

## WHO Surveys of Disabilities in Leprosy in Northern Nigeria (Katsina), Cameroon and Thailand (Khon Kaen)<sup>1,2</sup>

V. Martinez Dominguez, L. M. Bechelli and K. M. Patwary<sup>3</sup>

The problem of disabilities in leprosy control has increased in importance and received special attention in recent years. Everywhere there is deep interest in the rehabilitation of disabled patients, considered in the sense of

"... the physical and mental restoration, as far as possible, of all treated patients to normal activity, so that they may be able to resume their place in the home, society, and industry. To achieve this, treatment of the physical disability is obviously necessary, but it must be accompanied by the education of the patient, his family and the public, so that not only can he take his normal place, but society will also be willing to accept him and assist in his complete rehabilitation."<sup>(3)</sup>

Apart from the human aspect, it is also realized that patients with disabilities represent a significant loss of manpower for many countries where leprosy is endemic and, as is known, leprosy rates are usually higher in developing countries, which are more in need of capable men to raise the economic level, standard of living, and education of the community.

On the other hand, successful measures in the prevention and treatment of disabilities will help keep patients under regular treatment with DDS or other drugs, since, because of plantar ulcers, many patients attend centers for treatment irregularly. This is very important for the success of leprosy control, as in many countries the proportion of regularly treated patients decreases significantly after the first year of attendance.

The World Health Organization has given this subject particular attention. Different aspects of rehabilitation and disabilities were considered by the Second Expert Committee on Leprosy in 1959<sup>(3)</sup>. For estimation of the extent of disabilities in different countries, a scheme of classification for grading physical disability resulting from leprosy was suggested. This scheme was adopted in Leprosy Advisory Team surveys by the LAT.

In November 1960 a scientific meeting on rehabilitation in leprosy was held in Vellore, Madras State, India, sponsored by WHO, the Leonard Wood Memorial and the International Society for Rehabilitation of the Disabled, with assistance from the National Institute of Neurology and Blindness of the United States Public Health Service, the Bureau of Medicine and Surgery of the United States Navy, and the Christian Medical College, Vellore<sup>(5)</sup>.

The objectives of this meeting were defined by the Chairman, as follows:

1. To outline the existing knowledge of the etiology, prevention and treatment of disablement found in patients with leprosy;

<sup>1</sup> Received for publication March 16, 1966.

<sup>2</sup> Surveys made by WHO Leprosy Advisory Team (LAT). For composition of these teams see previous paper in this issue of THE JOURNAL, pages 223-243.

<sup>3</sup> V. Martinez Dominguez, M.D., Medical Officer, Leprosy Unit, Geneva, Switzerland (formerly Team Leader of LAT); L. M. Bechelli, M.D., Head, Department of Dermatology, Medical School of Ribeirão Preto University of São Paulo, Ribeirão Preto, Brazil. At present Chief Medical Officer, Leprosy Unit, Division of Communicable Diseases, WHO, Geneva; K. M. Patwary, Ph.D., Statistical Adviser, Zone I, AMRO (formerly LAT statistician).

2. To advise how available knowledge could best be applied in leprosy control, treatment and rehabilitation programs; and

3. To recommend what further research studies should be undertaken. In reporting the findings of the meeting, it would be necessary to indicate the size and extent of the problem, to suggest the optimum services needed and to indicate possible measures applicable in countries which, because of limited resources, cannot provide the optimum.

In this paper we are concerned with the following aspects of leprosy disability in Northern Nigeria (Katsina), Cameroon, and Thailand (Khon Kaen): (1) frequency, (2) type, (3) relation to forms of leprosy, (4) relation to sex, (5) relation to age groups, and (6) relation to ethnic groups.

#### MATERIALS AND METHODS

These were the same as those described in the preceding paper concerning epidemiologic data (<sup>1</sup>). The surveys were planned with statistical control to comply with the objectives of the Leprosy Advisory Team. Among these was the gathering of data on frequency and types of disability.

**Classification of disabilities.** Disabilities were classified according to the WHO scheme of classification for grading physical disabilities resulting from leprosy (<sup>3</sup>):

##### A. Hands

- Grade 1. Anesthesia to pain.
- Grade 2. Mobile claw hand. Useful thumb.
- Grade 3. Intrinsic paralysis involving fingers and thumb, or fingers only, but with contracture.
- Grade 4. Partial absorption of the fingers, but with useful length remaining.
- Grade 5. Gross absorption. Stumps only left.

