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Important Risk Factors of Post Kala-Azar Dermal Leishmaniasis Patients in Endemic Area of Bangladesh

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Abstract

Background: Post-kala-azar dermal leishmaniasis (PKDL) has important public health implications for transmission of visceral leishmaniasis (VL) or Kala-Azar commonly found in endemic area of Bangladesh. Elimination and prevention of VL requires detection and identification of risk factors and treatment of PKDL cases, necessarily because of its capacity to serve as a reservoir for the causative parasite, *Leishmania donovani.* **Objective:** To find out sociodemographic factors in different clinical pattern of PKDL cases in endemic area of Bangladesh. **Methodology:** This Observational study will explore the socio-demographic factors in different clinical forms for control of kala-azar in endemic area of Bangladesh. The cases will be enrolled from Valuka, Haluaghat, Trishal and other Upazilla health complexes of Mymensingh district and OPD of MMCH and CBMCH. **Results:** Clinical and epidemiologic profiles of 91 PKDL patients showed that median age of males and females at the time of diagnosis was significantly different ($P = 0.013$). A significant association was observed between family history of VL and sex of PKDL patients ($\chi^2 = 5.72$, $P < 0.01$). Nearly 85% of the patients showed development of PKDL within five year of VL treatment. The observed time (median = 2.5 year) between appearance of lesions and diagnosis is an important factor in VL transmission. A significant association was observed between type of lesions and duration of appearance after VL treatment ($\chi^2 = 6.59$, $P = 0.001$). **Conclusion:** PKDL was observed after a long period of treatment. Identification and remove the sociodemographic factors like housing condition, incomplete treatment and reservoir are important factor in the public health importance of patients with PKDL in terms of transmission of infection in the community.

Key word: PKDL, Sociodemographic factors, Endemic area

Introduction

Post-kala-azar dermal leishmaniasis (PKDL) is a dermatropic form of leishmaniasis caused by Leishmania donovani parasites infection in the skin after apparently successful treatment of patients with visceral leishmaniasis (VL) or those without a history of VL. It is characterized by macular, maculopapular, and nodular lesions in patients recovering from VL who are otherwise healthy[1]. It occurs in nearly 10-20% of patients cured of VL within 1-5 years in Indian subcontinent, and in approximately 50% of patients in Sudan within six months[1-4]. In Bangladesh PKDL cases also increase gradually. Patients with PKDL have immense public health importance because they act as reservoirs of infection[6]. Because there is no animal reservoir of L. donovani, in this sub-continent, it is important to detect patients with PKDL and their risk factors and treat them properly and remove these risk factors to prevent future outbreaks of VL[7]. PKDL can easily be confused with a number of skin disorders such as leprosy, psoriasis and eczema. Clinical similarities between the skin lesions of PKDL and leprosy may lead to diagnostic difficulties, especially in areas where the diseases are coendemic[4]. A patient is diagnosed as having PKDL if the following features are present: history of treatment kala-azar (present in 85% cases); presence of macules, papules or nodules

without any loss of sensation over the lesions; and a positive rK39 dipstick test. The microscopic detection of parasites in PKDL lesions is impeded by the limited sensitivity[4,5]. Clinical diagnosis may be problematic for patients in whom there is a long interval between active VL and the development of PKDL. Microscopic detection for the diagnosis of PKDL often lack sensitivity or specificity as: (i) the number of parasites in skin smears and biopsy specimens is often low or zero, thus requiring prolonged searches by routine microscopy[4,5]; (ii) serological tests are often positive upto 6 to 12 months after complete treatment of VL[6,7]; (iii) the leishmanin skin test (LST) may or may not be positive[16]. PKDL, in particular its nodular form, may easily be confused with a number of dermatological conditions of which leprosy is the most important[4]. PKDL patients may be an important source of infection in the transmission of VL[1],. Here we describe the risk factors of PKDL in endemic area with the application of rK39 dipstick ICT and Microscopy for LD body in slit skin smear for diagnostic tools and clinical data in Mymensingh district of Bangladesh where VL and PKDL are endemic. Because there is no mechanism currently available to detect PKDL cases at the community level, control strategies currently operational in disease-endemic areas would fail to achieve their goal of elimination. Therefore, we studied diagnosed PKDL cases during 2011-2012 in different upazilla health complexes of Mymensingh district to identify epidemiologic features that are important to disease control in public health.

Materials and methods

This cross sectional study was conducted at the Department of Microbiology, Mymensingh Medical College, Mymensingh Bangladesh during January 2011 - December 2011. A total of 91 diagnosed patients with PKDL by rK39 dipstick ICT and Microscopy for LD body in slit skin smear were enrolled in this study after providing informed consent. A semi-structured questionnaire was administered to each person to obtain demographic characteristics, area of residence, history of VL, relapse of VL, family history of VL or PKDL, month and year of first appearance of lesions, and site of lesions.

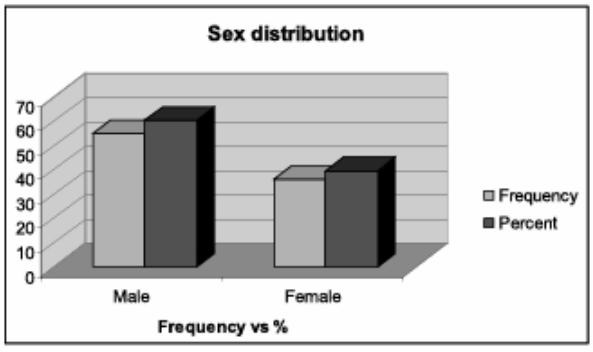
Results

This study was conducted on a total of 91 subjects clinically and serologically (rK39 ICT) diagnosis of PKDL. Of 91 cases of PKDL, 55(60%) were male and 36(40%) were female (Table-1 & Figure-1) and male to female ratio was 1.5:1.

