

An epidemiological survey of deformities and disabilities among 14,257 cases of leprosy in 11 counties

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Summary This study was planned and conducted in Yang Zhou Prefecture, covering 11 counties that were formerly areas with a high prevalence of leprosy. Out of 14,257 leprosy patients, 8122 (56·97%) cases with deformities and disabilities were found. The disability rate is much higher in patients with MB leprosy (81·15%) than in PB leprosy (53·04%). The statistical data and the type of deformities and disabilities are presented. The influences of various host factors and disease factor which cause disability and deformity are discussed.

Introduction

Leprosy produces deformities and disabilities which can leave a permanent mark on the patients and result in stigma. Therefore, disability control is of great importance in a leprosy control programme, and our government is giving more attention to this than ever before. In order to find out the magnitude of the problem—the distribution of disabilities by sex, age and type of leprosy, the distribution of hand, foot and eye deformity according to type, the number of patients requiring reconstructive surgery and/or protective shoes—and to draw up the national rehabilitation project, an epidemiological study of disability was carried out in Yang Zhou. This prefecture has 11 counties with a population of more than 10 million.

Material and methods

The epidemiological survey of disability and deformity was carried out from March 1988 to the end of the year by a team of 55 paramedical workers and doctors in the field and 3 medical supervisors. All were fully trained before the study commenced. Patients with

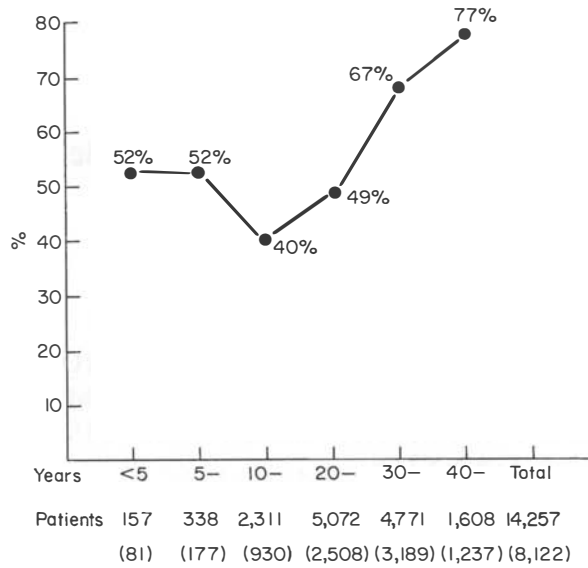


Figure 1. Duration of disease and disability.

deformities and disabilities were assessed according to the grading system recommended by the WHO Expert Committee (1970), with a little modification by us.

Out of 14,257 leprosy patients there were 10,356 males and 3901 females. The largest number of patients were PB (12,256 cases). Most patients had a long leprosy history of 20–29 years, followed by 30–39, 10–19, over 40 years, 5–9 years and less than 5 years in that order (Figure 1). A detailed history of each patient was taken, including the duration of the disease, the origin of complaints, the regularity of treatment, and the origin of deformities and disabilities. Detailed examinations were carried out, both local and systemic, including eyes, nose, face, sensory modalities, motor modalities, ulcers, hand and foot, etc. All the data were stored in a computer.

Table 1. Disabilities by age

Age	Males			Females			Total		
	No. of cases	No. of disabled	% disabled	No. of cases	No. of disabled	% disabled	No. of cases	No. of disabled	% disabled
< 15	11	5	45.45	5	2	40.00	16	7	43.75
15–24	45	22	48.89	27	10	37.04	72	32	44.4
25–34	329	163	49.54	176	91	51.70	505	254	50.30
35–44	2086	1229	58.92	824	479	57.77	2910	1708	58.69
45–54	3654	2134	58.40	1137	627	55.15	4791	2761	57.63
55–64	2599	1551	59.68	951	473	49.74	3550	2024	57.01
65–	1621	918	56.63	772	405	52.46	2393	1323	55.29
Unknown	11	6	54.54	9	7	77.78	20	13	65.00
Total	10,356	6028	58.21	3901	2094	53.68	14,257	8122	56.97

Results

FREQUENCY OF DEFORMITIES AND DISABILITIES

Out of 14,257 cases of leprosy, 8122 cases (56·97%) were found with deformities or disabilities (Table 1). Males were more often disabled than females (58·21% for males, 53·68% for females—difference significant at $p < 0\cdot0001$).