##### B. Feet

- Grade 1. Anesthesia.
- Grade 2. Trophic ulceration (present or past).
- Grade 3. Paralysis (foot drop or claw toes).
- Grade 4. Partial absorption of the foot

(up to one-third of surface area of the sole lost).

- Grade 5. Gross absorption (more than one-third of the foot lost).

##### C. Face

- Grade 1. A permanent mark or stigma of leprosy not amounting to ugliness (loss of eyebrows, deformity of the ear).
- Grade 2. Collapse of the nose.
- Grade 3. Paralysis of the eyelids, including lagophthalmos or paralysis of the facial nerve.
- Grade 4. Loss of vision in one eye or dimness of vision in both eyes (can count fingers).
- Grade 5. Blindness.

##### D. Miscellaneous

- Grade 1. Gynecomastia.
- Grade 2. Involvement of the larynx.

#### RESULTS

##### I. Frequency of Disabilities

**Northern Nigeria (Katsina).** Twenty-three and four-tenths per cent of all leprosy patients in Katsina Emirate were found to suffer from some kind of disability (Table 1). This means that in the Emirate there will be about 10,000 disabled leprosy patients and presumably more than 100,000 disabled patients in the Northern Region of Nigeria.

**Cameroon.** Thirty-five and six-tenths per cent of all leprosy patients suffered from some kind of disability (Table 1). This means that there will be nearly 30,000 disabled patients in Cameroon; almost 10 per 1,000 of the entire population are disabled by leprosy.

In Table 2 we see that the frequency of disabilities varied in the sample blocks No. 1 (South), No. 3 (North) and No. 2 (transitional zone between the northern and southern regions). The frequency of disabilities in sample block No. 1 was higher than in sample blocks Nos. 2 and 3, the difference being statistically significant ( $\chi^2 = 6.6$ ). The reason for this difference should be that in sample block No. 1 there was a higher proportion of old patients,

TABLE 1. Frequency of disabilities in leprosy (sampling)<sup>a</sup> in Northern Nigeria (Katsina), Cameroon and Thailand (Khon Kaen).

Country	Popula- tion ex- amined	No. cases	Disabled	
			No.	%
Nigeria	24,538	705	165	23.4
Cameroon	14,473	374	133	35.6
Thailand	16,568	205	85	41.5

TABLE 2. Frequency of disabilities in leprosy (sampling)<sup>a</sup> in Cameroon.

Sample block No.	Number cases	Number disabled	% disabili- ties
1	118	58	49.2
2	185	51	27.6
3	71	24	33.8
Total	374	133	35.6

<sup>a</sup> For this purpose, only the sample of patients obtained in the survey has been used, as it is the only one representative of the general pattern of leprosy in Cameroon.

among whom the frequency of disabilities is also higher.

**Thailand (Khon Kaen).** Forty-one and five-tenths per cent of all leprosy patients in Khon Kaen had some kind of disability (Table 1). In this percentage are included patients with disabilities of grade 1 (anesthesia and loss of eyebrows). This gives a rather exaggerated picture. If only the patients with disabilities of grades 2 to 5 are considered, the percentage of disabled patients in Khon Kaen was 17.6 per cent.

## II. Types of Disability

In Tables 3, 4, 5 and 6 the frequency and location of different types of disability are shown according to the classification suggested by the Second WHO Expert Committee on Leprosy (<sup>3</sup>). The data were collected from both inside and outside the sample survey.

**Northern Nigeria (Katsina).** From Table 3, it may be stated that:

(a) Out of 1,664 leprosy patients, 629 (37.8%) had some type of disability in the hands, 506 (30.4%) in the feet, and 261 (15.7%) in the face.

