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Original Article

Profile of Disease in Leprosy Patients Diagnosed in a Tertiary Care Centre in Kolkata during 2014-2017

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Study of profile of leprosy in a Tertiary care Centre in an Urban Metropolitan settings has important epidemiologically relevant messages. This study has been carried out to find out the profile of leprosy patients attending a Tertiary Care Centre at Kolkata and to interpret data in respect to different epidemiological variables. The cases attending R.G. Kar Medical College for the year 2014-2017 and who were referred to Microbiology Department for slit skin smear examination were studied. Their profile analyzed according to age, sex, type of disease, past treatment, presentation of disease, deformity status, presence of reactions, bacteriological status of the patients and treatment history. Diagnosis was based on the clinical assessment and slit skin smear for Bacteriological Index (BI) as well as Morphological index (MI). Among 2380 cases 720 (30.25%) were females and 1660 (69.75%) were males. Maximum patients (74%) belong to upper lower (Class IV) socio-economic class. 20-40 years age group was reported as peak age of onset with average onset of age as 35 years, 7.56% were children below 15 years of age. Maximum patients (63.87%) were in reproductive age group. Multibacillary (BL/LL) cases are more prevalent (71.47%). 21% of cases were bacteriologically positive with 10.9% having >3+ BI. MI upto 25% was observed in 92% of 360 smears examined for this purpose. Proportion of type 1 reaction was more than type 2 in both males and females. 440 (18.5%) had reactions, 12.6% had type 1 and 5.9% type 2 reactions. Reactions in females were more associated with pregnancy/ lactation. 24% of cases had grade I disability whereas grade II disability was present in 14% of cases which indicates delayed diagnosis and inadequate management or both. Both grade 1 and grade 2 were more in males. Leprosy was found to be more prevalent in males, more prevalent in upper lower (Class IV) socio-economic class and more commonly of borderline type. Strategy need to be fine tuned to improve early detection, more focus on females during the reproductive years and appropriate intervention to reduce overall morbidity and deformity/disability.

Key Words : Leprosy, Profile, Type 1 and Type 2 reactions, Disability, Kolkata, Tertiary Care Centre.

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Introduction

Leprosy is a chronic infectious disease caused by *Mycobacterium Leprae*. It mainly affects peripheral nerves. Leprosy is known for kind of disability and deformity it causes, which results in associated stigma and discrimination in the society.

Widespread implementation of multidrug therapy (MDT) has made management of leprosy cases rational, efficient and of shorter duration and has thus improved patient's compliance and reduced case load (Selvaraj et al 1998). It has led to substantial fall in overall prevalence of the disease (Noordeen 2006). The proportion of female leprosy patients is reported to be lower than that of males. The skin is one of the most easily accessible organs which contain the largest number of bacilli in leprosy. The bacteriological status of leprosy patients is generally assessed by slit skin smears (Drs. Groenen, Saunderson and Baohong Ji on behalf of ILEP-1988, Medico-Social Commission for smear taking in leprosy are available online (www.ilep.org.uk/fileadmin/uploads/Documents/Learning Guides/lg3eng.pdf) and bacteriological index (BI) is calculated using Ridley's logarithmic scale (Mahajan 2013).

India eliminated leprosy as a public health problem in 2005 when overall prevalence became less than 1/10,000 population (NLEP 2016/2017). After that services were merged with state health services, profile of cases reporting to a tertiary care centre is an indirect measurement of problems related to time of reporting, management of disease and its complication as well as transmission dynamics of disease in the community. Keeping this in view, this study has been carried out to understand the disease profile of leprosy cases attending a tertiary care hospital in Kolkata and analyse the same from the angle of epidemiologically relevant indices.

Materials and Methods

Clinically diagnosed cases of leprosy attending Skin OPD at R.G. Kar Medical College were sent to the Microbiology department for Slit Skin smear examination, during a period of three years from 2014–2017. Profile was analyzed according to age, sex, type of disease, past treatment, presentation of disease, deformity status, and presence of reactions and bacteriological status of the patients. Diagnosis and classification (IAL 1982) of disease was based on the clinical assessment and slit skin smear only. Socio-economic classification was done following Modified Kuppuswami scale (Singh et al 2017). Disabilities were graded by the method described in WHO disability grading system (Brandsma & Van Brakel 2003).

