

Original Research Article

The Ocular Findings among Patients with Leprosy in South-Eastern Region, Tanzania

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Abstract: Objective: To assess ocular findings among patients with leprosy and ex-leprosy at Nazareth Leprosy Center. **Methodology:** An analytical cross sectional study was conducted at Nazareth Leprosy Center in Morogoro region, from June to December 2021. All patients with leprosy and ex-leprosy patients who were available at Nazareth during the study period were interviewed and examined. A total of 88 participants were enrolled in the study and their socio-demographics, clinical history and ocular examination findings were analysed. **Results:** There were 53 (60.2%) males and 38 (43.2%) of participants were between the age of 54 to 70 years with a median age 64 years. Majority, 66 (75%), were unemployed and 46.6% had no formal education. Participants with multibacillary type of leprosy were 72.7% and forty three (48.9%) resided at the leprosarium Center. Ocular findings were present in 69% of study participants. Cataract was the most common (45.5%), 15.6% had lagophthalmos, 9.1% had keratitis and 9% uveitis. There were 19 (21.6%) patients who were blind with the best corrected visual acuity of less than 3/60 in the better eye. **Conclusion:** Patients with leprosy and ex-leprosy have significant prevalence of ocular pathologies which affects their vision. Patients with low socio-economic status and Multibacillary type of leprosy are more affected. Cataract is the most common cause of visual impairment, however other sight threatening conditions like lagophthalmos, exposure keratitis and uveitis are also common.

Keywords: Leprosy, ocular complications.

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INTRODUCTION

Leprosy is a chronic infectious disease caused by an acid fast bacilli bacteria *Mycobacterium leprae*. It affects the skin, peripheral nerves and the mucous membrane of various organs including the conjunctiva [1]. It is both preventable and curable by Multidrug therapy (MDT) combination of Rifampicin, Dapsone and clofazimine. Complications and disability caused by leprosy can be prevented by early detection and treatment, but when treatment is delayed, there may be progressive and permanent damage to the skin, nerves, eyes, and extremities. A compromised vision makes patients prone of injuries due to loss of sensation of extremities [2].

The pathogenesis of ocular complications is an outcome of nerve damage as a result of autoimmune reactions triggered by the pathogen, or a direct invasion of the eyeball and its adnexa by acid fast *Mycobacterium leprae* particularly in patients with multibacillary leprosy [3, 4]. For research purposes, multibacillary leprosy

includes all patients with more than 5 skin lesions. While paucibacillary leprosy is defined in patients with less or up to 5 skin lesions.

The occurrence and progression of ocular complications due to leprosy, are not withheld even after the completion of MDT.

The annual leprosy surveillance report by the World Health Organization (WHO) of the year 2021, reported the prevalence rate of leprosy to be 16.6 per million populations. New leprosy patients were reported from 127 countries. There is regional variation of the burden of the disease with more cases in low and middle income countries in Africa and Asia. Regional data on the prevalence of ocular manifestations are unreliable, incomplete and many of them are more than twenty years old [5].

In Tanzania, leprosy screening and treatment is free under the National Tuberculosis and Leprosy program (NTLP). There are more than 15 leprosy centers

offering treatment and rehabilitation services for patients with leprosy. Nazareth Leprosy center in Morogoro Region is one of them, offering treatment, rehabilitation and residence to patients with leprosy [6]. In most cases, leprosy patients live in remote areas, isolated and have financial, social and awareness barriers to utilization of eye care services [7]. The stigma attached to leprosy, pins down patients with leprosy to have a marginalized access to eye care services.

Despite the fact that Tanzania is among the countries with high burden of leprosy, less is known about its magnitude and impact of leprosy as far as eye health is concerned. Findings from this study will be used to raise awareness among health care providers on ocular complications due to leprosy and other eye diseases affecting this population and their impact on vision. This will enable planning for comprehensive management of leprosy and ex-leprosy patients in order to avoid visual impairment and improve quality of life of these patients.

Therefore, this study aimed to explore the magnitude of ocular complications and other eye diseases affecting leprosy and ex-leprosy patients.

MATERIAL AND METHODS

Study Design

This was a cross sectional analytical study conducted in a period of 6 months from June to December 2021.

Study Settings

The study was conducted at a leprosy center in Morogoro region which offers treatment, rehabilitation, and residence for patients and ex-leprosy.

Study Population

All adults (>18 years) patients and ex-leprosy who were available and Nazareth and those who came from home for treatment at Nazareth center during the study period were recruited.