(b) Out of 910 male leprosy patients, 27 (2.9%) had gynecomastia;

(c) Out of 1,664 patients, 16 (0.9%) had involvement of the larynx;

(d) The frequency of the different types of disability was as follows:

Grade 1 Hand	365	Anesthesia to pain only
Grade 1 Foot	329	Anesthesia to pain only
Grade 4 Hand	170	Partial absorption of fingers
Grade 2 Foot	144	Trophic ulceration
Grade 1 Face	141	Loss of eyebrows
Grade 3 Hand	105	Intrinsic paralysis
Grade 2 Hand	96	Mobile claw hand
Grade 3 Face	83	Paralysis of the eyelids
Grade 4 Foot	61	Partial absorption of the foot
Grade 2 Face	45	Collapse of the nose
Grade 3 Foot	35	Dropped foot
	27	Gynecomastia

TABLE 3. Frequency of disabilities by grade in leprosy patients in Northern Nigeria (Katsina).<sup>a</sup>

Disability	No. cases	Disability		Grade				
		No. without	No. with	1	2	3	4	5
Hands	1,664	1,035	629	365	96	105	170	22
Feet	1,664	1,158	506	329	144	35	61	24
Face	1,664	1,403	261	141	45	83	22	6
Gynecomastia	910	883	27					
Involvement of larynx	1,664	1,648	16					

<sup>a</sup> It should be noted that the classification of disabilities is not mutually exclusive; for example, a person having disability in the hand might not have it in the feet or face as well, and vice versa. Therefore, the total number of cases with disability does not coincide with the total number of cases shown in the grade or type columns.

Grade 5 Foot	24	Gross absorption of the foot
Grade 5 Hand	22	Gross absorption of the fingers
Grade 4 Face	22	Loss of vision in one eye
	16	Involvement of the larynx
Grade 5 Face	6	Blindness

From the data we see that disability of the hands of grade 5 (gross absorption; stumps only left) was rare, but disabilities of grades 1, 4, 3 and 2 were frequent. In the feet the main disability (excluding anesthesia) was trophic ulceration (grade 2), but disability of grade 4 (partial absorption) was frequent. Gross absorption of the foot was rare. In the face, disability of grade 1 (loss of eyebrows, deformity of the ear), was more frequent; collapse of

the nose (grade 2) and loss of vision (grades 4 and 5) were observed in lepromatous patients; loss of vision was also registered in indeterminate patients, but these were probably lepromatous patients who, with involution of the disease, presented pure neural manifestations and were therefore classified as indeterminate.

Disabilities of the hands and feet (grades 1, 2, 3, 4 and 5) were observed in lepromatous, tuberculoid and indeterminate patients, while gynecomastia, involvement of the larynx, loss of vision and collapse of the nose were seen in lepromatous patients. This applied also for Cameroon and Thailand.

**Cameroon.** From Tables 4 and 5, it may be stated that:

(a) Out of 1,560 leprosy patients, 676 (43.4%) had some kind of disability in the hands, 748 (47.9%) in the feet, and 231

TABLE 4. Frequency of disabilities by grade in leprosy patients in Cameroon.

Sample block No.	Disability	No. cases	Disability		Grade				
			No. without	No. with	1	2	3	4	5
1	Hands	529	308	221	32	32	13	128	51
	Feet	529	255	274	27	68	41	106	64
	Face	529	473	56	15	3	32	6	1
2	Hands	576	366	210	63	19	13	110	45
	Feet	576	309	267	32	105	38	91	51
	Face	576	507	69	33	15	19	3	1
3	Hands	455	210	245	69	26	7	132	54
	Feet	455	248	207	40	97	18	64	21
	Face	455	349	106	47	37	22	9	5
Total	Hands	1,560	884	676	164	77	33	370	150
	Feet	1,560	812	748	99	270	97	261	136
	Face	1,560	1,329	231	95	55	73	18	7

TABLE 5. Gynecomastia and involvement of larynx in Cameroon.

Sample block No.	Type	No. cases	Disabilities	
			Yes	No
1	Gynecomastia	287	17	270
	Involvement of larynx	529	0	529
2	Gynecomastia	351	32	319
	Involvement of larynx	576	0	576
3	Gynecomastia	232	8	224
	Involvement of larynx	455	0	455
Total	Gynecomastia	870	57	813
	Involvement of larynx	1,560	0	1,560

TABLE 6. Frequency of disabilities by grade in leprosy patients in Thailand (Khon Kaen)\*

Disability	No. cases	Disabilities		Grade				
		No. without	No. with	1	2	3	4	5
Hands	992	474	518	184	84	111	199	32
Feet	992	445	547	287	82	140	106	41
Face	992	655	337	182	64	97	20	6
Gynecomastia	695	645	50					
Involvement of larynx	992	992	0					

\* See footnote to Table 3.