Smear was taken from 4-6 sites: one from each ear lobule and rests from margin of lesions/active lesions (Rees and Young 1994). Smears were treated with modified Ziehl-Neelsen stain using 5% Sulphuric acid as decolouriser and examined under oil immersion field. The total number of the bacilli were measured using Ridley's logarithmic scale and bacteriological index (BI) was calculated (Mahajan 2013). The morphological index (MI), the percentage of solid-staining bacilli, was measured by the method described in National Leprosy Eradication Programme (http://nlep.nic.in/pdf/Annex%20V%20%20BI%20&%20MI.pdf).

Results

Among 2380 cases attending R. G. Kar Medical college and hospital during a period of three years from 2014-2017, 720 (30.25%) were female and 1660 (69.75%) were male. The ratio of male and female was 2.3:1. Age and sex distribution of cases is shown in Fig. 1.

Majority of cases (1520/2380, 63.87%) belonged to 16-49 years age group i.e. reproductive age group mainly.

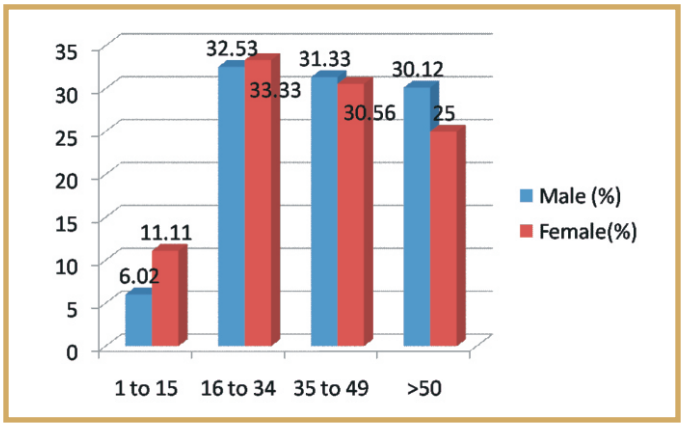

Fig. 1 : Sex and Age wise distribution of cases

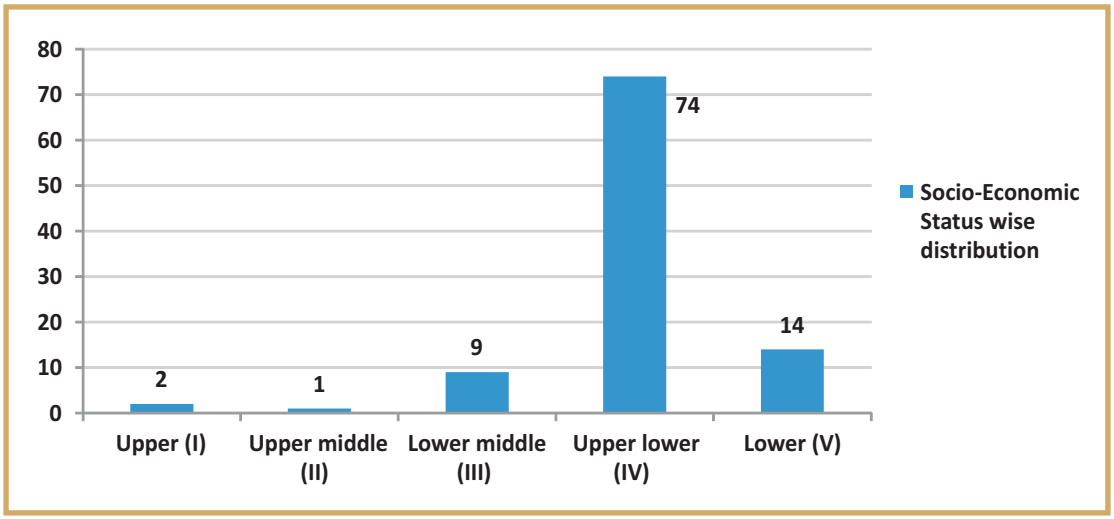

Fig. 2 : Socio-Economic Status wise distribution

Maximum patients (74%) belonged to upper lower (Class IV) socio-economic class (Fig. 2). (According to Modified Kuppuswami Scale).

