highly developed. Thus, the contact of foreign missionaries with undiagnosed leprosy cases in the villages is less there. The fear of leprosy is also greater in this area than in Northern Nigeria, so that patients are often forced by their neighbors to live secluded in the forest, away from other people in the villages. In French West Africa, however, these points will not apply.

We also note that all of the persons who contracted leprosy were born in the United States or Canada, where 614 of the 907 missionaries in Northern Nigeria were born. None of them had a known history of contact with leprosy patients prior to their coming to Nigeria. Twelve of these 614 contracted leprosy, but none of the 293 born in the Eastern Hemisphere did so. The χ^2 test, using Yates' correction on these figures, produces an χ^2 of 5.87. This difference might have been observed by chance once in 65 times.

Comparison of the people born in North America with those born in the Eastern Hemisphere has shown that the groups at high risk for contracting leprosy (clergymen and leprosy workers) were represented equally in the two groups. Also, there was no difference between the two groups as to average length of residence in Nigeria. If the occurrence of the disease had been the same in the two groups, we would have expected to find 4 patients among the persons born in the Eastern Hemisphere. We have no explanation to offer as to why there is this signifi-

cant difference between the two groups. The patients, all born in North America, had, judging from their names, the following national ancestral backgrounds: Six were of German, 5 of English and 2 of Dutch descent.

All of the patients have been treated with sulfones. Case 1 also received chaulmoogra products in the pre-sulfone era. This patient died in 1959 of heart disease, but her leprosy had also reactivated. All the other cases except Nos. 9 and 12, have inactive disease, and those two are improving. Four of the 8 tuberculoid cases and the one indeterminate case had a single lesion each. In 2 of these, the lesion was excised for purposes of biopsy.

Classification of the cases.—It is to be seen from Table 7 that the disease, in most cases, was mild. It is of course possible that some of the patients might have had severe progression of the disease and disability had they not been diagnosed and treated in the early stages. All of the patients are in active missionary work in Northern Nigeria, with the exception of the first case.

TABLE 7.—*Classification of cases by type of disease.*

| Type | Number of persons | Per cent of total |
|---------------------|-------------------|-------------------|
| Indeterminate | 1 | 7.7 |
| Tuberculoid, minor | 8 | 61.5 |
| Dimorphous, macular | 2 | 15.4 |
| Lepromatous | 2 | 15.4 |
| Total | 13 | 100.0 |

The number of missionaries in Northern Nigeria increased markedly in the 1940's and 1950's. We believe this is the reason for the greater numbers of leprosy cases diagnosed in the 1950's. We assume that the prevalence of leprosy in the general population of Northern Nigeria has not altered markedly in recent years (large-scale treatment campaigns with sulfones date from about 1955, so a decline in leprosy prevalence may occur from now on), and that the contacts of individual foreign missionaries with the indigenous population have not changed.

The mean interval between arrival in Nigeria and onset of leprosy, in the 13 cases (Table 5) was 8.7 years, with a range of 2 to 19 years. Four of these patients had worked in leprosy settlements, and 2 of them developed the disease within 2 and 2½ years after arrival in Nigeria. The 12 adults spent a total of 110 person-years in Nigeria before onset of the disease.

Relation of risk to length of residence.—We now wish to examine the data of Table 5 on the interval between arrival in Northern Nigeria and onset of leprosy, to determine whether the risk of contracting leprosy increases in a linear manner the longer a person lives in the area. The findings are shown in Table 8, from which the one child patient has been excluded.

TABLE 8.—*Risk of contracting leprosy in adults related to length of residence in Northern Nigeria.*

| Years of residence | Number of persons | Number of leprosy cases | Leprosy rate (per thousand) |
|--------------------|-------------------|-------------------------|-----------------------------|
| 2- 4 | 301 | 2 | 6.6 |
| 5- 9 | 222 | 3 | 13.6 |
| 10-14 | 170 | 6 | 35.6 |
| 15-19 | 92 | 1 | 10.9 |
| 20+ | 122 | 0 | 0.0 |
| Total | 907 | 12 | 13.2 |

As is to be seen, the risk of contracting leprosy increased up to 15 years' residence, but thereafter it declined. The χ^2 test, using Yates' correction, applied to this table (the last two lines of the table, 15-19 years and 20+ years, having been combined) produces an χ^2 of 4.1, with n being 3. This difference could have occurred by chance once in 3 times, so this trend is not of statistical significance.

Relation of risk to occupation.—Examination of the risk of contracting leprosy according to occupation results in the figures shown in Table 9.

