

ORIGINAL RESEARCH

# Lymphatic Filariasis in Southwestern Nigerian Rural Communities: A Cross-sectional Survey of the Knowledge, Awareness, and Predisposing Factors



Bolatito Oluwabiyi, MSc, Oyetunde T. Oyeyemi, PhD, Adetayo Olorunlana, MSc, Nofisat Omiyeni, OND, Ayomide Koleosho, OND

*Ijebu-Igbo and Ilishan-Remo, Ogun State, and Okada, Edo State, Nigeria*

## Abstract

**BACKGROUND** Nigeria is the second most endemic country in the world for lymphatic filariasis, with control efforts often hampered by poor community awareness and involvement in intervention strategies.

**OBJECTIVE** The aim of this study was to assess the knowledge, perception, and psychosocial aspects of some residents in Nigerian rural communities about lymphatic filariasis in order to develop disease control and intervention strategies with active community involvement.

**METHODS** A standardized questionnaire was adapted and a scale of measurement was developed. The methodology was quantitative and the study design was cross-sectional. A sample of 203 respondents was selected using a precision of 0.06.

**FINDINGS** A majority (51.2%) had heard of elephantiasis but very few (9.3%) had accurate knowledge of the causes of the disease. Most people (53.2%) had no sources of information about elephantiasis, and of the few individuals that claimed availability of sources of information, information about the mode of transmission of the disease (10.0%) was the most common. Very few individuals (7.9%) believed mosquitoes were associated with elephantiasis, with 16.7% having a history of elephantiasis. The proportion of respondents who did not use mosquito netting (61.1%) was significantly higher than those who did use it (33.0%) ( $P < .05$ ). An appreciable proportion (26.1%) of individuals believed elephantiasis to be an abominable disease, with 5.9% individuals believing that people treat the victims of elephantiasis with disrespect.

**CONCLUSIONS** The study areas are at high risk of lymphatic filariasis. There is a need to create a knowledge-based awareness among the residents for effective management of the disease.

**KEY WORDS** knowledge, awareness, lymphatic filariasis, predisposing factors, Nigeria

## INTRODUCTION

Globally, more than 1.4 billion people are at risk of elephantiasis,<sup>1</sup> as Nigeria and some other countries

contribute more than 80% of global burden of the disease.<sup>2</sup> The World Health Organization (WHO) report of 2011 affirmed that it affects more than 120 million people living in 72 countries

The authors declare that there is no conflict of interest regarding this article.

From the Department of Science Laboratory Technology, Abraham Adesanya Polytechnic, Ijebu-Igbo, Ogun State, Nigeria (BO, NO, AK); Department of Basic Sciences (Biology Programme), Babcock University, Ilishan-Remo, Ogun State, Nigeria (OTO); and Department of Sociology and Anthropology, Igbinedion University, Okada, Edo State, Nigeria (AO). Address correspondence to O.T.O. ([zootund@yahoo.com](mailto:zootund@yahoo.com)).

of the world, and 39 African countries carry more than a third of the global burden of lymphatic filariasis.<sup>3</sup> Researchers have found that lymphatic filariasis is associated with dermatitis, lymphedema, and elephantiasis of the limbs or genitalia, which adversely affect personal and social life and limit occupational activities.<sup>4</sup>

Nigeria was rated the second most endemic country worldwide and also the country with the largest population at risk of infection with lymphatic filariasis in the African continent.<sup>5</sup> Filarial infections have been reported in the coastal and rainforest zones of Nigeria.<sup>6,7</sup> A survey from the Federal Ministry of Health<sup>8</sup> estimated that 20 million people in Nigeria take treatment for elephantiasis. It noted that such a figure only represented about 20% of the at-risk population.