DISABILITIES AND AGE (Table 1)

The older the patient, the more frequent and serious were their disabilities. Males had more disabilities than females.

DISABILITIES IN RELATION TO THE TYPE OF LEPROSY

The details of disabilities and the type of leprosy are recorded in Table 2. The percentage of disabled cases varies with type, the highest being the LL group (89·12%). The disabled percentage among MB (81·15%) is higher than those among PB (53·04%) (difference significant at $p < 0\cdot0001$). A total of 3734 cases out of 6501 disabled PB leprosy patients (57·44%) and 863 cases out of 1610 disabled MB patients (53·60%) became disabled before the commencement of antileprosy treatment while 1059 cases of PB leprosy and 434 cases of MB leprosy were deformed during or after treatment.

DURATION OF DISEASE AND DISABILITY

Figure 1 illustrates the number of disabled persons in relation to duration of disease. The disabled rate increased with the length of disease.

PROPORTION OF GRADES 1, 2 AND 3 DISABILITY

Table 3 shows the proportion of Grades 1, 2 and 3 disability among 8122 disabled cases—Grade 3 is the highest (62·04%).

Table 2. Disabilities by leprosy type

Type	No. of cases	No. of disabled	% disabled	% disabled before treatment	% disabled during treatment	Unknown
I	41	16	39·02	14 (87·5)	0	2
PB TT	8000	3,456	43·2	2069 (59·87)	417 (12·07)	970
BT	4215	3,029	73·43	1651 (54·51)	642 (21·20)	736
Total	12,256	6,501	53·04	3734 (57·44)	1,059 (16·29)	1,708
BB	167	114	68·26	62 (54·39)	22 (19·30)	30
MB BL	751	546	72·7	254 (46·52)	165 (30·22)	127
LL	1066	950	89·12	547 (57·58)	247 (26·00)	156
Total	1984	1,610	81·15	863 (53·60)	434 (26·96)	313
Unknown	17	11	64·71	5	0	6

Table 3. Proportion of Grades 1, 2 and 3

	PB	MB	Unknown	Total
Grade				
1	197 (3.03)	65 (4.04)	0	262 (3.23)
2	2272 (34.95)	305 (18.94)	5 (45.45)	2582 (31.79)
3	3695 (59.91)	1138 (70.68)	6 (54.55)	5039 (62.04)
Facial	137 (2.11)	102 (6.34)	0	239 (2.94)
Deformity Total	6501 (100.00)	1610 (100.00)	11 (100.00)	8122 (100.00)

The actual disabilities and deformities of hands, feet and eyes are recorded in Tables 4, 5, and 6.

Table 4. Actual disabilities and deformities of hands

	PB	MB	Unknown	Total	Bilateral
No. of cases	12,256 (%)	1984 (%)	17 (%)	14,257 (%)	
Anaesthesia	2679 (21.86)	971 (48.94)	6 (35.29)	3656 (25.64)	1668 (11.70)
Mobile claw hand	3715 (30.32)	1042 (52.52)	5 (29.41)	4762 (33.40)	1814 (11.70)
Thumb paralysis	1532 (12.5)	528 (26.61)	4 (23.53)	2064 (14.48)	882 (6.19)
Cracks and wounds	370 (3.02)	208 (10.48)		578 (4.05)	299 (2.1)
Slight absorption	975 (7.96)	323 (16.28)	1 (5.88)	1299 (9.11)	373 (2.62)
Contractures	1115 (9.10)	380 (19.15)	2 (11.76)	1497 (10.50)	495 (3.47)
Wrist drop	386 (3.15)	70 (3.53)	1 (5.88)	457 (3.21)	73 (0.51)
Stiff joints	2723 (22.22)	804 (40.52)	5 (29.41)	3532 (24.71)	1296 (9.09)
Severe absorption	1270 (10.36)	482 (24.29)	2 (11.76)	1754 (12.30)	685 (4.81)

