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Socio-demographic Characteristics of Kala-azar Patients of Mymensingh Division in Bangladesh

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ABSTRACT

Introduction: *The protozoal disease Kala-azar, also known as Visceral Leishmaniasis (VL), is caused by the parasite Leishmania donovani and is spread through the bite of specific species of female phlebotomine sand flies. This study was carried out to establish the socio-demographic characteristics of kala-azar patients of Mymensingh Division in Bangladesh.* ***Methods:*** *This cross-sectional study was conducted in the Institute of Biological Sciences under Rajshahi University, Rajshahi. Data was collected from 'Surjokan to Kala-azar Research Center' (SKRC), in Mymensingh division of Bangladesh during the period of January, 2016 to December, 2018 by enrolling 56 Kala-azar patients and 56 healthy people (control group). A predesigned data collecting sheet was used to record all findings.* ***Results:*** *Among 56 kala-azar patients, majority (25, 44.60%) were within 18 to 40 years and mean age was 33.91±2.40 years. Males were predominant (35, 62.5%) with Male:Female ratio of 1.67:1. Most of the patients were farmer (30.35%) and primary educated (46.78 %). They belonged to a low socioeconomic class (44.64%) and lived in mud houses (47.56%). This study revealed that, farmers (p-0.036) and people living in mud houses (p-0.022) are more susceptible to Kala-azar infection.* ***Conclusion:*** *This study concluded that determination of the socio-demographic characteristics is helpful for the prevention and control of Kala-azar infection.*

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INTRODUCTION

Leishmaniasis is a vector-borne parasitic disease caused by protozoan Leishmania and is transmitted by female phlebotomine sand flies. The three most prevalent manifestations of this disease are visceral leishmaniasis (VL), mucocutaneous leishmaniasis (MCL), and cutaneous leishmaniasis (CL). Immune response to infection, host factors and biology of the involved vector play important role in the

severity of disease.[1] It also depends on the features of the causative Leishmania species.The most severe type of leishmaniasis, known as visceral leishmaniasis (VL) or Kala-azar, is caused by Leishmania donovani throughout Asia and Africa.[2] Fever, generalized weakness, anorexia, weight loss, darkening of skin etc. are common symptoms and splenomegaly, hepatomegaly, anemia, leukopenia, thrombocytopenia, hyper-gammaglobulinemia, hypoalbuminemia etc. are important signs of Kala-azar patients.[3]

Worldwide, 200 million people are at risk, and five lacs new cases are reported each year.[4] More than 90% of Kala-azar cases reported globally are found in Bangladesh, Northeast India, Nepal, Sudan and Northeast Brazil, and >60% of VL cases are found in India, Nepal and Bangladesh.[5]Kala-azar is a fatal disease if left untreated. An estimated 51,000 people die each year due to kala-azar worldwide.[6] In the endemic areas of Kala-Azar, the majority of the population has low earnings, inadequate education, and poor housing.[7]

Kala-azar is still one of the most important health problems in Bangladesh, with a high frequency of mortality and morbidity. Though the treatment of this disease has achieved significant progress, but still a number of patients are complicated by post-kala-azar dermal leishmaniasis (PKDL).[8] The number of affected districts has decreased from 45 to 26 in Bangladesh, and there were a total of 864 cases in 2016 and 459 cases in 2017. Most cases were reported from Mymensingh and Tangail district.[9] It is frequently associated with malnutrition, poverty, poor housing and sanitary conditions, lack of immunity and environmental changes.[10]

To plan effective strategies for VL control, elimination and treatment, we must understand sociodemographic background of disease occurrence. So, the aim of this study was to determine the socio-demographic characteristics of Kala-azar patients.

METHODS

This cross-sectional type of descriptive study was carried out in the Institute of Biological Sciences (IBSc), Rajshahi University, Rajshahi, Bangladesh, during the period of January, 2016 to December, 2018. Kala-azar patients were selected from "Surjokanto Kala-azar Research Center" (SKRC) in Mymensingh division. There were 56 Kala-azar patients (35 males and 21 females) and 56 control groups (32 males and 24 females) were selected from the same socio-demographic background for this study. The patients were free from co-morbidities like malaria, enteric fever, chronic liver disease, thalassemia, lymphoma, leukemia, diabetes mellitus and hypertension etc. Informed written consent was taken from the study subjects. Ethical clearance for the study was obtained from the Ethics Review Committee (ERC no. 92/320-IAMEBBC/IBSc); Institute of Biological Sciences (IBSc), Rajshahi University and institutional approval was obtained from the authority of SKRC, Mymensingh. Socio-demographic data were collected by using structured questionnaires and face to face interviews. The patients were diagnosed on the basis of clinical presentation and positive rK39 test.