(14.8%) in the face.

(b) Out of 870 male leprosy patients, 57 (6.5%) had gynecomastia.

(c) No patient out of 1,560 had involvement of the larynx.

(d) The frequency of the various types of disability was as follows:

Grade 4 Hand	370	Partial absorption of the fingers
Grade 2 Foot	270	Trophic ulceration
Grade 4 Foot	261	Partial absorption of foot
Grade 1 Hand	194	Anesthesia to pain only
Grade 5 Hand	150	Gross absorption of the fingers
Grade 5 Foot	136	Gross absorption of the foot
Grade 1 Foot	99	Anesthesia to pain only
Grade 3 Foot	97	Dropped foot
Grade 1 Face	95	Loss of eyebrows
Grade 2 Hand	77	Mobile claw hand
Grade 3 Face	73	Paralysis of the eyelids
	57	Gynecomastia
Grade 2 Face	55	Collapse of the nose
Grade 3 Hand	33	Intrinsic paralysis
Grade 4 Face	18	Loss of vision in one eye
Grade 5 Face	7	Blindness
	0	Involvement of the larynx

The proportion of patients with serious disabilities of the hands (grades 4 and 5) was higher in Cameroon than in Katsina and Khon Kaen. Partial (grade 4) or gross absorption of the foot (grade 5) was also more common in Cameroon. However, the frequency of disabilities on the face (grades

2, 3, 4 and 5) followed about the same pattern as observed in Katsina.

**Thailand (Khon Kaen).** From Table 6, it may be stated that:

(a) Out of 992 patients, 518 (52.2%) had some type of disability or deformity in the hands, 547 (55.1%) in the feet, and 337 (33.9%) in the face.

(b) Out of 695 male leprosy patients, 50 (7.2%) had gynecomastia.

(c) There was no case with involvement of the larynx.

(d) The frequency of the different types of disability was as follows:

Grade 1 Foot	287	Anesthesia to pain only
Grade 4 Hand	199	Partial absorption of the fingers
Grade 1 Hand	184	Anesthesia to pain only
Grade 1 Face	182	Loss of eyebrows
Grade 3 Foot	140	Dropped foot and claw foot
Grade 3 Hand	111	Intrinsic paralysis
Grade 4 Foot	106	Partial absorption of the foot
Grade 3 Face	97	Paralysis of the eyelids
Grade 2 Hand	84	Mobile claw hand
Grade 2 Foot	82	Trophic ulceration
Grade 2 Face	64	Collapse of the nose
	50	Gynecomastia
Grade 5 Foot	41	Gross absorption of the foot
Grade 5 Hand	32	Gross absorption of the fingers
Grade 4 Face	20	Loss of vision in one eye
Grade 5 Face	6	Blindness
	0	Involvement of the larynx

TABLE 7. Location of the different types of disability in leprosy patients examined in Northern Nigeria (Katsina), Cameroon and Thailand (Khon Kaen).

Country	No. cases	Location and per cent of disabilities				
		Hands	Feet	Face	Gynecomastia	Involvement of larynx
Nigeria	1,664	37.2	30.4	15.7	2.9 (910)	0.9
Cameroon	1,550	43.4	47.9	14.8	6.5 (870)	0
Thailand	992	52.2	55.1	34.0	7.2 (695)	0

Total disabilities of the face were more frequent than in Katsina and Cameroon, perhaps because of the fact that the proportion of lepromatous patients is higher in Thailand and lepromatous leprosy more often causes loss of eyebrows and deformity of the ear.

Disability of the foot of grade 3 (paralysis: foot drop or claw toes) was also more frequent in Thailand, but trophic ulceration was less frequent than in Cameroon.