Table 5. Actual disabilities and deformities of feet

	PB	MB	Unknown	Total	Bilateral
No. of cases	12,256 (%)	1984 (%)	17 (%)	14,257 (%)	
Anaesthesia	2223 (18.14)	1100 (55.44)	4 (23.53)	3327 (23.34)	1570 (11.01)
Foot drop	1911 (15.60)	321 (16.18)	5 (29.41)	2237 (15.69)	295 (2.07)
Cracks, injuries	283 (2.31)	127 (6.4)		410 (2.88)	116 (0.81)
Simple ulcers	404 (3.30)	204 (10.28)		608 (4.26)	93 (0.65)
Slight absorption	705 (5.75)	341 (17.19)		1046 (7.34)	391 (2.11)
Fixed equinovarus	211 (1.72)	143 (7.21)		354 (2.48)	86 (0.60)
Complicated ulcers	793 (6.4)	481 (24.24)		1274 (8.95)	303 (2.13)
Shortened foot	998 (8.14)	596 (30.04)		1594 (11.20)	500 (4.07)
Amputation				565 (3.96)	

Table 6. Actual disabilities of eyes

	PB	MB	Unknown	Total	Bilateral
No. of cases	12,256 (%)	1984 (%)	17 (%)	14,257 (%)	
Insensitive cornea	948 (7.73)	394 (19.86)	2 (11.77)	1344 (9.43)	700 (4.91)
Lagophthalmos	1500 (12.24)	609 (30.70)	5 (29.41)	2114 (14.13)	900 (6.31)
Eversion of lower lid	736 (6.01)	275 (13.86)	2 (11.76)	1013 (7.11)	409 (2.87)
Keratitis E	588 (4.80)	220 (11.09)		808 (5.67)	297 (2.08)
Iridocyclitis	195 (1.59)	136 (6.85)	1 (5.88)	332 (2.33)	150 (1.05)
Blurring vision	605 (4.95)	281 (14.16)	3 (17.65)	889 (6.24)	372 (2.61)
Marked impairment of vision	206 (1.68)	127 (6.40)		333 (2.34)	92 (0.65)
Blindness	210 (1.71)	154 (7.76)	1 (5.88)	365 (2.56)	113 (0.79)

Table 7. Facial deformities

	PB	MB	Unknown	Total
No. of cases	12,256 (%)	1984 (%)	17 (%)	14,257 (%)
Facial paralysis				
lateral	1289 (10.52)	290 (14.62)		1579 (11.10)
bilateral	284 (2.32)	176 (8.87)		460 (3.23)
Loss of eyebrow	97 (0.79)	1173 (59.12)		1270 (8.91)
Collapsed nose	20 (0.16)	156 (7.86)		176 (1.23)

The actual disabilities and deformities of hands, feet and eyes are recorded in Tables 4, 5 and 6.

Some deformities of the hands, feet and eyes may benefit from reconstructive or plastic surgery, such as a mobile claw hand (33.40%), a foot drop (15.69%), median nerve paralysis of the thumb (14.48%), wrist drop (3.21%), lagophthalmos (14.83%), etc. Other disabilities may be reversed by health education of the patients in hand-, foot-, and eye-care, MCR shoes, protective gloves, and so on.

FACIAL DEFORMITIES

Table 7 shows various facial deformities which may be suitable for plastic surgery. A total of 744 out of 3488 patients with facial deformities had no deformities of the hands and feet.

Discussion

In this study the disability rate* (56.97%) in Yang Zhou Prefecture is rather high compared to other countries, such as Rao¹ 42.9%; Hasan² 44.3%; Koticha and Nair (1979)⁹ 37.1%; Prasad³ 20%; Chawdhary⁴ 25.8% and Mishra⁵ 21.2%. However, this is

* This totals 55% if Grade I is excluded.

lower than that observed by other researchers in China, such as Zheng Tisheng⁶ 67.5%; Zhang Zhengwei⁷ 73.13% and Song Fuyuan⁸ 63.62%. Perhaps the assessments were made in different situations or the criteria of disability grading, definition and samples used for study were quite different. For example, the observations of Zheng Tisheng⁶ were carried out in the community and some leprosariums, whereas the observations of Zhang Zhengwei⁹ were made in a leprosy hospital containing many old patients with severe disabilities. Furthermore, their study concerned a series of defaulter patients. Therefore an exact comparison is impossible.