All statistical analysis was done by using Statistical Package for Social Science (SPSS), version-20. Results were expressed as Mean±Standard Deviation (SD). Statistical significance of reference between two groups was evaluated by x^2 test and p value ‹0.05 was considered statistically significant.

RESULTS

Among the 56 patients, majority 25 (44.60%) were in 18-40 years age group and mean age was 33.91±2.40 years and within the control group, majority 27 (48.22%) were in 18-40 years age group (Table I).

Table I: Distribution of the study subjects by age group

Age (in years)	Patients (n-56)	Control (n-56)	x^2	*p*-value
<18	10 (17.90%)	13 (23.20%)		
18-40	25 (44.60%)	27 (48.22%)	1.1439	0.56
41-60	21 (37.50%)	16 (28.58%)		
Total	**56 (100%)**	**56 (100%)**		

Out of 56 patients, 35 (62.5%) were male and 21 (37.5%) were female with M:F ratio of 1.67:1. and in control group, 34 (60.72%) were male and 22 (39.28%) were female with M:F ratio of 1.54:1 (Figure 1).

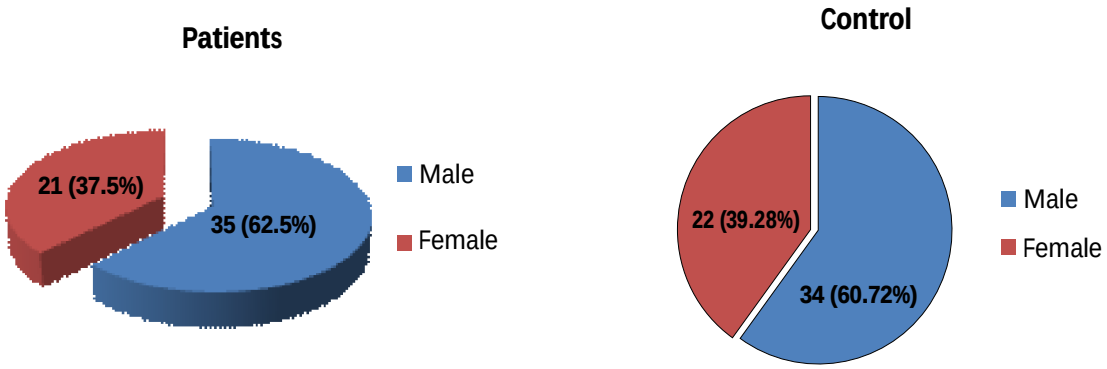

Figure 1: Sex distribution in Kala-azar patients and control group

In the occupational background, maximum patients were farmers (25, 44.64%) and only 8.93% were service holders whereas 22 (39,29%) were day laborer in control group (Table II).

Table II: Occupational status of study subjects (n-112)

Occupation	Patients (n-56)	Control (n-56)	x^2	*p*-value
Farmer	25 (44.64%)	14 (25.00%)		
Day laborer	13 (23.22%)	22 (39.29%)		
Housewife	7 (12.50%)	12 (21.43%)	6.6428	0.036
Business man	6 (10.71%)	5 (8.93%)		
Service holder	5 (8.93%)	3 (5.35%)		
Total	**56 (100%)**	**56 (100%)**		

Concerning the educational level, the survey found that a large number of patients (24,42.85%) were primary educated and a limited number were graduated but within control group, most (21,37.50%) of study subjects were illiterate(Table III).

Table III. Educational level of study subjects (n-112)

Educational level	Patients (n-56)	Control (n-56)	x^2	*p*-value
Illiterate	15 (26.79%)	21 (37.50%)		
Primary	24 (42.85%)	16 (28.57%)		
Secondary	10 (17.86%)	12 (21.42%)	0.7252	0.94
HigherSecondary	5 (8.92%)	4 (7.15%)		
Graduateand above	2 (3.58%)	3 (5.36%)		
Total	**56 (100%)**	**56 (100%)**		

The most of the patients (29, 51.79%) resided in mud houses and 7.14% lived in bricked houses but within control group 32.14% lived in mud houses (Table IV).