**Location of the different types of disabilities.** The data are shown in Table 7. The frequency of disabilities in the hands and feet was about the same and higher than in the face. In Thailand, the frequency of disabilities in the hands, feet and face was higher than in the two African countries. This was probably due to the higher proportion of lepromatous patients in Thailand. There was no involvement of the larynx in Cameroon and Thailand and only 0.9 per cent in Northern Nigeria. Treatment with sulfones seems to be the chief cause of this finding, in view of their action on the lesions of the larynx.

Gynecomastia was observed in 16.6 per cent of lepromatous patients in Katsina, in 20.0 per cent in Cameroon and in 14.8 per cent in Khon Kaen.

### III. Disabilities in Relation to the Form of Leprosy

The data, collected from both inside and outside the sample survey, are presented in Table 8.

In the three countries, disabilities were more frequent in lepromatous patients, less common in indeterminate cases and even less frequent in tuberculoid patients. In Thailand pure neural leprosy cases were relatively frequent. In some of them it was possible to find leprosy bacilli in smears taken from ear lobes; they were therefore classified as lepromatous patients. Others were bacteriologically negative, with no dermatologic symptoms to permit a correct classification. As lepromin tests and biopsies of the nerve trunks could not be made, it was considered preferable to classify these cases as indeterminate.

### IV. Disabilities According to Sex

Data are presented in Table 9. In Katsina and Khon Kaen disabilities were more prevalent among males than among females. In Cameroon disabilities were slightly more prevalent among males than among females, but the difference was not statistical-

TABLE 8. Disabilities in relation to lepromatous, tuberculoid, indeterminate and borderline leprosy in Northern Nigeria (Katsina), Cameroon and Thailand (Khon Kaen).

Country	Lepromatous			Tuberculoid			Indeterminate			Borderline		
	No. cases	Dis-abled	%	No. cases	Dis-abled	%	No. cases	Dis-abled	%	No. cases	Dis-abled	%
Nigeria	287	252	87.8	577	128	22.2	778	265	34.1	15	12	80
Cameroon	111	91	81.9	433	114	26.3	347	152	43.8	2	1	—
Thailand	539	427	79.2	186	63	33.9	254	141	55.5	8	6	75

ly significant. Greater exposure of men to trauma might have been responsible for the difference observed.

#### V. Disabilities According to Age

For this study only the sample of patients obtained in the survey was used, as it was the only one representative of the general pattern of leprosy in the three countries (Table 10).

**Northern Nigeria (Katsina).** As shown in Table 10, there was a strong correlation between frequency of disabilities and age groups. The frequency increased from 7.4 per cent in the group 5-14 years to 48.2 per cent in the group 45 years and over. This

is quite understandable, because of the more advanced stage of the disease and the accumulation of lepromatous cases in older groups.

**Cameroon.** The frequency of disabilities also increased from 5-14 years to 45 and over.

**Thailand.** The same pattern is observed, but with a similar proportion of disabilities in the groups 15-44 years and 45 and over.

Taking into consideration all the patients seen from both inside and outside the sample survey in order to increase the efficiency of the interpretation of results, we observed the same pattern: in Katsina, Cameroon and Khon Kaen the frequency

TABLE 9. Disabilities in leprosy in relation to sex in Northern Nigeria (Katsina)<sup>a</sup>, Cameroon and Thailand (Khon Kaen)<sup>b</sup>.

Country	Sex	No. cases	Disabled	
			No.	%
Nigeria	M	671	276	41.1
	F	620	133	21.4
Cameroon	M	502	209	41.6
	F	391	149	38.1
Thailand	M	605	432	71.4
	F	384	208	54.2

<sup>a</sup> The lots of patients obtained both in the sample unit and sample unit vicinity (not from the leprosy sanatorium) were used in order to increase the efficiency of the interpretation of results. This is correct from the statistical interpretation of the result.

<sup>b</sup> The lots of patients obtained in the survey and leprosy sanatorium, mobile and static clinics were used.

TABLE 10. Disabilities in leprosy according to age group (sample) in Northern Nigeria (Katsina), Cameroon and Thailand (Khon Kaen).