TABLE 9.—*Occupational risk of contracting leprosy in Northern Nigeria.*

| Occupation | Number of persons | Number of leprosy cases | Leprosy rate (per thousand) |
|-------------------|-------------------|-------------------------|-----------------------------|
| Clergyman | 192 | 5 | 26.0 |
| Medical personnel | 214 | 3 | 14.0 |
| Teachers | 204 | 1 | 4.9 |
| All others | 297 | 3 | 10.1 |
| Total | 907 | 12 | 13.2 |

The χ^2 test, using Yates' correction, gives a result of 5.5, with n being 3. This difference might have occurred by chance once in 10 times. We conclude, then, that occupation had something to do with matter of whether or not a person may contract leprosy, the clergymen running the greatest risk and the teachers the smallest. We suppose that this difference in risk of contracting leprosy is related to the fact that clergymen, as well as women workers who do evangelistic work (who in the above classification were lumped with many others in the "all other" group), spend much time in the villages and thus have more contact with the general population than teachers, who spend most of their time with healthy children in the schools. All 3 of the medical personnel who developed leprosy—all females—had worked in leprosy settlements, as did also one of the clergymen for a short time. One other clergyman (Case 9) had some contact with a known indigenous leprosy patient. All of the men who contracted leprosy were clergymen.

If we test the significance of the difference between the clergymens' and all the other male missionaries' risk of contracting leprosy, the χ^2 , using Yates' correction, and with n equalling 1, is 6.1. This difference

might have occurred by chance only once in 75 times and is highly significant. The occupations of the other male missionaries included airplane pilots, builders, business administrators, dentists, doctors, printers and teachers. These men, with the exception of some of the doctors who are engaged in leprosy work, had little contact with leprosy patients.

Four persons among the 12 who contracted leprosy had a total of 6 years of experience in leprosy work, representing 5.5 per cent of the life experience in Northern Nigeria of all 12 people. Among the 907 missionaries in that area, 177 had 699 years of experience in leprosy work out of a total of 9,395 years of life experience of all 907 persons, or 7.5 per cent of the total number of years spent in the area. From Table 9 it is seen that the risk of contracting leprosy among the clergymen was highest among the several occupations. This fact has to be kept in mind in contrasting the risk of contracting leprosy between those who worked in leprosy settlements and all the other missionaries. Twenty-seven of the 192 clergymen had spent some time in leprosy work.

Risk of leprosy workers.—Considering the simple leprosy rates among the leprosy workers (4 cases in 177 persons, or 22.6 per thousand), and among all other leprosy workers (8 cases in 730 persons, or 11.0 per thousand), the difference is not significant, χ^2 being 1.16, which might occur by chance once in 4 times. The results are quite different if we consider the risk in relation to years of work experience, as is shown in Table 10.

TABLE 10.—*Risk of contracting leprosy, by years of work experience.*

| Type of work | No. of persons | Total person-years | Number of leprosy cases | Leprosy rate (per 100 person-years) |
|--------------|----------------|--------------------|-------------------------|-------------------------------------|
| Leprosy | 177 | 699 | 4 | 5.7 |
| All others | 730 | 8,696 | 8 | 0.9 |

Based on the person-years of experience, the risk of contracting leprosy is much greater among leprosy workers than the other persons. The χ^2 tests gives an χ^2 of 8.2, which is highly significant, occurring by chance less than once in 100 times. There was no risk attached to doing general medical work, according to this study. Among the teachers only 1 case occurred, and this in a person who did much visiting in villages for the purpose of inspecting rural schools.

Risk in relation to the civil status.—A comparison of the risk of contracting leprosy by marital state is shown in Table 11.

It will be seen that the rate for married women is decidedly lower than that for single women or married men. The number of single men is so small that the lack of leprosy cases among them is of no significance. The difference between the married and single women, tested by the χ^2 method using Yates' correction produces an χ^2 of 1.72. This might

TABLE 11:—*Risk of contracting leprosy in relation to the marital state.*

| Group | Total persons | Number of leprosy cases | Leprosy rate (per thousand) |
|-----------------|---------------|-------------------------|-----------------------------|
| Single males | 12 | 0 | 0.0 |
| Married males | 309 | 5 | 16.2 |
| Single females | 283 | 5 | 17.6 |
| Married females | 303 | 2 | 6.6 |
| Total | 907 | 12 | 13.2 |

have occurred by chance one time in 5. We believe the difference may be due to the smaller amount of contact which married women have with the local people since they, particularly if they have children, spend more time at home than do single women.

Due to the great difficulty of obtaining comparable information, we did not attempt to include other foreigners in Nigeria in this study, e.g., Roman Catholic missionaries, government officials, and employees of trading firms. We do know of one government administrative officer in Northern Nigeria who contracted lepromatous leprosy, with onset of the disease in 1939. But we have no data on the total population at risk in which this case occurred. It is our impression, from information obtained through medical authorities in England and Nigeria, that the prevalence of leprosy in English government officials is much lower than in the group of missionaries in this study. In fact, no cases were known to have occurred in government officials in recent years.

SUMMARY

This paper is a descriptive epidemiologic study of the occurrence of leprosy among foreign Protestant missionaries in Nigeria and neighboring parts of French West Africa. The material on the studied population and leprosy cases among them was collected by means of questionnaires sent out to the individual missionaries and the doctors of the missions participating in the study.

