PREVALENCE OF LOW VISION AND BLINDNESS IN A LEPROSARIUM IN KANO STATE, NIGERIA.

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Abstract

Leprosy is a chronic infectious, granulomatous disease associated with disability and stigmatization. It is among the world's major blinding diseases that are avoidable. The purpose of this study was to ascertain the prevalence of low vision and blindness in leprous population in Kano State, Nigeria. The Cross sectional descriptive study was conduct over a 6 months period on 283 participants aged 14 years and above. Ocular examinations of the external and internal structures of the participants were performed. Visual acuity was measured using the logMAR E chart. Of the 283 participants, 171 (60.4%) were males and the mean age was 46.8 ±18. Overall prevalence of visual impairment (0.52 – 4.0logMAR; < 6/18 – NPL [BCVA]) was 109 (38.5% CI 46.50–50.699), 53.2% of them were males and 91.7% were 30 years and above. The prevalence of low vision (0.52–1.30logMAR; < 6/18 –3/60) and blindness (1.32 – 4.0 logMAR; < 3/60 – NPL) was 13.0% and 25.0% respectively. The prevalence of low vision and blindness in this population was high, this may be due to the complications of the disease and /or as part of the ageing process. There is a great need to include ocular examination as part of routine screening and surveillance programmes in the Leprous population, this would reduce the burden of visual disability on them.

Keywords: Low vision, Blindness, Leprosy, Prevalence, Kano.

Introduction

The burden of low vision and blindness around the globe is devastating. The prevalence of low vision and blindness is higher among leprosy patients than in the wider population and it occurs as a complication of the disease or as part of the ageing process.[1] Leprosy is a chronic granulomatous disease caused by the *Bacillus Mycobacteriumleprae*. This primarily affects the skin and peripheral nerves[2,3]. In 1998, the number of people living with leprosy-related visual impairments was estimated to be 2 million. Social problems resulting from stigma are often not restricted to the person who has had leprosy but affect the whole families[4]. Prevalence of leprosy has fallen as a result of effective antibiotic therapy.[5] It is however still endemic in various regions of the world. In 2003, only 513,798 new patients were detected for treatment of leprosy worldwide.[6] Reported prevalence of leprosy was 212802 cases in

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2008, and 2007 saw 254252 new cases registered, the number of cases fell by 11100 (4%) from 2006 to 2007 globally.[4,6]

In Nigeria, between 1991 and 2012, a total of 111,788 leprosy patients were successfully treated with Multi Drug Therapy (MDT). Nigeria, in the year 2000, achieved the WHO elimination target of less than 1 case per 10 000 population[7]. With a case detection rate below 0·5 per 10 000, Nigeria may well be described as low endemic for leprosy. However, there are pockets of 'high endemicity' at sub-national levels, where the leprosy prevalence is still 1 case/10000 population.[8] The leprosy case detection rate increased slightly from 2·21/100,000 in 2010 to 2·24/100,000 in 2012 and declined to 1·66/100,000 population in 2014.[9]

Although leprosy control has been a public health success over the past decades, leprosy patients still suffer from avoidable blindness. Individuals with visual impairment and blindness due to ocular leprosy form a severely disadvantaged group because of other disabilities due to the disease, its social stigma and delay in receiving appropriate eye care. Visual impairment in patients with leprosy is an additional health burden often overlooked by health service providers[1]. In this study we assessed the prevalence of low vision and blindness, of Yadakunya leprosy settlement village in Kano State, Nigeria.

MATERIALS AND METHOD

This study was carried out among the leprous population at Yadakunya leprosy settlement village. Yadakunya is a Leprosy village located near Yadakunya Leprosy Hospital (where this study was carried out) with a population of about 5,595. It is located in the North-Eastern part of Kano City under Ungogo Local Government Area of Kano State Nigeria. It lies between latitudes 12'05º North of equator or and longitude 80'291º and 80'501º East of the prime meridian[10]. The research was a cross sectional study and the aim was to determine the prevalence of low vision and blindness in patients with leprosy. It was carried out at Yadakunya leprosy hospital for a period of six months (from February 1st, to July 1st, 2016). Data on age, sex and duration since diagnosis of leprosy were recorded. The type of leprosy and duration of treatment was determined from the patient's medical records.