Country	Age group	No. cases	Disabilities	
			No. with	%
Nigeria	0-1	0	0	0
	1-4	8	0	0
	5-14	175	13	7.4
	15-44	408	97	23.8
	45 & over	114	55	48.2
Cameroon	0-1	0	0	0
	1-4	2	0	0
	5-14	24	1	4.2
	15-44	191	62	32.5
	45 & over	157	70	44.6
Thailand	0-1	0	0	0
	1-4	1	0	0
	5-14	14	1	7.1
	15-44	117	49	41.9
	45 & over	73	35	47.9

TABLE 11. Frequency of disabilities in leprosy by age group (patients both from inside and outside the sample survey) in Northern Nigeria (Katsina), Cameroon and Thailand (Khon Kaen).

Country	Age group	No. cases	Disabilities	
			No. with	%
Nigeria	0-1	0	0	0
	1-4	10	0	0
	5-14	276	26	9.4
	15-44	780	271	34.7
	45 & over	225	112	49.8
Cameroon	0-1	0	0	0
	1-4	2	0	0
	5-14	59	2	3.3
	15-44	447	167	37.4
	45 & over	385	189	49.1
Thailand	0-1	0	0	0
	1-4	1	0	0
	5-14	41	7	17.1
	15-44	626	405	64.7
	45 & over	321	228	71.0

of disabilities increased in the older age groups (Table 11). The higher proportion of disabilities in Thailand may be explained because of a higher percentage of leproumatous patients than in Cameroon and Nigeria.

In the light of the facts noted above, we realize that early diagnosis, with early treatment, will permit prevention of disabilities and deformities.

#### VI. Disabilities and Ethnic Groups

In Katsina (Table 12) the frequency of disabilities was higher in the Hausa than in the Fulani groups ( $\chi^2 = 4.01$ ). Perhaps this may be explained by the fact that the Hausas practice many crafts, such as farming, weaving and dyeing of cloth, leather

TABLE 12. Comparative frequency of disabilities in leprosy between ethnic groups in Northern Nigeria (Katsina)\*.

Ethnic group	No. cases	Disabilities	
		No.	%
Hausa	1,029	340	33.0
Fulani	262	69	26.3

\* For comparisons of disabilities by sexes, age groups and ethnic groups, the lots of patients obtained both in the sample and sampling unit vicinity (not from the leprosarium) were used in order to increase the efficiency of the interpretation of results. This is correct from the statistical interpretation of the result.

work, ornamental brass, silver and copper work, etc. Among the Fulani, the main occupation is keeping cattle, although they also are farmers.

#### DISCUSSION

The data collected by the WHO Leprosy Advisory Team show the importance of disabilities in the control of leprosy from the human, social and economic points of view. As mentioned earlier, the measures applied to prevent and treat disabilities and deformities will help keep the patients under regular treatment, particularly as they are discouraged by the appearance and/or aggravation of deformities, some of which, such as plantar ulcers, can impede attendance for treatment. In addition to the benefit obtained by such measures, the prevention and reduction of deformities will lessen the stigma attached to leprosy. Hence the need for a rehabilitation program in leprosy campaigns. One or more of the existing sanatoria should be adapted gradually for rehabilitation. Rehabilitation should also be vocational, so as to provide out- and inpatients with a more nearly adequate profession or trade according to their physical condition, and in order to prevent deformity.

Obviously, the most effective prevention of deformities is achieved with the preven-



tion of the disease. Therefore, special rehabilitation services should be created only when the means, fundamental equipment and necessary personnel have already been provided for the development of basic activities in leprosy control. However, the prevention and treatment of disabilities, in the field, by simple methods should be started as soon as possible and incorporated as routine work in leprosy control activities.

#### SUMMARY

**Frequency of disabilities.** In random sampling surveys, the frequency in leprosy patients was 23.4 per cent in Northern Nigeria, 35.6 per cent in Cameroon and 41.5 per cent in Thailand. Disabilities were considered in accordance with the suggestions of the Second WHO Expert Committee on Leprosy. This means that in the Katsina Emirate there will be about 10,000 disabled patients and presumably more than 100,000 in the Northern Region of Nigeria. In Cameroon there will be nearly 30,000 disabled patients. These data show the importance of leprosy from the economic and social points of view.

**Type of disabilities.** (Data collected from both inside and outside of the sample survey): In Northern Nigeria 37.8 per cent of the patients had some type of disability or deformity in the hands, 30.4 per cent in the feet, and 15.7 per cent on the face. In Cameroon 43.4 per cent of disabilities were in the hands, 47.9 per cent in the feet, and 14.8 per cent on the face. In Thailand 52.2 per cent were in the hands, 55.1 per cent in the feet, and 34.0 per cent on the face.