Majority of the patients belonged to borderline type, both in males (47.05%) and females (38.20%). 1701/2380 (71.47%) belonged to BL/LL types (Table 1).

Bacteriologically 1880 (78.99%) were negative for AFB in slit skin smears; 260 (10.92%) had BI <3+ whereas remaining 240 (10.09%) had BI >3+ (Table 2).

About 24 % cases had Grade 1 disability whereas Grade 2 disability was present in 14%, slightly more in male (Fig. 3).

440 (18.49%) cases presented with lepra reactions. Proportion of type 1 reactions was more than type 2. Both type of reactions are more in male than in female (Fig. 4). Type I reaction in

Table 1 : Distribution of cases according to type of disease

Type Of disease	Male%	Female%	Total %
TT	48 (2.89)	79 (10.97)	127 (5.34)
BT	322 (19.40)	230 (31.94)	552 (23.19)
BL	781 (47.05)	275 (38.2)	1056 (44.37)
LL	509 (30.66)	136 (18.89)	645 (27.10)
Total	1660 (100)	720 (100)	2380 (100)

Table 2 : Bacteriological index wise distribution of cases

BI	Female (%)	Male (%)	Total %
Smear Neg	620 (86.11)	1260(75.90)	1880 (78.99)
<3+	40(5.56)	220(13.25)	260(10.92)
>3+	60(8.33)	180(10.85)	240 (10.09)
Total	720	1660	2380(100)

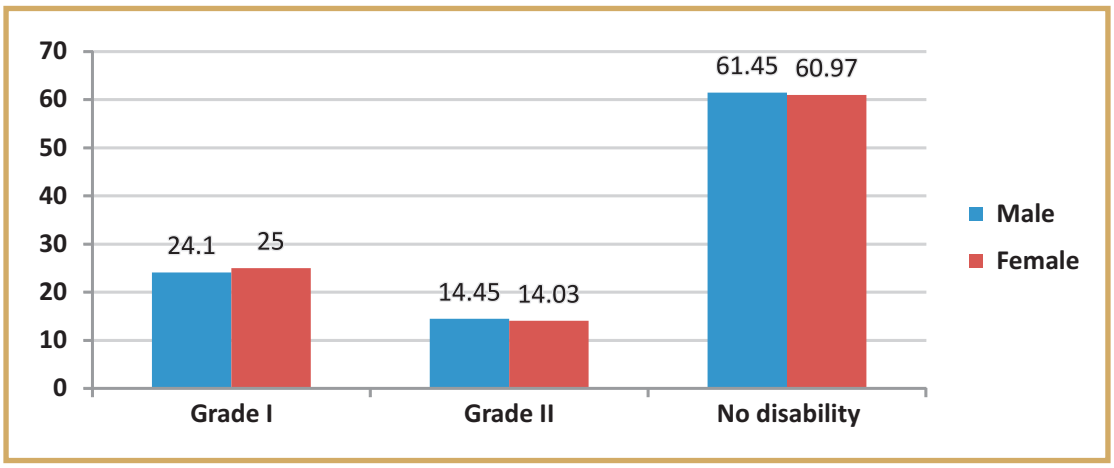

Fig. 3 : Disability status of the patients

females was more associated with reproductive age group.

Onset of reaction in female was associated more with pregnancy/lactation than in menarche or menopause (Fig. 5) and association with MDT therapy was found in 6.7% cases. (Both in male and female).

Out of total 2380 patients, 816 (34.29%) had history of prior MDT treatment before coming to R. G. Kar Hospital. Smear positivity at the time initiation of MDT is shown in the Table 3. Out of them, only 15.13% cases were found to be smear positive again.