Table IV: Housing status of study subjects

Housing status	Patients (n-56)	Control (n-56)	x^2	*p*-value
Mud house	29 (51.79%)	18 (32.14%)	9.5745	0.022
Bamboo house	17 (30.36%)	13 (23.22%)		
Stilts house	6 (10.71%)	14 (25.00%)		
Bricked house	4 (7.14%)	11 (19.64%)		
Total	**56 (100%)**	**56 (100%)**		

Out of 56 patients, 25 (44.64%) patients had a monthly family income of less than 10,000 taka (Low socio-economic group) and only 4.6% patients had more than 20,000 taka (Table V).

Table V: Economic condition of study subjects (n-112)

Economic condition (Monthly income in taka)	Patient (n-56)	Control (n-56)	x^2	*p*-value
<10000	25 (44.64%)	21 (37.50%)	1.712	0.63
10,000-15,000	24 (42.86%)	23 (41.07%)		
15001-20,000	5 (7.92%)	9 (16.08%)		
>20,000	2 (4.6%)	3 (5.35%)		
Total	**56 (100%)**	**56 (100%)**		

DISCUSSION

These socio-demographic characteristics are useful for the diagnosis, prognosis and prevention of the disease.

In this study, majority (44.60%) of Kala-azar patients were within 18 to 40 years age group and mean age was 33.91±2.40 years. Tesfanchal et al.[11] showed that majority of the patients (28%) were within 15-20 years of age group and mean age was 27.98± 9.63 years. Siddiqui et al.[12] reported majority (26.7%) of the patients were within 25-34 years and Chufal et al.[13] observed mean age of kala-azar patients was 23 years.Kala-azar is more common in young people because they are more active and more prone to be bitten by sand fly.

This study revealed that the prevalence of Kala-azar in males was 62.5% and females was 37.5%, and the male and female ratio was 1.67:1. Singh et al.[14] found that males (67%) had a higher prevalence of Kala-azar infection than females (33%) in India. Sinha et al.[15] found that male (61%) were common than female (39%). Similar findings reported by Tesfanchal et al.[11] and Chufal et al.[13]. Kala-azar is more common in male possibly due to professional differences.

The study showed that the majority (25, 44.64%) of the patients were farmer. There was significant (*p*-036) association between occupational status and Kala-azar infection. Siddiqui et al.[12] found that majority (41.5%) of patients engaged in agricultural work. Yared et al.[16] reported similar findings regarding occupation of Kala-azar patients. On the other hands, Caldas et al.[17] mentioned that, most (33%) of the patients were maid housewives. Farmers work in fields, which is the common breeding place for sand flies.

A large number of the patients were primary educated (24, 42.85%) and illiterate (15, 26.79%) in this study. Most of the patients were illiterate observed by Siddiqui et al.[12] (60%) and Ranjan et al.[18](49%). Due to lack of knowledge, they are not aware of the protection of sand fly biting.

Regarding the housing condition, about half (47.56%) of the patients lived in mud houses. Housing condition is significantly (*p*-0.022) associated with Kala-azar. Siddiqui et al.[12] (70%) and Sinha et al.[15] (61%) observed Kala-azar is common disease in those people who lived in mud houses. Ranjan et al.[18] reported that 83% of patients had floors of houses with mud. Mud

houses are suitable places for sand fly breeding due to presence of cracks and crevices in the floors and walls. Additionally, sand fly breeding is caused by higher humidity in mud houses. In this study, most of the patients were poor and their monthly family income was <10000 taka BD. This study is consistent with other studies conducted by Sinha et al.[15] and Ranjan et al.[18]. Poor people usually suffer from malnutrition, which may be a possible cause of Kala-azar infection.

Small sample size and restricted study area are limitations of this study. Future studies should investigate whether these findings are consistent or not.

CONCLUSION

This study concluded that farmers, low socioeconomic status and inadequate education are common socio-demographic risk factors of Kala-azar patients. So, this study will be helpful for designing and developing effective methods for prevention and control of Kala-azar.