Table 1: Sex distribution in PKDL cases

Sex	Frequency	Percent
Male	55	60.4
Female	36	39.6
Total	91	100.0

Figure-1:



Age distribution of subjects is shown in the table-2. Majority of the cases (70) were in the age group of 6-20 years. Number of cases gradually declined with increase in age. Minimum number of case (06) was in the age group of above 30 years.

Table-2: Age groups of PKDL Cases

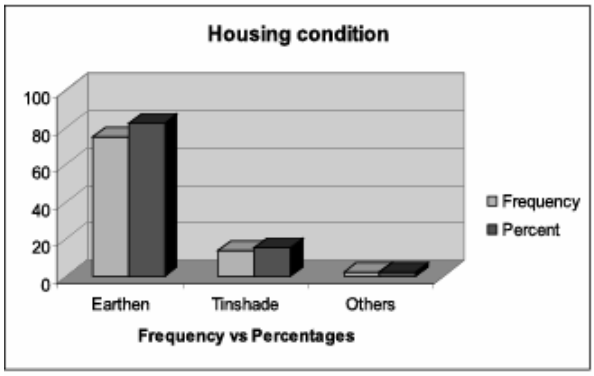
Age group	Frequency	Percent
6-10 yrs	21	23.1
11-15 yrs	34	37.4
16-20 yrs	15	16.5
21-25 yrs	8	8.8
25-30 yrs	7	7.7
> 30 yrs	6	6.6
Total	91	100.0

The housing condition of PKDL cases shown in Table-3. Earthen house and tin shade house were in 75(82%) and 14 (16%) respectively. Out of 91 PKDL cases, 78 (74.3%) were from community and 27 (25.7%) were from inpatient department.

Table 3: Housing condition of all cases

Housing type	Frequency	Percent
Earthen	75	82.4
Tinshade	14	15.4
Others	2	2.2
Total	91	100.0

Figure-2:



The family history of VL is shown in table-4. 56(61.5%) of PKDL cases had history of VL attack previously.

Table-4: Family History of PKDL cases

History of VL	Frequency	Percent
Yes	56	61.5
No	35	38.5
Total	91	100.0

Drug history (Treatment by Inj. Sodium Stibugluconate of VL cases) of PKDL shown in table-6. 85(93%) cases had previous incomplete treatment by inj. Sodium Stibugluconate about 2-6 years previously.

Table-5: Drug History of VL cases

Drug History	Frequency	Percent
Yes	85	93.4
No	6	6.6
Total	91	100.0

Discussion

Post Kala-azar dermal leishmaniasis and visceral Leishmaniasis are poverty-related diseases. The poorest segment of the community suffers from these diseases. Developmental researches of these diseases are also difficult to perform because of remote and backward approach to reach the endemic locality. Thereby, it has appeared as a neglected disease and a major health problem in our country as PKDL is an endemic area of our country. In the Indian sub-continent PKDL act as a reservoir of Leishmania donovani. For this purpose, timely and adequate treatment, remove sociodemographic factors may contribute significantly to reducing the human reservoir and eradicate these anthroponotic diseases.

The distribution of PKDL patients is similar to that of VL patients because PKDL patients represent a small subset of VL patients with a higher proportion among males (60%) than females (40%). In the present study, out of 91cases, 55(60%) were male and 36(40%) were

female (Table-1) and male to female ratio was 1.5:1 (Table I). Other studies from home also recorded almost similar ratio between male to female e.g.- ICDDRB (2002) and ICDDRB (2003) found male to female ratio of 1.2:1 and 1.04:1 respectively. The median age of occurrence of PKDL was significantly different by sex (P = 0.013). The higher proportion of female patients with PKDL in persons 5-14 years of age could be caused by appearance of lesions on face, which are often confused with leprosy, a severe social stigma regarding marriage in communities in India, particularly in rural areas. PKDL and VL affect various age groups depending on the infecting species, geographic location, reservoir and host immunocompetence. In Indian type of VL, Children between 5 and 15 years of age are affected more in VL and 6-20 years of age are affected more (Gradoni et al, 1995) in PKDL. Males are infected more often than females, most likely because of their increased exposure to sandflies due to professional activities (Berman, 1997).

In our study, living housing condition of most (82%) Post-Kala-azar dermal leishmaniasis cases were made of earthen walls (Figure-2). Due to low socio-economic condition people made their houses with mud. Easily developed tiny cracks and crevices in the earthen house are the favourable places for sandflies (Desjeux, 2002). So, people residing in earthen houses must bear more risk for being infected by KA agents and PKDL.

In our study, Majority of the cases (61.5%) were one or more previous history of infection by Leishmania donovani and treatment by injection Sodium stibugluconate. It is the essential demand of the time to control Leishmaniasis(VL & PKDL). For this purpose, timely and adequate treatment may contribute significantly to reducing the human reservoir of this anthroponotic disease. Chemotherapy is critically important in reducing the burden of disease and antimonials (SbV) are the first-line drugs for all clinical forms. Treatment is long, expensive and not devoid of adverse side effects. In many states of India, treatment failure is already well documented due to low responsiveness of parasites to sodium antimony gluconate. In Bangladesh, resurgence of VL has been noticed in the decade of 1970 that has gradually increased to an epidemic form in many localities. Currently VL appears at a rate in excess of 15000 per year (Al-Masum et al, 1995; DGHS, 1995). More over, clinical impression in our locality also suggested substantial percentages of treatment failure by SAG.

Conclusion

Analyzing the findings of the study, it was concluded that PKDL affected more males than females and majority of them were children under 12 years of age. Sociodemographic factors like housing condition, incomplete treatment and reservoir are important factor in the public health importance for control of disease.

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