.

Epidemiological indicators and clinical profile of leprosy cases in Dhaka

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Abstract

Objective To evaluate epidemiological indicators and clinical profile of leprosy patients in Dhaka city.

Methods In this cross-sectional observational study 722 new leprosy patients registered in six different clinics of The Leprosy Mission International – Bangladesh, Dhaka program over two and half years (January 2011 to June 2013) were included. Demographic details and clinical characteristics during diagnosis were recorded.

Results Out of 722 patients, 390 (54%) were males and 332 (46%) were females. Proportion of cases under 15 year age was 8.7%. Borderline tuberculoid was the most common form of the disease (81.0%) followed by tuberculoid (9.3%), lepromatous (4.3%), borderline lepromatous (3.5%), borderline (1.8%) and pure neural (0.1%). Proportion of multibacillary leprosy was 22.4%. Most of the patients had duration of symptoms from 6 months to 1 year (53.0%). 12% of patients had history of contact with leprosy patients. Type 1 reaction was more prevalent than type 2 (7.6% and 2.9%, respectively). Proportion of cases with grade 2 disability was 5.9%. Most common presentation was with hypopigmented macule with obvious margin, marked anesthesia and mild infiltration. Ulnar nerve was the most common nerve to be involved (15.8%).

Conclusion Leprosy cases are being frequently diagnosed in Dhaka city. Epidemiological indicators reflect that there may be ongoing disease transmission and relative delay in diagnosis despite a strong surveillance program.

Keywords
Leprosy, epidemiological indicators, clinical profile

Introduction

Leprosy is a chronic granulomatous slowly progressive infection caused by the obligate intracellular organism *Mycobacterium leprae* affecting mainly the peripheral nerves, skin and certain other tissues and results in disabling deformities.[1-3] It leads to considerable physical and psychological disabilities. This has made leprosy among the most feared and stigmatizing of all diseases.[4] The disease occurs worldwide, with most cases in the tropical areas of Asia and Africa.[5] South-East Asia contributes 72% cases worldwide.[6]

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According to World Health Organization (WHO) in Bangladesh there were 3970, 3688 and 3141 new case detections respectively in 2011, 2012 and 2013. In 2013, among the new cases number of multibacillary (MB) leprosy was 1380 (43.9%), number of females was 1237 (39.4%), number of children was 166 (5.3%) and number of cases with grade 2 disabilities was 341 (10.8%).[6] Although Bangladesh has achieved the leprosy elimination goal by the end of December 1998, 2 year ahead the target set by WHO, leprosy is still not an uncommon disease in Bangladesh and it is endemic in Bandarban, Nilphamari, Khagrachari, Rangamati, Gaibandha, Rangpur, Lalmanirhat, Dianajpur districts and Dhaka and Chittagong Metro.[7]

Prompt recognition and treatment are essential to limit morbidity and loss of quality of life in leprosy patients.[8] As a result of increasing surveillance the disease pattern is continuously changing. So, this study was conducted to evaluate the current epidemiological indicators and clinical patterns of leprosy patients attending six clinics of The Leprosy Mission International – Bangladesh (TLMI-B), Dhaka program.

Methods

It was a cross-sectional observational study carried out over two and half year period from January 2011 to June 2013. All new leprosy cases registered over this period at 6 different clinics of TLMI-B, Dhaka program were included in the study. TLMI-B is working in conjunction with National Leprosy Elimination Program in Dhaka and other areas of Bangladesh. Among their 15 clinics in Dhaka, most are based in government and non-government medical colleges covering the major portion of Dhaka city. The 6 clinics (clinics in Dhaka Medical College Hospital, Sohrawardi Medical College, Bangladesh Medical College,

Mansur Ali Medical College, Al-Falah clinic, Maniknagar clinic) were selected as they cover wider areas and have comparatively higher case detection rate. The patients were detected in the field level by experienced field workers, appointed to visit the clinic at a particular day and verified by registered physician. The clinical and epidemiological details of the patient were recorded including age, sex, occupation, duration of disease (as described by the patient as time interval between first noticing the lesion and diagnosis), contact history, peripheral nerve involvement (thickening of nerve with or without palsy), disability, presence of reaction at diagnosis, eyebrow hair loss, involvement of nose and pinna, types of disease and laboratory diagnosis of bacterial index (BI) for acid-fast bacilli (AFB). The type of leprosy according to Ridley-Jopling classification was defined clinically, supplemented by slit skin smear when available. The disease was labelled as paucibacillary (PB) when the number of skin lesion was upto 5 and multicabacillary (MB) when the number of lesion exceeded 5 or the smear was positive.[7] Diagnosis was based on clinical ground by the cardinal signs of leprosy and supported by demonstration of AFB in slit-skin smear, which was performed in cases who gave consent to undergo the procedure. Skin biopsy for histopathological evaluation was done in a few cases. The skin lesions were tested for anaesthesia and peripheral nerves were palpated for thickening and tenderness. Type I reaction was diagnosed when the lesions were raised, warm and erythematous with enlarged, tender peripheral nerve adjacent to the lesion. On the other hand, type II reaction was diagnosed by the presence of multiple tender nodules with systemic features.[7] Isolated nerve tenderness was labelled separately as neuritis. Disability grading was recorded as suggested by WHO.[9] For treatment purpose, WHO recommended regimen was used. The study was approved by ethical committee of TLMI-B. Patients were not

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Table 1 Age and sex distribution of the study population and duration of symptoms.