Ethical approval was obtained from the Ethical committee, Aminu Kano Teaching Hospital Kano and the Health Service Management Board Kano State. The purpose of this study was clearly explained before written informed consent was obtained from each of the patient for eye examination. Instruments used for data collection include: review of medical record, semi structured questionnaire, and clinical examination. To be eligible to be included in this study, participants met the following criteria: 1. Signed a written consent form. 2. Diagnosed with leprosy> 6 years.

The following materials were used during the research: Direct opthalmoscope (For examination of the internal structures of the eyes), retinoscope (for objective refraction), trial lens boxes and trial frames (for subjective refraction), pen torch (for examination of the external structures of the eyes), pinhole disc (for pinhole acuity assessment), pupillary distance rule (for measurement of pupillary distance) and sloan letters and baily-lovie design tumbling E logMAR charts for distance and near Visual Acuity (VA) assessment. The World Health Organization (WHO) classification of blindness and low vision[11] (Table 1) was used in classification of patient's visual impairment.

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Visual impairment was defined as visual acuity range of 0.52 – 4.0 logMAR (< 6/18 – No Light Perception is the Snellen equivalent). Visual acuity of 0.52–1.30 logMAR (< 6/18 –3/60 is the Snellen equivalent) was classified as low vision. 1.32 – 4.0 logMAR (< 3/60 –No light perception is the Snellen equivalent) was classified as blindness. Visual impairment included moderate visual impairment; severe visual impairment and blindness.

The pre-tested study questionnaire was administered to eligible participants through the help of ophthalmic nurses. For each consenting participant, data on age, sex, and duration since diagnosis of leprosy were recorded. The examination was done by a Low Vision Optometrist using a pen torch and direct ophthalmoscope

Procedure: After taking the ocular history, visual acuity was tested with a Sloan Letters and Baily-Lovie Design Tumbling E logMAR charts in a well illuminated room. Pinhole disc was used to detect if reduced visual acuity (VA) was due to refractive error or eye disease/ anomaly. Examination of the ocular adnexa (eyebrows, eyelids, lacrimal punctum), anterior segment of the eye (conjunctiva, sclera, cornea, anterior chamber, iris, and pupil) was done with a pentorch. Fundus examination was done with direct ophthalmoscope in a semi dark room. Objective and subjective refraction were performed, and best corrected VA was measured and recorded. Confrontation field testing was performed to measure the extent of visual fields loss. Since most of the patients had lost sensitivity in their fingers as a result of leprosy, visual field assessment using automated visual field analyzer was not an instrument of choice. The data obtained was analyzed using the Statistical Package IBM SPSS version 20. Data was presented using frequency distribution tables and figures.

Table 1
CLASSIFICATION OF VISUAL IMPAIRMENT (WHO, 2008)

S/N	Actual Size 13 Foot	4 Meter	Letter Size	Equivalent 20 foot	6 Meter	LogMAR	Decimal	C of LV / B	Cat
1	13/13 – 13/39	4/4 – 4/12	4M – 12.5M	20/20 – 20/60	6/6 – 6/18	0.0 – 0.50	1.00 – 0.32	N-Mild LV	0
2	13/39 – 13/130	4/12 – 4/40	12M – 40M	20/60 – 20/200	< 6/18 – 6/60	0.50 – 1.0	0.32 - 0.10	MLV	1
3	13/130 – 13/260	4/40 – 4/80	40M – 80M	20/200 – 20/400	<6/60 – 3/60	1.02 – 1.30	0.10 – 0.05	SLV	2
4	13/260 – 13/812.5	4/80 - 4/250	80M – 250M	20/400 – 20/1250	<3/60 – 1/60	1.32 – 1.80	0.05 – 0.016	LB	3
5	13/812.5 – 13/13000	4/250 – 4/4000	250M – 4000M	20/1250 – 20/20000	<1/60 – LP	1.82 – 3.00	0.016 – 0.001	PB	4
6	NPL	NPL	NPL	NLP	NLP	4.0	NLP	TB	5