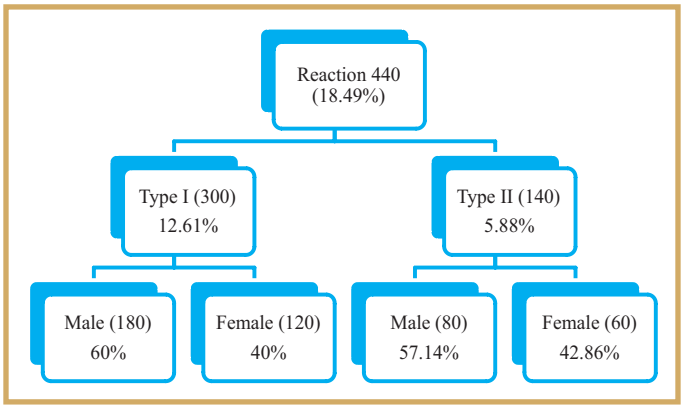

Fig. 4 : Showing proportion of cases with reactions

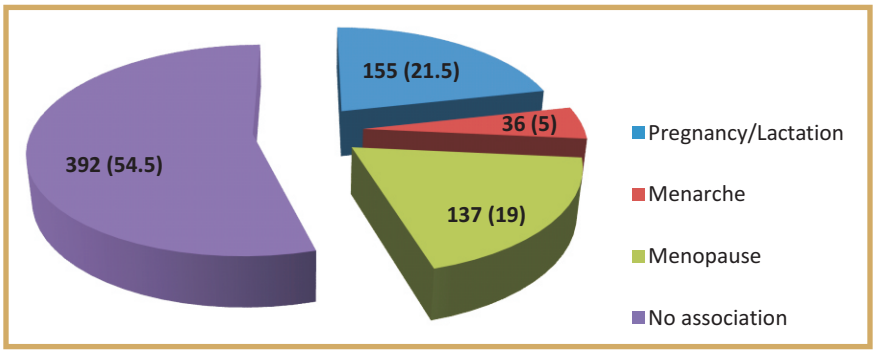

Fig 5 : Onset of Reaction in female and relationship with known predisposin

Table 3 : Showing Follow up cases after completion of MDT in relation with smear positivity at the time of start of treatment

	BI <3+ (%)	BI >3+ (%)	Total (%)
Repeat smear +ve	140 (5.88)	220 (9.24)	360 (15.13)
Repeat smear -ve	269 (11.30)	187 (7.86)	456 (19.16)
Total	409 (17.18)	407 (17.10)	816 (34.29)

$\chi^2 = 32.519$, df = 1, $\chi^2/df = 32.52$, $P(\chi^2 > 32.519) = 0.0000$

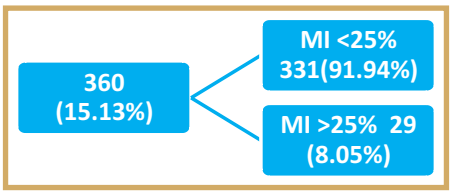

Fig. 6 : Showing follow up of cases in relation with MI value

Out of smear positive cases, 91.94% showed their Morphological index (MI) value below 25%, where as only 8.05% cases had higher MI value (>25%). (Fig. 6)

Discussion

With widespread use of MDT the numbers of advanced cases are decreasing. According to NLEP – Annual Report for the year 2016-17, India has attained the level of elimination of leprosy (<1/10,000 cases) with prevalence rate being 0.66/10,000. 554 districts (81.23%) out of total 682 districts also achieved elimination by March 2017 (NLEP 2016-2017). In this study, the disease profile in a tertiary hospital was analyzed. Preponderance of males was seen with low proportion of females (30.25%) which was slightly lower in comparison with NLEP 2016-2017 report, where country-wise proportion of leprosy cases in female is 39.17%, whereas state-wise it is 37%. Perhaps, it is due to difference in health seeking behaviour of males and females as females are slow to self report due to social stigma (Price 2017). This finding is also consistent with other studies also (Norman et al 2006).

In earlier studies, bimodal peak was observed between 10-14 years and 30-40 years (Rao et al 1970, Dharmendra 1985) where as in MDT era incidence rate has been reported to rise between 10-20 years of age (WHO 1988, WHO 1998) and 20-35 years age-group was reported as peak age of onset with average onset of age 31.92 (Wu et al 2000). Majority of patients were of reproductive age group (16-49 years) in our study. Child proportion in leprosy has declined and been reported as 8.7% (country–wise) and 7.48% (State-wise) (NLEP 2016-2017), 8-10% (Casabianca 2006). In this study, proportion of cases in less than 15 years of age group was 7.56% which is consistent with trend in other studies.