In response to the World Health Resolution 50.29 encouraging member states to eliminate lymphatic filariasis, the WHO launched its Global Programme to Eliminate Lymphatic Filariasis with the aim of eliminating the disease as a public health problem.<sup>9</sup> Moreover, the Nigerian Lymphatic Filariasis Elimination Programme of the Federal Ministry of Health, with the assistance of the Carter Center, initiated a collaboration toward the elimination of elephantiasis in the year 2015.<sup>4,8</sup> Though the year 2015 has gone without the Nigeria initiative accomplishing the set goal for the elimination of the disease, earlier in 2012 the WHO neglected tropical diseases roadmap reconfirmed the target date for achieving elimination as 2020.<sup>2</sup>

Despite this lofty goal, there is a dearth of information about the disparity between level of awareness and accurate knowledge of the disease in most endemic areas in Nigeria that had hampered and may still hamper the elimination program. The design and implementation of health education strategies specific to our participants' population will benefit immensely from this study. The aim of the study was to assess the knowledge, perception, and psychosocial aspects of some residents of Nigerian rural communities about lymphatic filariasis in order to develop disease control and intervention strategies with active community involvement.

## MATERIALS AND METHODS

**Study Area.** The study was conducted in 9 villages within Ijebu North and North-East Local Government Areas in Ogun State, Nigeria. The areas were selected based on the prevailing environmental factors that could predispose the residents to

lymphatic filariasis and information about the presence of the disease in the communities. It was carried out between February and April 2015. The study areas are typical rural settings lacking in basic amenities like good roads, electricity, and good water supply. All health-related issues of the dwellers are referred to underequipped local area community health centers. The people subsist on river water, which of course is often polluted by human excreta as a result of lack of toilet facilities. Poor housing made of mud and practices like storage of water in open earthen vessels with thick forest surrounding dwelling places are prominent factors predisposing the people to mosquito-related diseases.

**Design and Sample Size Determination.** The study was descriptive, and convenience random sampling was adopted to recruit a total of 203 participants. With a 21.0% prevalence of lymphatic filariasis in a previous study in some rural communities in Ogun State,<sup>7</sup> a 177 minimum sample size was computed using a precision of 0.06. The overall sample size used for the study was 203 participants.

**Methods of Data Collection.** A well-structured questionnaire on knowledge, awareness, and predisposing factors of lymphatic filariasis was prepared by researchers with input from a medical sociologist, social psychologist, and parasitologist using a standard WHO questionnaire format. A total of 203 respondents filled the questionnaire. The questionnaire was validated and pretested to ensure reliability and validity before initiating the fieldwork.<sup>10</sup> Research assistants were recruited to administer the questionnaire using the local language to determine the extent of participants' knowledge, awareness, and attitude, as well as their psychosocial behaviors in relation to lymphatic filariasis.

**Ethical Considerations.** All participants were fully informed of the study's objectives and procedures. They were notified that participation was voluntary and that withdrawal at any time was without any penalty. Those who wished to participate gave consent before the administration of the questionnaires. The study made use of only information obtained through questionnaire and therefore ethical approval was not obtained. However, all information obtained was treated in line with the standard ethical procedures.

**Statistical Analysis.** Data were entered in a Microsoft Excel spreadsheet and transferred to GraphPad Prism 6 (GraphPad Software Inc., La Jolla, CA) for analyses. Descriptive statistics was used to estimate

proportion of responses.  $\chi^2$  and Fisher's exact test were used to test for differences in the proportion of responses in categorical variables.  $P < .05$  was considered to be statistically significant in the determination of association between variables.

## RESULTS

Sociodemographic variables of the respondents differed significantly, such as in the proportion of male (44.3%) and female (55.7%) participants ( $P = .005$ ). The same was observed in the different age groups, with a significantly higher proportion (26.1%) recorded in individuals in the 20–29 years age group ( $P = .009$ ). Most of the participants had a primary school education (40.9%), with farming (31.9%) being the most predominant occupation (Table 1).

**Table 1. Sociodemographic Characteristics of the Study Population (n = 203)**

Variables	Categories	Respondent	Proportion (%)	P
Gender				.005
	Male	90	44.3	
	Female	113	55.7	
Age (y)				.009
	10-19	17	8.4	
	20-29	53	26.1	
	30-39	27	13.3	
	40-49	43	21.2	
	50-59	32	15.8	
	≥60	31	15.2	
Education				<.0001
	No education	18	8.9	
	Primary	83	40.9	
	Secondary	53	26.1	
	Tertiary	49	24.1	
Marital status				<.0001
	Never married	68	33.5	
	Ever married	135	66.5	
Occupation*				<.0001
	Unemployed	7	3.4	
	Trading	47	23.0	
	Farming	65	31.9	
	Artisan	19	9.3	
	Student	43	21.1	
	Civil servants	12	5.9	
	Others	11	5.4	
Religion				<.0001
	Christian	126	62.1	
	Islam	62	30.5	
	Traditional	7	3.3	
	No religion	8	3.9	

\* Multiple responses.