The disability rate rose in older age groups. In the age groups of 35–44, 45–54 and 55–64, the prevalence of disability and deformity was very high (58.69%, 57.63% and 57.01% respectively). This is similar to the results of Bravo,⁹ Noodeen,¹⁰ and Zheng Tisheng.⁶

In the present study, the disability rate in the male is higher than in the female. This agrees with the data of Kushwah,¹¹ Nilakanta Rao¹² and Bravo.⁹

In this study the lepromatous type of leprosy was more prone to develop deformities and disabilities than the borderline type. The difference of disability rate between PB and MB leprosy is significant ($p < 0.0001$). These findings are similar to those reported by Noordeen¹⁰ and Zheng Tisheng⁶ and can be explained by the widespread and progressive nature of lepromatous leprosy. Other leprosy types are more localized and have a shorter evolution. A shorter duration means less spread of disease, and less involvement of the nerves. Therefore, early detection of the disease and neuritis, and adequate therapy and health education are very important for disability control in a leprosy control programme.

In this study, 57.4% of PB cases and 53.60% of MB cases had developed deformities and disabilities before the commencement of anti-leprosy treatment, which agrees with the observation made by Zheng Tisheng.⁶ This is probably due to late detection and treatment of the disease, and neuritis.

We have observed that the disability rate increased with increased duration of disease. Similar observations have been made by Zheng Tisheng⁶ and Noordeen¹⁰ etc. We consider the duration of the disease to be a more important factor than the age of patients in causing deformities and disabilities.

There was little difference in the prevalence of anaesthesia of the hands and feet in both types of leprosy (PB, MB), (25.64% and 23.34%) but the prevalence of anaesthesia in patients with MB leprosy was more than double that of patients with PB leprosy in both hands (48.94%/21.86%) and feet (55.44%/18.14%). These observations agree with those made by Prasad³ and Zheng Tisheng.⁶ Of 8122 cases disabled in this study, 3656 cases had insensitive hands and 3327 cases had insensitive feet, needing protective gloves/shoes. Education in self-care of the hands and feet is necessary to prevent patients' hands and feet suffering further injury and wounds, etc.

The observation of various types of hand deformities, foot deformities and eye disabilities in this study is basically in agreement with the observations of Zheng Tisheng.⁶ However, the amputation rate in this study is much higher than that observed by any other researcher. The reason is not known.

The incidence of facial deformities was very low and not comparable with those of the hands and feet, which corresponds to the observation made by Zheng Tisheng.⁶

In this study, 10–25 of 8122 disabled cases are suitable for consideration for possible reconstructive or plastic surgery. However, patients' attitudes during the survey demonstrate that the majority (58.54%) would refuse any surgical treatment. Education

of these patients is therefore essential for their rehabilitation. Analysis of disability and deformity in this study demonstrated that health education in the self-care of hands, feet and eyes, and protective shoes, etc. had a greater potential to reduce disability in leprosy than reconstructive and plastic surgery.

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Une enquête épidémiologique des difformités et des infirmités dans 14.257 cas de lèpre dans 11 départements

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Résumé Cette étude a été planifiée et exécutée à la Préfecture de Yang Zhou couvrant 11 départements qui étaient auparavant des régions où la lèpre était fréquente. Sur 14.257 patients lépreux, 8.122 cas (56,97%) de difformités et d'infirmités ont été observés. Le taux d'infirmités était bien plus élevé chez les lépreux MB (81,15%) que chez les lépreux PB (53,04%). Les données statistiques et le type de difformités et infirmités sont présentés. L'influence des divers facteurs de l'hôte et le facteur maladie qui causent l'infirmité et la difformité sont discutés.

Un estudio epidemiológico de las deformidades y deshabilidades entre 14.257 casos de la lepra en 11 condados

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Resumen Este estudio fue preparado y realizado en 11 condados en la Prefectura de Yang Zhou, anteriormente zonas en que había una prevalencia alta de la lepra. De 14.257 pacientes de la lepra, se encontraron 8.122 (56,97%) casos de deformidades y deshabilidades. El porcentaje de deshabilidades es mucho más en los pacientes con lepra multibacilar (81,15%) que en el paucibacilar (53,04%). Se presentan los datos estadísticos y los tipos de deformidad y deshabilidad. Se discuten los efectos de varios factores de huésped y de factor de enfermedad que causan deshabilidades y deformidades.