In this study, majority of patients belonged to borderline group, in both males and females which is consistent with the other studies (Chhabra et al 2015 and Norman et al 2006). As borderline lesions are more apparent, so perhaps it may be a reason for more patients self reporting with borderline form of leprosy. Decreased proportion of cases in early polar form of disease may be due to increase of herd immunity in the community and CMI in the individual at one end or at the other end perhaps patients still tend to hide therein apparent/early lesions due to fear and stigma. As the smear positive cases were low (24.10% male and 13.89% female) in our study, it is possible that being in urban settings, they were partially treated, although appropriate treatment history is not available in all cases.

Leprosy is still considered as a contagious and unclean disease. It has been a feared and stigmatised disease mainly because of the deformities associated with it. Although wide-spread use of MDT has made a sea change in the profile of the disease nevertheless, disabilities continue to be a major problem (Srinivasan 2000) and reported to be more common in men than in women (Enna 1974).

In MDT era, various studies have reported disability rate to vary as 22.3% (Saha 1993); 24.3% (Selvaraj et al 1998); 7.9% (Casabianca 2006), 20-25% (Norman et al 2006), and 22-27% (Rao and Jayakumar 2006). According to National Leprosy Eradication Programme – Annual report for the year 2016-2017 disability rate all over India is 3.94 /million (Grade I deformity 4.11% and Grade II deformity 3.87%) whereas in West Bengal it is 3.06/million (Grade I deformity 4.36% and Grade II deformity 2.69%). In this study, disability rate among cases (38.7%) is higher than reported in other studies as being a tertiary care hospital where many referred cases also comes and also some cases of interstate migrant workmen from

Bihar, Orissa, Jharkhand, Assam, Tripura and North east states. Proportion of cases with disability is slightly more in males in our study. This male preponderance in disability incidence has also been reported in other studies (WHO 1998, Richardus et al 1999, Saha and Das 1993).

In this study, incidence of patients presenting with lepra reactions was observed to be 18.49% and type 1 reactions (12.61%) are more than those of type 2 (5.88%). The number of ENL type reactions in patients taking treatment has diminished due to the suppressive effect of the clofazimine used in MDT (Kumar et al 2004). Various studies have been reported reactions in a high percentage (41.3%, 34.9%, and 30.9%) of their patients at the time of presentation (Lienhardt and Fine 1994, Singal and Sonthalia 2013, Kumar et al 2004) which show that many patients seek treatment only when they developed reactional lesions or painful symptoms of neuritis due to reaction. There may be need to increase awareness in patients for reactions and to guide them to seek appropriate treatment from a hospital well in time.

Out of total cases presenting with reactions higher proportion of patients are male and probably it is due to the fact that men are involved more in outdoor activities and women are more slow to self report due to fear of being stigmatised (Lienhardt and Fine 1994).

In this study, it is seen that onset of reaction in female is associated more with pregnancy/ lactation (21.5%) than in Menarche (5%) or Menopause (19%). Such associations are well known and indicate adequate attention to such age groups.

It is also seen that most of the patients (74%) attending leprosy clinic belongs to upper lower socio-economic status, according to Modified Kuppuswami scale, depicting that illiteracy, social stigma, unemployment and low income make them forced to stay unhygienically in congested colonies resulting in social and health related issues (Majumder 2015).

In this study 34.29% had history of prior MDT treatment before coming to R. G. Kar Hospital. Out of them, only 15.13% cases were found to be smear positive again. Out of smear positive cases, 91.94% had Morphological index (MI) value below 25%, thus indicating effectiveness of MDT therapy but probably due to irregularity in chemotherapy all bacilli were not destroyed.

As this was a hospital based study, results may not reflect status of disease in a community and also being a tertiary care centre most of the cases belong to geographic area away from local population. So it depicts the profile of disease in leprosy patients attending hospital. Decreased proportion of female cases is a cause of concern and there is a need to develop gender-sensitive health education strategy to encourage female patients for self reporting. Decreasing incidence of smear positive cases, higher incidence of deformity and reactional cases also shows that although implementation of MDT has been effective in reducing infectivity and disease transmission, there is a need for emphasis on assessment of reactions and disability at diagnosis so that those at particular risk can be recognised and managed appropriately.

Conclusion

In the current MDT era, there is preponderance of leprosy patients in reproductively active age groups and of borderline type. There are more cases with disabilities that require awareness, early self reporting and timely treatment for prevention of deformities. Overall, it denotes presence of active infection in the community and will require early detection, prompt and greater intervention to reduce deformity and morbidity.

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