

Leprosy among the Fulani nomadic pastoralist population of Adamawa State, Nigeria

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Summary

Background: Leprosy remains a serious public health problem in Nigeria. This research highlights the burden of leprosy among an estimated 450,000 nomadic pastoralists in the remote regions of Adamawa State.

Objective: To assess the prevalence of undiagnosed leprosy among Fulani nomadic pastoralists of Adamawa State.

Methods: Active screening of the nomadic pastoralist population for leprosy was implemented over a 2-year period in Adamawa State. A total of 378 community screening days were organised with community leaders among Fulani nomadic pastoralists. Diagnosis of leprosy was done by trained leprosy supervisors, health workers and community volunteers, according to the national TB and leprosy control guidelines.

Results: Sixty one (61) new cases were detected among the pastoralists, representing a prevalence of 1.35/10,000 population. The MB proportion was 85%, while the male: female ratio was 1:1.5, with a higher MB proportion seen among children (< 15 years) than the adult (> 15 years) age group. The prevalence of leprosy among children was 0.15/10,000. Adult females had a higher prevalence of undiagnosed leprosy than males (0.71 versus 0.48 per 10,000). Grade 2 disability was present in 13%, and three quarters of these had MB leprosy. Leprosy new case detection increased by over 26% in the final study period.

Conclusion: Gender differences, a high MB proportion and on-going transmission of leprosy among nomadic pastoralists are a cause of concern. There is need for stringent public health measures to control leprosy among this group.

Keywords: Leprosy, Adamawa, Fulani, Nomadic Pastoralists

Introduction

Nigeria ranked fifth among countries with high leprosy burdens and was second only to Congo based on data on the African subcontinent.¹ However, there has been a reported 27% decline in the incidence of leprosy from 2008 to 2010.² This can be credited mainly to the introduction of comprehensive treatment with Multidrug Therapy (MDT) by the World Health Organization (WHO).³ However, despite the decline in prevalence recorded globally and even in Nigeria, according to the International Federation of Anti-Leprosy Associations (ILEP) in the technical bulletin published in 2001, titled, "The Interpretation of Epidemiological Indicators in Leprosy," pockets of high leprosy endemicity still exist in several communities. Leprosy control data from the Adamawa TB and Leprosy Control Programme show the same communities in Local Government Areas (LGA's) persistently reporting new leprosy cases over the years.⁴

Nomadic pastoralists are a group of people who migrate in search of pasture and water primarily for their cattle and are constantly driven by the climate.⁵ They are known to roam over a wide range of land covering hundreds of kilometres in pursuit of better conditions to sustain themselves and their cattle. They move along defined cattle routes with resting points and tents which they temporarily erect; these resting points are often not far from dispensaries where veterinary and human health services are provided by health workers employed by the government.⁵

It is often difficult to capture this group during government censuses; however, there are an estimated 9.4 million nomads in Nigeria. Over 5 million are nomadic pastoralists, while the remainder are nomadic farmers and fishermen, found mostly around the Chad River basin in north-eastern Nigeria.⁶ Nomadic pastoralists are a composite of many different ethnic groups; however over 90% belong to the Fulfulde or Fulani tribe, which represents 6.6% of the Nigerian population; Adamawa has an estimated 450,000 Nomadic Fulani pastoralists, making it the State with the highest population of nomads in Nigeria.⁷

Not much is known about the burden of leprosy among nomadic pastoralists. However, this disease remains highly endemic amongst poor and disfranchised communities, with one prime example being the Fulani nomadic population of north-eastern Nigeria.^{8,9} Leprosy, among other infectious diseases, such as malaria, trachoma, helminthic infections, onchocerciasis and trypanosomiasis,¹⁰ is quite prevalent among nomadic groups as well as malnutrition and cardiovascular diseases.¹¹ Documentation of cataract and blindness has been noted in untreated cases of leprosy¹² with an increased risk for those over the age of forty in leprosy settlements in north-eastern Nigeria. The high disease burden in this nomadic Fulani population is accentuated by their mistrust of allopathic medicine and their strong dependence on herbal remedies,⁵ which often contribute to delays in the diagnosis of leprosy, evidenced by observed signs of Grade 2 disability at presentation. Other factors include the remoteness and the mobility of this group, as well as the lack of awareness on the part of both the health-care workers and the affected individuals.⁴

This research project was leveraged onto a tuberculosis active case-finding intervention, funded by TB REACH Wave 2, years one and two, through the STOP TB Partnership, which focused on nomadic pastoralist communities of Adamawa State in north-eastern Nigeria.⁷ This research highlights the importance of leprosy among nomadic pastoralists in Adamawa State, north-eastern Nigeria.