Subjects	Male	Female	Total (%)
Age group (years)			
<15	32	31	63 (8.7)
15-29	134	128	262 (36.3)
30-39	103	58	161 (22.3)
40-49	67	82	149 (20.6)
50-59	39	24	63 (8.7)
≥60	15	9	24 (3.3)
Duration of symptoms			
< 6 months	18	6	24 (3.3)
6 mo -1 year	179	204	383 (53.0)
>1 - 5 year	133	83	216 (29.9)
> 5 year	33	20	53 (7.3)
Unknown	27	19	46 (6.4)
Total (%)	390 (54)	332 (46)	722 (100)

Table 2 Clinical manifestations of leprosy (n=722).

Characters of lesions	N (%)
Macule	494 (68.4%)
Plaque	214 (29.6%)
Nodule	26 (3.6%)
Ulcer	22 (3.0%)
Hypopigmented	681 (94.3%)
Erythematous	64 (8.9%)
Obvious margin	701 (97.1%)
Unclear margin	40 (5.5%)
Marked anesthesia	637 (88.2%)
Some anesthesia	92 (12.7%)
No anesthesia	12 (1.7%)
Heavy infiltration	69 (9.5%)
Moderate infiltration	140 (19.4%)
Mild infiltration	462 (64.0%)
Madarosis	22 (3.0%)
Ear lobe enlargement	32 (4.4%)
Claw hands or feet	20 (2.8%)
Shortening of finger	8 (1.1%)
Foot drop	5 (0.7%)
Wrist drop	1 (0.1%)
Saddle nose	7 (1.0%)
Lagophthalmos	1 (0.1%)
Enlargement of nipple	1 (0.1%)
Photophobia with lacrimation	1 (0.1%)
Paralysis of the finger	3 (0.4%)

subjected to any additional visit or procedure for the study other than that needed for clinical management. Data were recorded during registration of the leprosy patients with informed consent.

Results

The total number of patients was 722 (304 in 2011, 337 in 2012 and 82 in first 6 months of 2013). The age and sex distribution of the patients are shown in **Table 1**. Most of the patients (26.9%) belonged to 15-29 year age group with a male-female ratio=5:4. The youngest patient was 2½-year-old and the eldest patient was 70-year-old. The number of child (<15 years) cases was 63 (8.7%) and female cases was 332 (46%). Duration of symptoms varied from 1 month to 15 years, but the majority (53%) had symptom duration from 6 months to 1 year (**Table 1**). Eighty seven (12%) patients had history of contact with leprosy patients. Intra-familial contact was more than extra-familial contact (71 versus 16). Most of the affected females were homemakers and most of the affected males were physical labourers. The characteristics of skin lesions and frequencies of other presenting features are shown in **Table 2**.

Borderline tuberculoid was the most common form of the disease (81.0%) followed by tuberculoid (9.3%), lepromatous (4.3%), borderline lepromatous (3.5%), borderline (1.8%) and pure neural (0.1%). PB presentation was more common than MB presentation (77.6% and 22.4%, respectively. Type 1 lepra reaction was more prevalent than type 2 (7.6% vs 2.9%). 9.7% patients had disabilities at time of diagnosis. The rate was significantly higher in MB cases (40.6%) in comparison to PB cases (0.9%) (χ^2 =233, $p<0.001$). Disabilities affecting the feet were more frequently observed than hands and eyes. Both the reactions as well as disabilities occurred more commonly in MB patients (**Table 3**). Number of cases with grade 2 disability was 43 (5.9%).

Most frequently affected nerve was ulnar nerve followed by the common peroneal nerve (**Table**

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Table 3 Reactions and disability in leprosy patients.

	PB (n=562)	*MB (n=160)*	*Total (n=722)*
Reaction			
Type 1	13 (2.3%)	42 (26.2%)	55 (7.6%)
Type 2	0 (0.0%)	21 (13.1%)	21 (2.9%)
Neuritis	6 (1.1%)	29 (18.1%)	35 (4.8%)
No reaction	543 (96.6%)	79 (49.4%)	622 (86.1%)
Disability			
Hand			
Grade 1	2 (0.4%)	9 (5.6%)	11 (1.5%)
Grade 2	0 (0.0)	27 (16.9%)	27 (3.7%)
Feet			
Grade 1	1 (0.2%)	26 (16.2%)	27 (3.7%)
Grade 2	3 (0.5%)	26 (16.2%)	29 (4.0%)
Eyes			
Grade 2	0 (0.0%)	3 (1.9%)	3 (0.4%)
Disability affecting at least one or more sites	5 (0.9%)	65 (40.6%)	70 (9.7%)
No disability	557 (99.1%)	95 (59.4%)	652 (90.3%)

Table 4 Nerve involvement in leprosy patients (n=722).