Exclusion Criteria: Severely ill patients who could not withstand the interview.

Sampling Technique and Sample Size:

Eighty-eight participants were enrolled consecutively. The minimum calculated sample size was

74 with an assumption that the prevalence of ocular complications due to leprosy from previous studies was 73.9%, with 10% margin of error, and a clinical significance of 5%.

Data Collection

Data were collected through interviewing patients by using a structured questionnaire. The questionnaire consisted of demographic data and details of clinical history of leprosy, and past medical history. Participants were asked to provide information about the duration of the disease and whether they were on or had completed treatment. The principal investigator was assisted by an experienced Ophthalmologist to examine all patients by slit lamp and indirect Ophthalmoscope. Patients found with ocular complications were referred to the Ifakara St. Francis hospital for further investigations and management.

Data Analysis

Data were analyzed by using social science package software (SPSS) version 23. Chi-square test was used to test hypothesis on the difference in ocular findings among participants for categorical data. Logistic regression model for analysis of factors was used and a p-value of less than 0.05 was considered to be statistically significant.

Ethical Considerations

Ethical approval to conduct this study was obtained from the IRB at Muhimbili University of Health and Allied Sciences. Permission to conduct this study was granted by the administrative authority at Nazareth Leprosy Center. A written informed consent was obtained from each participant prior to commencement of the study.

RESULTS

Eighty-eight study participants were recruited and were all included in the analysis. Fifty three (60.2%) participants were male and 43.2% were between the age of 54-70 years with a median of 64 years. 51.1% of participants had attained a maximum of primary education while 46.6% had no formal education. Sixty six (75%) participants were completely dependent for their livelihood. Majority (72.7%) had multibacillary type of leprosy, 47.7% had lived with the disease for more than fifteen years (Table 1).

Table 1: Socio-demographic characteristics of study participants

Characteristics	Frequency	
	No	%
Sex		
Male	53	60.2
Female	35	39.8
Age group (years)		
18-35	3	3.4
36-53	21	23.9
54-70	38	43.2

Characteristics	Frequency	
	No	%
>70 Median age: 64 (18,91)	26	29.5
Education level		
No formal education	41	46.6
Primary	45	51.1
Secondary	2	2.3
Occupation		
No employment	66	75.0
Self employed	22	25.0
Marital status		
Single	51	58.0
Married	37	42.0
Residence		
Nazareth center	43	48.8
Outpatients	45	51.2

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The prevalence of ocular findings due to leprosy among study participants was 69%. This was a

mixture of both minor and sight threatening conditions (Table 1).

Table 2: Ocular findings among participants (N=88)

	n (%)
Yes	68 (69)
No	20 (31)

Among the types of ocular findings, cataract was the most common whereby 45.5% of participants had visually significant cataract and among these, 12.5% were below the age of 50 years. Other sight threatening conditions like lagophthalmos, entropion, cornea scars,

uveitis, and glaucoma were prevalent in 15.6%, 9.1%, 12.6%, 9%, and 2.3% respectively.

Fifty-six percent of participants had some degrees of visual impairment. Among these, 21.6% were blind (presenting visual acuity in the better eye of less than 3/60 in the better eye) (Table 3).

Table 3: Categories of Presenting Visual acuity in the better eye (N=88)

	N (%)
6/6-6/18	38 (44)
<6/18-6/60	29 (33.4)
<6/60-3/60	1 (1)
<3/60	20 (21.6)

Among patients with visual impairment, cataract was the common cause in 43%. Other causes of visual impairment were lagophthalmos with exposure

keratitis (21%), cornea scars (21%), uveitis (10%), and glaucoma (5%).

Table 4: Causes of Visual impairment among participants (N=49)

	n (%)
Cataract	21 (43)
Lagophthalmos with keratitis	10 (21)
Corneal scar	10 (21)
Uveitis	5 (10)
Glaucoma	3 (5)

DISCUSSION

The 2015-2020 WHO global strategy for leprosy control emphasized on the shift of campaigns from elimination of leprosy as a global public health agenda to minimization of disease burden by reduction of disabilities including loss of vision among patients

with leprosy [9]. Good vision is of critical importance in these patients because they are at risk of injury and trauma due to loss of sensation of peripheral extremities.

This study revealed that leprosy is more prevalent among people with low socio-economic status.