**Disabilities in relation to the form of leprosy (lepomatous, tuberculoid, indeterminate).** (Data collected from both inside and outside the sample survey): Disabilities were more frequent in lepomatous patients and less common in tuberculoid patients.

**Disabilities according to sex.** In Northern Nigeria and Thailand disabilities were more prevalent among males than among females; in Cameroon, disabilities were slightly more prevalent among males (37.8%) than among females (32.5%), but the difference was not statistically significant.

**Disabilities according to age.** There was a strong correlation between frequency of disabilities and age groups. The frequency increased in older age groups. This is understandable because of the more advanced stage of the disease and higher proportion of lepomatous patients among old people.

**Disabilities and ethnic groups.** In Northern Nigeria disabilities were slightly more frequent in Hausa (33.0%) than in Fulani (26.0%).

The data show the importance of disabilities in leprosy. Simple physiotherapy methods should be used in mobile and static units. However, special rehabilitation services should be created only when the means, fundamental equipment and necessary personnel have already been provided for the development of basic activities in leprosy control, for the most effective prevention of deformities is achieved with the prevention of the disease.

#### RESUMEN

*Frecuencia de las incapacidades.*—En muestras al azar, en encuestas realizadas, la frecuencia en enfermos de lepra fue 23.4 por ciento en Nigeria del Norte, 35.6 por ciento en Cameroon, y 41.5 por ciento en Thailandia. Las incapacidades se consideraron de acuerdo con las recomendaciones del Segundo Comité de Expertos en Lepra de la OMS. Esto quiere decir que en el Emirato de Katsina habrían aproximadamente 10,000 pacientes con incapacidades y posiblemente mas de 100,000 en la región Norte de Nigeria. En Cameroon, habrían aproximadamente 30,000 enfermos con incapacidades. Esta cifra muestra la importancia que tiene la lepra del punto de vista económico y social.

*Tipos de incapacidades.*—(Datos reunidos dentro y fuera de la encuesta): En Nigeria del Norte 37.8 por ciento de los enfermos tenían alguna clase de incapacidad o deformidad de las manos, 30.4 por ciento en los pies, y 15.7 en la cara. En Cameroon 43.4 por ciento de las incapacidades fueron de las manos, 47.9 por ciento en los pies, y 14.8 por ciento en la cara. En Thailandia 52.2 por ciento fueron en las manos, 55.1 por ciento en los pies, y 34.0 por ciento en la cara.

*Incapacidades en relación con el tipo de lepra (lepomatosa, tuberculoid e indeterminada).*—Información reunida dentro y fuera de la encuesta: Las incapacidades fueron mas frecuentes en enfermos lepomatosos y menos común en enfermos tuberculoides.

*Incapacidades relacionadas con el sexo.*—En Nigeria del Norte y Thailandia las incapacidades fueron mas frecuentes en los hombres que en las mujeres; en Cameroun, las incapacidades fueron ligeramente mas frecuentes entre los hombres (37.8%) que entre las mujeres (32.5%), pero la diferencia no fué estadísticamente significativa.

*Incapacidades en relación con la edad.*—Se observó una evidente correlación entre la frecuencia de las incapacidades y grupos de edades. La frecuencia aumentó en los grupos de mas edad. Esto se explica por el grado mas avanzado de la enfermedad y una proporción mas alta de pacientes lepromatosos entre personas de edad mayor.

*Incapacidades y grupos etnicos.*—En Nigeria del Norte, las incapacidades fueron levemente mas frecuentes en Hausa (33.0%) que en Fulani (26.0%).

Esta información demuestra la importancia de las incapacidades en lepra. Simples métodos fisioterápicos deben ser usados en unidades móviles y fijas. No obstante, servicios especiales de rehabilitación deberían crearse, solamente, cuando ya se cuenta con los recursos, equipo básico y el personal necesario para el desarrollo de las actividades fundamentales en el control de la lepra, porque la prevención mas efectiva de las deformidades se logra con la prevención de la enfermedad.