Thickened nerve	*Non tender*	*Tender*	*Total*
Great auricular	65	3	68 (9.4%)
Ulnar	89	25	114 (15.8%)
Radial	57	10	67 (9.3%)
Median	6	1	7 (1.0%)
Common peroneal	69	14	83 (11.5%)
Posterior tibial	47	12	59 (8.2%)
Superficial cutaneous	24	1	25 (3.5%)
Facial	7	0	7 (1.0%)
Supratrochlear and sural	14	0	14 (1.9%)
At least one or more nerve involvement	-	-	143 (19.8%)
No nerve involvement	-	-	579 (80.2%)

Table 5 Slit skin smear and skin biopsy results in leprosy patients (n=722).

Investigation	*N (%)*
Slit-skin smear	
BI 0	71 (9.8%)
BI 1+	2 (0.3%)
BI 2+	5 (0.7%)
BI 3+	4 (0.5%)
BI 4+	13 (1.8%)
BI 5+	27 (3.7%)
Not done	600 (83.1%)
Skin biopsy	
Tuberculoid	4 (0.5%)
Borderline tuberculoid	1 (0.1%)
Lepromatous	1 (0.1%)
Not done	716 (99.2%)

4). Slit-skin smears were studied in 122 cases. Among them 51 were found positive and 71 were negative (**Table 5**). Only 6 patients underwent skin biopsy for histopathological examination. In all of those cases leprosy was confirmed (tuberculoid 4, borderline tuberculoid 1 and lepromatous 1).

Discussion

In this study, out of 722 newly detected cases, borderline tuberculoid was far more prevalent than other types of leprosy: a result similar to different studies done in different countries.[4,10-15] Proportion of MB cases which is useful guide to the cases at risk of developing complications and risk of transmission was 22.4% which is much lower than that of whole country, as well as, neighbouring countries in South Asia[6] indicating

increasing awareness and relatively strong surveillance in this capital city.

Majority of affected patients were in their productive phase of life with a peak in the 15-29 year age group. As we know if the transmission of leprosy is being reduced in an area, it is expected that the number of children affected will decrease.[16] Proportion of child cases (under 15 years of age) in our study was 8.7%. The proportion is higher in comparison to the country as a whole (5.3%), but lower than many other regions of south Asia[6] indicating an ongoing transmission. Though in many studies sex ratio was strongly in favour of male.[4,12,14,17-19] We found a male-female ratio = 5:4. As there is concern that women may have less access to health care specially in developing areas, a higher ratio often reflects that the women are not getting adequate facility.[16] The ratio we get was reassuring in this regard.

The lag period in between onset of symptoms and the diagnosis is less than one year in most of the cases, reflecting the strong surveillance by both government and non-government sectors. Familial clustering was quite common as 9.8% patients had history of intra-familial contact. Affected people were predominantly from lower socioeconomic group. The most common presentation was with hypopigmented macule with obvious margin, marked anesthesia and mild infiltration. Overall prevalence of reaction was much higher in multibacillary in relation to paucibacillary patients, which is similar to that reported by Teixeira *et al*.[20]

The proportion of new cases with grade 2 disabilities often indicates the quality of case-detection activities and when high reflects underdetection due to various reasons.[6] In the present study proportion of such cases (5.9%) was lower than many areas but still significant. The reason behind such prevalence of disabilities may be social stigma and misconception regarding the disease resulting in delay in health care seeking. Grade 2 disability of feet was more common and disability rate was higher in multibacillary patients.

Slit-skin smear is an important tool for confirming leprosy. But as a substantial bacillary load is required for the skin smear result to be positive, the test is invariably negative in paucibacillary leprosy.[8] So in our study population, the most of the paucibacillary patients did not undergo slit-skin smear examination. Even among 122 patients who underwent this examination BI was zero in most of them (n=71). But this negative result does not exclude the clinical diagnosis of leprosy. Skin biopsy for histopathology can be done in difficult cases to exclude the differentials.

Though nerve enlargement is one of the cardinal signs of leprosy, in our study only 19.8% had one or more nerve enlargement. This reflected the fact that nerve enlargement is common but not universal in leprosy. Among the enlarged nerve ulnar nerve was most commonly affected followed by common peroneal nerve. This result is similar to other studies.[4,17,18,22]

The present study could not cover all the new cases detected in Dhaka over the study period. Still the pattern we found reflects that of this overcrowded metropolitan city. The rate of cure, relapse, defaulters etc. was beyond the reach of this study as we did not include the follow up data. Many patients might develop significant disability and/or reactions during the course of treatment which were not present during diagnosis. Due to resource constrain histopathological confirmation was not feasible in most of the cases. Even many a patients deny undergoing slit skin smear examination. So we had to be satisfied with clinical diagnosis.

Conclusion

Leprosy cases are being frequently diagnosed in Dhaka city. Epidemiological indicators reflect that despite a strong surveillance program there may be ongoing disease transmission and relative delay in diagnosis.

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