Nearly half, (46.6%) of study participants did not have any type of formal education training. In addition to that, 75% were unemployed. A study done in Kenya by Kagame *et al.*, reported similar findings where by 80% of patients with leprosy and ex-leprosy were unemployed [10]. The National TB and Leprosy program has reported for years the association between low socio-economic status and leprosy and listed it as the main risk factor for new infections, recurrences, disabilities, and loss of follow up [11]. This calls for efforts among health care providers and stakeholders to ensure inclusive health care services to patients with leprosy to achieve well-being and good health as stipulated by the Sustainable Development Goals (SDGs).

More than half (69%) of study participants had one or more of ocular finding. This was a mixture of minor and potentially sight threatening conditions. A similar proportion was reported in a study done in Nigeria by J.A Ebeigbe [12]. However, there is a wide variation of the prevalence of ocular complications in different regions. European studies have reported a less number of 27%, while the number is higher as 97% in low and middle income countries in Africa and Asia as reported by P. Courtright [13]. This variation may be attributed to geographical difference in leprosy burden, where by leprosy is currently more confined in tropics and subtropical countries.

Blindness (BCVA <3/60 in the better eye) was found in 21.6% of study participants. Compared to the prevalence of blindness in the generation population, patients with leprosy and ex leprosy patients are 35 times more blind than the general population [14]. However, there were no eye care services at this center during the period of this study.

Studies done in different regions of India by Thompson K J *et al.*, and T.J.Efytche reported lower prevalence of 3.2% and 2.9 % respectively [15, 16]. However, most of these studies were conducted in the general population as opposed to our study that was done at leprosy center.

The observed high prevalence of blindness in our study may be due to the fact that majority of participants were older with a mean age of 63 years. Old age is associated with long duration of the disease, as well as coexistence with other age related eye diseases which causes loss of vision ,for example cataract [17]. A study done in Yemen by Raga A. Salem reported the magnitude of blindness to be 50% [18]. Other studies in Nepal and Cameroon by Javvathi and Mvogo respectively, reported the prevalence to be 48% and 38% respectively [19]. The lower prevalence of blindness in our study compared to these studies may be due to different categorization of blindness. Blindness was defined as a BC visual acuity of less than 3/60, whereas other studies used a BC visual acuity of less than 6/60 thereby increasing the prevalence. However, no one

should suffer from sight loss from avoidable causes like cataract. There must be a regular eye screening and treatment program to all patients with leprosy and those cured of the disease.

This study revealed that cataract was the most common sight threatening ocular finding which affected 45.5% of study participants. Pre-senile cataracts were reported in 12.5% of participants who had cataract suggesting the possibility that uveitis in patients with leprosy might be the cause of cataract. Side effects of steroids may also contribute to the occurrence of pre-senile cataract. Hence more studies to establish the cause of pre-senile cataract in this population are encouraged. Lower prevalence of cataract among patients with leprosy was reported by J.A Ebeigbe in Nigeria [5] and most of the reviewed European studies [20]. The higher prevalence of cataract in our study may also be due to low cataract surgical coverage due to absence of eye services and stigma attached to leprosy leading to a backlog of un-operated cataracts in these patients.

Lagophthalmos with exposure keratitis is another sight threatening condition that was found in 16% of study participants. This is lower than a prevalence of 45% that was found in Nepal among patients with leprosy [12]. A number of published studies have reported lagophthalmos to be more common in patients with paucibacillary leprosy [8, 17]. The cause of lagophthalmos in patients with leprosy is due to infiltration of the facial cranial nerve in patients with paucibacillary type. In our study, majority of patients had multibacillary type of leprosy, which might have accounted for relatively lower prevalence of lagophthalmos.

Cornea scars were present in 13% of study participants. Glaucoma, uveitis, keratitis and dry eyes all together were found in 12% of study participants.

This was lower than in studies done in Yemen by Raga A.Salem and in Nigeria by Egbeige who reported that 23.2% of study participants had cornea scars [8, 5]. The observed difference may be attributed to different study population selection. Our study included both patients who were still on treatment and those who had completed treatment, while other studies recruited patients who were still on treatment only. It is important to note that, all patients who had cornea opacity in this study, had some degrees of visual impairment and 18.2% were blind.

CONCLUSION

During this study, all patients who required medical treatment were provided with the prescribed medications. As a result of this study, spectacles for correction of presbyopia were provided and a regular screening and treatment program, has been established in collaboration with Eye Care Foundation, Light for the World and St. Francis Referral hospital.

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