Key: C = Classification, Cat = Category, MAR = Minimum Angel of Resolution, LP = Light Perception, NPL = No Light Perception, N = Normal, LV =Low Vision, MLV = Moderate Low Vision, SLV = Severe Low Vision, LB = Legal Blindness PB = Partial Blindness, TB = Total Blindness

RESULTS

Out of a total of 303 registered patients in the Yadakunya Leprosy hospitals eye clinic, 283 (comprising 171 male and 112 female) met the inclusion criteria (Table 2). Six (6) declined consent while 14 patients were absent during the screening for the study. One hundred and seventy-four (174) patients had normal vision (0.0 – 0.50 logMAR (6/6 - ≥ 6/18 [≥20/60]) with Best Corrected Visual Acuity (Table 3). One hundred and nine (109) patients had low vision and blindness (table 5). There were 58 (53.2%) males and 51 (56.8%) females in a ratio of 1.14: 1 who had low vision and blindness (table 4). The age range was from 14 years to 89 years with a mean age of 48.6, a standard deviation of 18 and point estimate of 48±18. Thirty-eight and half percent (38.5% [95 % confidence interval (CI) 46.50–50.699]) of patients living with Leprosy who had

low vision and blindness are between 50 to 69 years of age (Table 4). The prevalence of Low Vision and Blindness for the period of six months was 39% (Table 5). Prevalence of Low Vision was 13% (Table 6) while Blindness was 25% (table 7). Month of May recorded highest prevalence of low vision and blindness among the patients invited with prevalence of 53%, followed by February 47% (Table 5).

Table 2
Demographic Characteristics of Participants

Variable	Frequency (n)	Relative frequency (%)
Sex		
Male	171	60.42
Female	112	39.58
Age		
<15	27	9.54
15–29	49	17.31
30–49	74	26.15
50–69	82	28.98
70>	51	18.02
Total	**283**	**100**

Table 3
Distribution by classification of Visual impairment and gender

Visual Impairment	Visual Acuity	Male (%)	Female (%)	Total (%)
Normal	0.0 - 0.50 logMAR (6/6 – 6/18)	113 (39.9)	61 (21.6)	174 (61.5)
Moderate VI	0.52 – 1.0 logMAR (< 6/18 – 6/60)	12 (4.24)	16 (5.65)	28 (9.89)
Severe VI	1.02 – 1.30 logMAR (<6/60 – 3/60)	2 (0.71)	7 (2.47)	9 (3.18)
Blind				
Legal Blindness	1.32 – 1.8 logMAR (<3/60 – 1/60)	15 (5.30)	3 (1.06)	18 (6.36)
Partial Blindness	1.82 – 3.00 logMAR (<1/60 – LP)	11 (3.89)	4 (1.41)	15 (5.30)
Total Blindness	4.0 logMAR (NLP)	18 (6.36)	21 (7.42)	39 (13.78)

Table 4
Distribution of participants with visual impairment by Age

Age (years)	Male (n %)	Female (n %)	Total (n%)
<15	5 (4.6)	2 (1.9)	7 (6.4)
15–29	0 (0)	13 (11.9)	13 (11.9)
30–49	13 (11.9)	13 (11.9)	26 (23.9)
50–69	25 (22.9)	17 (15.6)	42 (38.5)
70>	15 (13.8)	17 (15.6)	21 (19.3)
Total	58 (53.2)	51 (46.8.)	109 (100)

Table 5
Monthly distribution of Leprous Patients among diagnosed Low Vision and Blindness, Invited from February – July, 2016