Methods

Community screenings for both TB and leprosy were conducted from January 2012 to December 2013 in screening camps set up in identified nomadic pastoralist communities. In order to improve awareness of leprosy symptoms and the availability of free services, a series of messages in the language of the nomadic pastoralist tribe (Fulfulde) were developed and disseminated through local radio and television stations in Adamawa State and during community seminars, which preceded community screenings. Facility-based health care workers and community volunteers from nomadic pastoralist communities were trained on leprosy detection, referral to existing treatment centres, and treatment support.

Using maps developed for livestock management in Adamawa State as a guide, nomadic communities, settlements and cattle routes were charted and health facilities were identified, including existing leprosy service delivery points close to migration routes.

Following consultation with nomadic community leaders, it was agreed that community market days should be the leprosy screening days, and in total 378 such days were organised. They began with a health education (community seminar) session on leprosy delivered by the Local Government TB and Leprosy Supervisor (LGTBLS), followed by screening of all individuals in attendance by trained health workers and community volunteers to identify people with skin patches. A confirmatory examination to demonstrate at least one cardinal sign of leprosy was conducted by the LGTBLS and the state TB and Leprosy Supervisors. All leprosy cases detected were linked to the nearest Multi-Drug Treatment (MDT) treatment centre for enrolment and treatment according to the National TB and Leprosy Control Programme (NTBLCP) data capture system.

COMMUNITY VOLUNTEERS

As a sustainability strategy, community volunteers from Fulani nomadic pastoralist communities were supported by the Adamawa State TB and Leprosy Control Programme to continue the identification and referral of community members with leprosy signs and symptoms to the nearest MDT centre for confirmation and treatment. A skin patch with definite loss of sensation or signs of peripheral nerve damage confirmed the diagnosis of leprosy. Newly diagnosed leprosy cases were classified and treated according to the NTBLCP guidelines. Community volunteers also offered treatment support to ensure treatment adherence among community members diagnosed with leprosy.

STATISTICAL ANALYSIS

The Chi-square (χ^2) test was used to compare prevalence of leprosy types between genders and age groups using the software package Statistical Package for Social Sciences (SPSS).

Results

During this 24-month intervention, 96,376 nomadic pastoralists were screened, averaging 255 individuals per screening day. Sputum was collected and examined from 9,890 (10.3%) of those screened, resulting in 1,150 (11.6%) smear-positive TB cases. During the intervention, 1,777 patients with all forms of TB among nomads were notified.⁷

Table 1. Leprosy type, age group and gender of new patients among nomads in Adamawa

Type of Leprosy	0–14 years		15+ years		Total
	Male	Female	Male	Female	
Pauci-bacillary (PB) Leprosy	0	1	5	3	9
Multi-bacillary (MB) Leprosy	2	4	17	29	52
Total	2	5	22	32	61

The overall prevalence rate of previously undiagnosed leprosy detected in the nomadic population was found to be 1.35/10,000. Of the 61 new leprosy cases detected, 52 (85%) had MB leprosy and nine (15%) had PB leprosy. Across all age groups, the prevalence rate of leprosy was found to be higher in females than in males (0.82 versus 0.53 per 10,000). Of the seven children, five (71%) were girls and two (29%) were boys; in the adult (>15years) population, 32 (60%) were women and 22 (40%) were men (Table 1). The prevalence rate of leprosy among adults (>15years) was found to be greater (1.2/10,000) compared to the rate in children (0.15/10,000).

When we compared the types of leprosy to age and sex per 10,000, we found a higher number of MB than PB cases across both age groups and gender (1.15 versus 0.2). There was no significant relationship between the adult males and females for PB and MB cases ($\chi^2 = 1.84, P = 0.17$) with a greater number per 10,000 of MB leprosy observed than PB leprosy in the adults (1.02 versus 0.18).

Based on the level of physical disability, results from this clinical assessment of the nomadic population show that eight patients (13%) had Grade 2 disability and of these six (75%) were MB patients; whilst 11 (18%) and 42 (69%) had Grades 1 and 0 respectively (see Table 2). No children were found with Grade 2 disability among the Nomadic population.