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REFERENCES

1. Amin MR, Fardin J, Noor N, Mallik PK, Tabassum T, Khan MAS, et al. Leishmaniasis in Dhaka Medical College-experience of three years. Heliyon. 2020; 6(e05414): 1-6. doi:10.1016/j.heliyon.2020.e05414
2. Burza S, Croft SL, Boelaert M. Leishmaniasis. Lancet. 2018; 392(10151): 951-970. doi: 10.1016/S0140-6736(18)31204-2. PMID: 30126638.
3. Hightower AW, Chowdhury R, Ali M, Amann J, Wagatsuma Y, Haque R, et al. Risk Factors for Kala-azar in Bangladesh. Emerg Infect Dis. 2005; 11(5): 655-662. doi: 10 3201/eid1105 040718.
4. Guerin PJ, Olliaro P, Sundar S, Boelaert M, Croft SL, Desjeux P, et al. Visceral leishmaniasis: current status of control, diagnosis, and treatment, and a proposed research and development agenda. Lancet Infect Dis. 2002; 2(8): 494-501. doi: 10. 1016/s1473-3099(02)00347-x. PMID: 121508 49.
5. World Health Organization Regional Technical Advisory Group on Kala-azar elimination. Report of the first meeting, Manesar, Haryana, 20-23 December 2004, New Delhi: WHO Regional Office for South East Asia, 2005.
6. World Health Organization (WHO). World health report: shaping the future. Geneva: World Health Organization, 2003.
7. Ahluwalia IB, Bern C, Costa C, Akter T, Chowdhury R, Ali M, et al. Visceral leishmaniasis: Consequences of a neglected disease in a Bangladeshi community. Am J Trop Med Hyg. 2003; 69(6): 624-628. PMID: 14740879.
8. Bern C, Chowdhury R. The epidemiology of visceral leishmaniasis in Bangladesh: prospects for Improved control. Indian J Med Res. 2006; 123(3): 275-288. PMID: 16778310.
9. National Guideline for Kala-azar Case Management, Kala-azar Elimination Program, Directorate General of Health Services, Ministry of Health and Family Welfare. Government of the People's Republic of Bangladesh, May, 2013.
10. Wijerathna T, Gunathilaka N, Gunawardana K, Rodrigo W. Potential Challenges of Controlling Leishmaniasis in Sri Lanka at a Disease Outbreak. Biomed Res Int. 2017; 2017: 1-9. doi: 10.1155/ 2017/6931497. PMID: 28630867; PMCID: PMC5467302.
11. Tesfanchal B, Gebremichail G, Belay G, Gebremarium G, Teklehaimanot G, Haileslasie H, et al. Alteration of Clinical Chemistry Parameters Among Visceral Leishmaniasis Patients in Western Tigrai, Ethiopia, 2018/2019: A Comparative Cross-Sectional Study. Infect Drug Resist. 2020; 13: 3035-3062.doi: 10.2147/IDR.S261698. PMID: 32943889

12. Siddiqui NA, Kumar N, Ranjan A, Pandey K, Das VN, Verma RB, et al.Awareness about kala-azar disease and related preventive attitudes and practices in a highly endemic rural area of India. Southeast Asian J Trop Med Public Health. 2010; 41(1): 1-12. PMID: 20578475.
13. ChufalSS, Pant P, Chachra U, Singh P, Thapliyal N, Rawal V, et al. Role of Haemotological changes in Predicting Occurence of Leishmaniasis- A Study in Kumaon Region Of Uttarakhand. J Clin Diagn Res. 2016; 10(5): EC39-EC43. doi: 10 7860/ JCDR/2016/15438 7885.
14. Singh RK, Pandey HP, Sundar S. Visceral Leishmaniasis (Kala-azar): challenges ahead. Indian J Med Res. 2006; 123(3): 331-344.
15. Sinha PK, Ranjan A, Singh VP, Das VNR, Pandey K, Kumar N, et al. Visceral leishmaniasis (kala-azar)—the Bihar (India) perspective. J Infect. 2005; 53(1); 60-64.
16. Yared S, Deribe K, Gebreselassie A, Lemma W, Akililu E, Kirstein OD, et al. Risk factors of visceral leishmaniasis: a case control study in north-western Ethiopia. Parasit Vectors. 2014; 7(470): 1-11.
17. Caldas AJM, Costa J, Acquino D, Silva AOAm, Netto MB, Barral A. Are there differences in clinical and laboratory parameters between children and adults with American visceral leishmaniasis? Acta Tropica.2006; 97(3): 252-258.
18. Ranjan A, Sur D, Singh VP, Siddique NA, Manna B, Lal CS, et al. Risk factors for indian kala-azar. Am J Trop Med Hyg.205; 73(1): 74-78.