## RÉSUMÉ

*Fréquence des invalidités.*—Lors d'enquêtes effectuées sur des échantillons de malades de la lèpre choisis au hasard, on a observé les proportions suivantes de difformités: 23.4 pour cent au Nigéria du Nord, 35.6 pour cent au Cameroun, et 41.5 pour cent en Thaïlande. Les invalidités ont été appréciées d'après les suggestions émises par le Deuxième Comité d'Experts sur la Lèpre de l'OMS. Cela signifie que dans l'Emirat de Katsina, il doit y avoir environ 10,000 maladies avec difformités, et sans doute plus de 100,000 dans le Nigéria du Nord. Au Cameroun, il doit y avoir près de 30,000 malades avec invalidités. Ces données témoignent de l'importance de la lèpre du point de vue social et économique.

*Type de invalidités.*—(Données recueillies tant dans le cadre de l'échantillonnage au hasard qu'en dehors de ce cadre.) Au Nigéria du Nord, 37.8 pour cent des malades présentaient l'une ou l'autre difformité ou invalidité aux mains, 30.4 pour cent aux pieds, et 15.7 pour cent au visage. Au Cameroun, 43.4 pour cent des invalidités atteignaient les mains, 47.9 pour cent les pieds, et 14.8 pour cent le vis-

age. En Thaïlande chiffres étaient les suivants: 52.5 pour cent aux mains, 55.1 pour cent aux pieds, et 34.0 pour cent au visage.

*Invalidités en relations avec le type de lèpre* (Lepromateuse, tuberculoïde, indéterminée).—(Données recueillies tant dans le cadre de l'échantillonnage au hasard qu'en dehors de ce cadre.) Les difformités étaient plus fréquentes chez les malades lépromateux et moins fréquentes chez les malades tuberculoïdes.

*Invalidités en relation avec le sexe.*—Au Nigéria du Nord et en Thaïlande, les invalidités étaient plus fréquentes chez les hommes que chez les femmes. Au Cameroun, les invalidités étaient légèrement plus fréquentes chez les hommes (37.8%) que chez les femmes (32.5%), mais la différence toutefois n'était pas statistiquement significative.

*Invalidités en relation avec l'âge.*—On a observé une corrélation étroite entre la fréquence des invalidités et les groupes d'âge. La fréquence augmentait dans les groupes d'âge avancé. Ceci est compréhensible du fait que maladie est d'autant plus avancée et la proportion de malades lépromateux est d'autant plus élevée que les individus sont plus âgés.

*Invalidités et groupes ethniques.*—Au Nigéria du Nord, les invalidités étaient légèrement plus fréquentes chez les Haoussa (33.0%) que chez les Fulani (26.0%).

Ces données montrent l'importance des invalidités dans la lèpre. Des méthodes simples de physiothérapie devraient être employées dans des centres fixes ou mobiles. Des services spécialisés de réhabilitation ne devraient toutefois être créés que lorsque les ressources, l'équipement de base et le personnel indispensable ont déjà été fournis en vue de permettre le développement d'activités de base pour le contrôle de la lèpre. En effet, c'est la prévention de la maladie qui constitue le moyen le plus sûr d'éviter les difformités.

## REFERENCES

1. BECHELLI, L. M., MARTINEZ DOMINGUEZ, V. and PATWARY, K. M. WHO epidemiologic random sample surveys of leprosy in Northern Nigeria (Katsina), Cameroon and Thailand (Khon Kaen). *Internat J. Leprosy* **34** (1966) 223-243.
2. CAMEROON REPUBLIC, Report of a survey by the WHO Leprosy Advisory Team, March-July 1961, MHO/PA/237.61.
3. EXPERT COMMITTEE ON LEPROSY, Second Report, Geneva, August 1959, WHO Tech. Rep. Series No. 189, 1960.

4. KATSINA EMIRATE, Northern Nigeria, Report of a survey by the WHO Leprosy Advisory Team, April-September 1960.
5. SCIENTIFIC MEETING ON REHABILITATION IN LEPROSY, Vellore, India, November 1960, WHO Tech. Rep. Series No. 221, 1961.
6. THAILAND, Report of a survey by the WHO Leprosy Advisory Team, March-September 1962, MHO/PA/237.62.