When one examines the prevalence of leprosy cases in the period inclusive of the first quarter of 2012 to the second quarter of 2013, it is important to note that this study period started with zero but ended with the highest at 26% (see Table 3).

After 12 months, 8 (89%) of the nine PB leprosy cases among the nomads completed treatment; one defaulted and could not be traced. On the other hand, a total of 24 PB leprosy cases were detected in the same period by the State TB and Leprosy Control Programme; 22 (92%) completed treatment, two died and another two defaulted.

After 24 months, 47 (90%) of the 52 MB cases among Nomads completed treatment, three defaulted while two were transferred out. On the other hand, of the 327 MB leprosy cases detected by the State Leprosy Control team, 310 (95%) completed treatment, three died, eight

Table 2. Impairment among new patients diagnosed by type of leprosy among nomads in Adamawa State (1st January 2012 to 30th June 2013)

Disability Grade	Pauci-bacillary (PB) Leprosy	Multi-bacillary (MB) Leprosy	Total (%)
Grade 0	3	39	42 (69)
Grade 1	4	7	11 (18)
Grade 2	2	6	8 (13)
Total	9	52	61 (100)

Table 3. Number of new cases

Quarter, Year	Period	New cases
1 st for 2012	January to March, 2012	0
2 nd for 2012	April to June, 2012	14
3 rd for 2012	July to September, 2012	9
4 th for 2012	October to December, 2012	13
1 st for 2013	January to March, 2013	9
2 nd for 2013	April to June, 2013	16
	Total	61

were transferred out, two defaulted while four were still on MDT at the time of cohort compilation.

Discussion

A critical fact to note from this assessment of the nomads is the gender difference in both the prevalence and the severity of previously undiagnosed leprosy. For example, the number of MB cases amongst women and girls was approximately twofold higher than for their male counterparts, with an overall male/female ratio of 1:1.5. This observation could be attributed to the Fulani culture, which is mainly patriarchal, and to decision-making by the men. A recent study found that the Fulani man decides whether or not the woman or child visits a health care facility. The same study also noted the culture of shyness among the Fulanis, where the women are naturally shy towards strangers and are therefore opposed to the idea of being examined by health workers.¹²

This also confirms that leprosy is a highly stigmatized disease in which gender inequalities are usually encountered. The disparity between the sexes has also been confirmed by Peters and Eshiet¹³ in southeastern Nigeria, where women presented late to the health facilities with more visible signs of deformities than male leprosy patients. The reasons these women fail to utilise medical facilities in the early stages are multi-factorial. Firstly, women are more likely to suffer from abuse than men if they are identified as leprosy patients in their communities;¹⁴ secondly, women have a higher probability of being ostracised and rejected by their families and the community than men with the same level of disease. Moreover, women with leprosy are more likely to be viewed as a source of infection; in fact, studies have shown that up to 50% of mothers with leprosy stopped breastfeeding their children.¹⁵

The pattern of leprosy infection with regards to age is similar to a malaria study done among nomadic Fulanis in southeastern Nigeria, where higher infection rates were found in children than in adults. As our study has shown, a higher MB proportion was seen among children (< 15 years) than in the adult age group (> 15 years). Certain factors have been suggested to account for such trends in the nomadic Fulani population, including close contact in camps among the school age children. A study by Anosike *et al.*⁹ noted that there was greater contact among school age children than in adults in the Fulani camps, especially in scenarios where the children play, do laundry and bathe together in water pools.

Lifestyle is another important factor, as this mobile tribe lives in highly congested and unsanitary conditions that allow infections to spread from the old to the young.⁹ This can be

explained by the fact that leprosy, like tuberculosis, is spread by nasal secretions and will increase in transmission where the density of human population is high in a confined space with poor air quality.¹⁶ This transfer of *Mycobacteria* will increase within close knit communities, such as that of the Fulani nomadic pastoralists, who reside in overcrowded conditions with up to twenty residents in one tent alone.⁸ Studies by Fine *et al.*¹⁷ in northern Malawi have confirmed that living in the same domicile as someone with MB leprosy increased one's risk of contracting the disease five- to eight-fold compared to contact with non-household members.

In Adamawa State, one of the most common reasons for late presentation to health centers by people with leprosy is the fact that a significant amount of time and resources is spent on seeking help from traditional healers along with patronage of over-the-counter drugs from local chemists.¹⁸ This was found to be a practice with nomadic Fulani herders, where health issues are referred to the medicine man, known as *boka*, instead of visiting a health facility.⁸ Another factor that could result in the delay in seeking treatment is the fact that diseases such as leprosy, which is called *sadaure* in the Fulani Nomadic dialect,² are asymptomatic in the early stages.