1. Among 907 missionaries in Northern Nigeria, there were 12 leprosy cases, giving a prevalence rate of 13.2 per 1000 persons. There is a leprosy prevalence of 35 per thousand in the indigenous population of this Region.

2. Among 302 missionaries in the southern part of Nigeria and neighboring parts of French West Africa there were no leprosy cases. Some suggestions are offered to explain this difference.

3. In 2 schools for missionaries' children in Northern Nigeria, with a total of 223 children, we found one early case (indeterminate type). This single case gives a leprosy prevalence in the children of 4.5 per 1000 persons.

4. Most of the 12 infected adults had mild forms of leprosy, 8 of them being minor tuberculoid. There were also 2 dimorphous cases, and 2 persons with the lepromatous type.

5. All the people who developed leprosy were born in the United States or Canada. We do not know why, of the persons born in other parts of the world and representing one-third of the studied population, none developed leprosy.

6. Those missionaries who had the largest amount of contact with the local population and/or known leprosy cases—clergymen, persons doing leprosy work, and female evangelistic workers—had higher attack rates than teachers and persons doing general medical work. Similarly, single women had a higher attack rate than married women.

RESUMEN

Representa este trabajo un estudio epidemiológico de la incidencia de la lepra entre los misioneros protestantes extranjeros de Nigeria y las porciones próximas del Africa Occidental Francesa. Los datos relativos a la población estudiada y a los casos de lepra en ella fueron compilados por medio de cuestionarios remitidos a los distintos misioneros y a los médicos de las misiones que participaron en el estudio.

1. Entre 907 misioneros de la Nigeria Septentrional, hubo 12 casos de lepra, arrojando esto una tasa de 13.2 por 1,000 personas. En la población indígena de esta región, la incidencia de lepra es 35 por 1,000.

2. Entre 302 misioneros de la porción meridional de Nigeria y de las porciones cercanas del Africa Occidental Francesa, no hubo casos de lepra. Se ofrecen algunas indicaciones para explicar esta diferencia.

3. En 2 escuelas para hijos de misioneros en la Nigeria Septentrional, con un total de 223 alumnos, se descubrió un caso incipiente (forma indeterminada) de lepra. Este solo caso produce una incidencia en los niños de 4.5 por 1,000 personas.

4. La mayor parte de los 12 adultos infectados tenían formas leves de lepra, siendo 8 de ellos tuberculoides ligeros. Hubo además 2 casos dimorfos y 2 de la forma lepromatosa.

5. Todos los sujetos que manifestaron lepra habían nacido en los Estados Unidos o el Canadá. No se sabe porqué, de las personas nacidas en otras partes del mundo y que representaban la tercera parte de la población estudiada, ninguna manifestó lepra.

6. Los misioneros que tuvieron mayor contacto con la población y/o casos conocidos de lepra—clérigos, personas dedicadas a obras antileprosas y evangelizadoras—mostraron tasas más altas que las maestras y las personas que ejecutaban labor médica de forma general. De modo semejante, las mujeres solteras tuvieron una incidencia más alta que las casadas.

RESUMÉ

Cette communication traite, de façon descriptive, d'un problème d'épidémiologie: la lèpre parmi les missionnaires protestants au Nigéria et dans les régions limitrophes de l'Afrique Occidentale Française. Les données concernant la population étudiée et les cas de lèpre survenus parmi elle ont été obtenus par des questionnaires envoyés aux missionnaires et aux médecins de mission participant à cette étude.

1. Au Nord-Nigéria, parmi 907 missionnaires, on a relevé 12 cas de lèpre, donnant une incidence de 13.2%. L'incidence de la lèpre est de 35% parmi la population indigène de cette région.

2. Dans la partie méridionale du Nigéria et dans les régions limitrophes de l'Afrique Occidentale Française, aucun cas de lèpre n'a été noté parmi 302 missionnaires. Quelques explications sont suggérées pour rendre compte de cette différence.

3. Au Nord-Nigéria, dans 2 écoles pour enfants de missionnaires totalisant 223 enfants, nous avons trouvé un cas précoce (type indéterminé). Ce cas unique donne une incidence de lèpre parmi les enfants de 4.5%.

4. La plupart des 12 adultes reconnus atteints de lèpre présentaient une forme

légère, 8 d'entre eux étaient tuberculoïdes mineurs. On a noté aussi deux cas dimorphes, et 2 sujets souffraient du type lépromateux.

5. Tous les individus qui ont développée la lèpre étaient nés aux Etats-Unis ou au Canada. Nous ignorons pourquoi, parmi les individus nés dans d'autres parties du monde et qui représentaient un tiers de la population étudiée, aucun n'a contracté la lèpre.

6. Les missionnaires ayant plus de contact avec la population locale, ainsi qu'avec des cas de lèpre reconnus—clergymens, missionnaires travaillant dans le domaine de la lèpre, femmes se consacrant à l'évangélisation—ont présenté un taux d'infection plus élevé que les professeurs et les personnes engagées dans la médecine générale. De même, les femmes célibataires ont présenté un taux d'infection plus élevé que les femmes mariées.

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