	Registered Leprosy Cases			Leprosy with Low Vision & Blindness			Preva-lence	Period Prevalence
Month	M(%)	F(%)	T(%)	M(%)	F(%)	T(%)	(%)	Per 100
February	33(11.7)	18(6.4)	51(18.0)	11(3.9)	13(4.6)	24(8.5)	0.47	47/100
March	36(12.7)	22(7.8)	58(20.5)	14(5.0)	7(2.5)	21(7.2)	0.36	36/100
April	38(13.4)	14(5.0)	52(18.4)	7(2.5)	5(1.8)	12(4.2)	0.23	23/100
May	19(6.7)	24(8.5)	43(15.2)	12(4.2)	11(3.9)	23(8.1)	0.53	53/100
June	20(7.1)	15(7.1)	35(12.4)	9(3.2)	6(2.1)	15(7.1)	0.42	42/100
July	25(8.8)	19(6.7)	44(15.6)	5(1.8)	9(3.2)	14(5.0)	0.31	31/100
Total	171(60.4)	112(39.6)	283(100)	58(20.5)	51(18.0)	109(38.5)	0.385	39/100

Table 6
Prevalence of Low Vision among Patients with Leprosy.

Month	Number of Leprosy Patient	Number of Patient with low vision	preva-lence	Period prevalence per 100
February	51	10	0.20	20/100
March	58	6	0.10	10/100
April	52	3	0.06	6/100
May	43	10	0.23	23/100
June	35	4	0.11	11/100
July	44	4	0.09	9/100
Total	283	37	0.13	13/100

Table 7
Prevalence of Blindness among Patients with Leprosy.

Month	Frequency	No. of Blindness	PP	PP per 100
February	51	14	0.27	27/100
March	58	15	0.26	26/100
April	52	9	0.17	17/100
May	43	13	0.30	30/100
June	35	11	0.31	31/100
July	44	10	0.23	23/100
Total	283	72	0.25	25/100

Key: LV = Low Vision, PP = Period prevalence

DISCUSSION

This study was a cross sectional descriptive survey involving people living with leprosy at Yadakunya leprosy settlement village. More males than females participated in the study and majority were 30 years and above. Out of a total of 283 leprosy cases, prevalence of blindness was 25%, majority were males. This value is high when compared to prevalence of blindness among people without leprosy[12,13] and leprosy patients from previous studies. A similar study carried out in the North Eastern Nigeria[14] found that 10 in 100 leprosy patients were blind as opposed to 25 in 100 found in this study. Also, the blindness of prevalence found in this study is higher than 9.9%, 19%, and 10.9% reported in Northern Viet Nam study[1], Southern Cameroon[15], and Ethiopian[16] respectively. This higher prevalence may be due to long prevalence of leprosy since the study involved only patients with more than six years duration of leprosy. This may also be link to lack of adequate eye care services. There was a higher prevalence of low vision and blindness cases among the male patients. The predominance of male to female screened was in agreement with the study carried out in North Eastern Nigeria[14] and Ossiomo leprosarium in Edo state, Nigeria[17]. One reason suggested for this preponderance in previous studies is that the male lifestyle generally exposes them to greater risks of infection, while women may tend not to seek medical help even when it is required[17].

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Most of the patients were above 50years of age. The mean age was 48.6 years (range 14 – 89 years). Aging has been shown to be associated with leprosy related ocular complication and visual loss[14,18]. As the leprosy patients become older, their ocular morbidity tends to increase as found in this study, which clearly shows the need for accessible and affordable eye health facilities for persons living with leprosy.

The overall prevalence of visual impairment (low vision and blindness) based on Best Corrected Visual Acuity (BCVA) worse than 6/18 was 38.5%. The prevalence of low vision based on Best Corrected Visual Acuity reported in this study is similar to 13.2% and 13.8% reported in Southern Cameroon[15] and Bangladesh[19] respectively, but higher than 0.39% and 2.3% reported in Tajimi City Japan[20] and in Kunming, China[21] respectively. This may be as a result of healthy environment and good health facilities. Participants for this study were from only one leprous population in Kano State, Nigeria, therefore findings may not be generalised for the North Western zone of Nigeria.

Conclusion

The prevalence of low vision and blindness in leprosy patients was high. The findings in this study indicate that the overall prevalence of low vision and blindness among patients attending the Yadakunya leprosy hospital eye clinic were 13.0%, and 25.0% respectively. Patient's eye care need is not being met at present with only two ophthalmic nurses working in the hospital eye clinic. Early detection and treatment of visual impairment in this population is recommended to reduce the duration of visual disability and improve their quality of life.

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