Late stage presentation increases the risk of the development of MB leprosy along with Grade 2 disability, compared to the milder form of the disease, and increases the risk of nerve damage.^{19,20} Two-thirds of the Fulani population in this study had Grade 2 disability and were in the chronic stage of infection with MB leprosy. This level of disability often requires the attention of specialised healthcare of ophthalmic and rehabilitation services,^{21,22} which are available only at tertiary health centres in the urban areas such as Yola, the capital of Adamawa. This poses barriers for the Fulani nomads with leprosy in the remote regions of the state due to the lack of suitable transport, inaccessible roads (especially in the rainy season) and most important of all, financial constraints.²³

Accessibility of health care workers to the Fulanis is also hindered by the common seasonal movement from one settlement to the next by these nomads. The constant mobility of these nomads makes it difficult for health workers to monitor and treat leprosy cases in such encampments. In the same vein, this also affects the nomad's access to other health interventions from the health workers. As Dao and Breiger²⁴ noted in their study on immunisation of migrant Fulanis in Oyo State, Nigeria, "only 2% of the Fulani preschool children received immunisation, compared to about 48% of other children in same LGA". One of the key areas in the prevention and control of infectious diseases in public health is vaccination coverage in children. In fact, the level of protection for BCG vaccination against leprosy ranges from 20 to 80%;²⁰ additionally, this vaccine may account for the transition of patients from the MB to the PB form of the disease.^{15,25}

The Nomadic Fulanis of Adamawa play a critical role in the Nigerian economy by selling their milk and animal products to local residents and manufacturing firms,²⁶ which increases their interactions with the general population. Their health and survival are therefore an important factor in the economic growth and development of the country, as evidenced by the direct correlation between the Gross National Product and adult survival rates, specifically for low income countries.²⁷

The surge in the new infection rates in the final quarter of this study is a clear indication of ongoing transmission of leprosy in this part of Nigeria. This shows the need for active surveillance in this region of the country, along with prompt diagnosis and treatment. In order to eradicate leprosy in Nigeria, sustained monitoring and evaluation need to be fully implemented by the National Tuberculosis and Leprosy Control Programme (NTBLCP).

Their efforts should extend to not only Adamawa State but also to poorly accessible regions of the southeast parts of the country, where pockets of leprosy still remain.²⁸

Public health initiatives should include immunisation programmes for infants based on the possible protective effects of BCG against leprosy; ophthalmic screening²¹ and rehabilitation services due to the debilitating effects of leprosy.^{29,30} Given the fact that Nigeria has one of the highest prevalence rates of tuberculosis globally,⁷ effective BCG immunisation campaigns would be an added bonus in reducing the burden of two infectious diseases simultaneously. In its effort to sustain this and other health interventions among the nomadic pastoralists of Adamawa State, the government has set up grazing reserves across the state, which are equipped with dispensaries, water sources and nomadic schools.³¹

TB and leprosy control services are provided in these dispensaries while the trained community volunteers among the nomads have continued to make referrals of suspected leprosy and presumptive TB cases to these clinics. Furthermore, this intervention leveraged on chartered nomadic routes and health facilities to improve coverage of leprosy and TB services among the nomads. Health workers from these health facilities are now part of routinely trained staff on TB and leprosy control in the State.³¹

Regarding rehabilitation and prevention of further disability among the eight Grade 2 disability leprosy cases detected among the nomads, the state TB and leprosy programme ensured that basic soaking, washing, oiling and wound dressing materials were available and were adequate for five of the eight cases while the remaining three had complicated wounds that required resting the limb and some physiotherapy; they were referred to the only leprosy referral health facility in the state (Garkida Dermatological Hospital). All other MB leprosy cases were treated in the field with MDT alone.³²

Given the cultural barriers between the general population and the Fulani nomadic pastoralist groups, the best approach to accessing and serving the nomadic communities would be the recruitment and training of nomadic Community Health Workers (CHW's).³³ This is one of the major reasons why the intervention outlined in this paper was a success. Training should also be extended to Fulani leaders and staff at the local nomadic education centers. Furthermore, designing culturally appropriate health education programmes that address their needs would be an added bonus. All of these combined efforts should lead to a significant reduction in both the severity and prevalence of leprosy not only in northeastern Nigeria but across the country.

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