A majority of the respondents (51.2%) had heard of elephantiasis; they had some level of awareness, and of those with awareness, 45.8% identified the condition as a disease. Aside from those who claimed ignorance about the part of the body affected by the disease, the proportion of individuals who associated the disease with the leg (22.1%) was significantly higher than that of breast (3.4%) and testis (9.1%) ( $P < .05$ ). Only 9.3% had accurate knowledge of the mode of transmission of elephantiasis; others assumed other causations like stepping on a charm (13.7%) or walking in dirty water (8.3%), and a vast majority (63.4%) did not know of any causation. Most of the people (53.2%) had no sources of information about elephantiasis, although of the few individuals who claimed availability of sources of information, information about the mode transmission of the disease (10.0%) was the most common. Very few respondents (18.2%) gave a positive response regarding awareness of those having elephantiasis, whereas a large proportion of people gave neither a positive nor a negative response (49.8%) (Table 2).

Malaria was the most common illness (44.9%) in the study area. The proportion of the respondents who rarely visited the hospital when sick (39.9%) was significantly higher than those who often did the same (7.9%) ( $P < .05$ ). Very few individuals (7.9%) believed mosquitoes were associated with elephantiasis, with 16.7% having a history of elephantiasis. The proportion of respondents who did not use mosquito netting (61.1%) was significantly higher than those who did use it (33.0%). Most of the elephantiasis patients or those who had encounters with them (65.0%) oftentimes did nothing to ameliorate the condition (Table 3). Although many were indifferent (61.6%) to the public health implication of elephantiasis, significantly high numbers of respondents (59.6%) did not know the public health implications of the disease. Very few individuals (3.0%) had been treated for elephantiasis in the past (Table 3). An appreciable proportion (26.1%) of individuals believed elephantiasis was an abominable disease, with 5.9% individuals believing that people treat the victims of elephantiasis with disrespect (Fig. 1).

## DISCUSSION

Nigeria was rated the second most endemic country worldwide for lymphatic filariasis and also the country with the largest population in the African

**Table 2. Awareness and Knowledge About Elephantiasis (n = 203)**

Variables	Response	No.	Proportion (%)	P
Heard of elephantiasis				.0004
	Yes	104	51.2	
	No	57	28.1	
	No response	42	20.7	
Awareness of elephantiasis in the communities				<.0001
	Yes	24	11.8	
	No	110	54.2	
	Don't know	69	34.0	
Type of information*				<.0001
	Mode of transmission	42	10.0	
	Prevention	20	7.3	
	Treatment	12	2.7	
	None	130	80.0	
Sources of information*				<.0001
	Radio	15	6.4	
	Television	25	10.7	
	Health center	24	10.3	
	Friends	6	2.6	
	Community members	30	12.9	
	All of the above	2	0.9	
	None	124	53.2	
	Others	7	3.0	
Knowledge of elephantiasis				.0003
	Don't know	110	54.2	
	A disease	93	45.8	
Local name for elephantiasis*				<.0001
	Don't know	131	63.9	
	<i>Ese-erin</i>	58	28.3	
	<i>lpa</i>	15	7.3	
	<i>Keredugbe</i>	1	0.5	
Part of the body affected by elephantiasis*				<.0001
	Don't know	111	53.4	
	Leg	46	22.1	
	Breast	7	3.4	
	Testis	19	9.1	
	All of the above	25	12.0	
Mode of transmission*				<.0001
	Don't know	130	63.4	
	Stepping on a charm	28	13.7	
	Walking on dirty water	17	8.3	
	Mosquito bite	19	9.3	
	Others	11	5.4	
Awareness of those affected by elephantiasis				<.0001
	Yes	37	18.2	
	No	65	32.0	
	No response	101	49.8	

\* Multiple responses.

continent, with approximately two-thirds at risk of infection.<sup>5,8</sup> This study was conducted in 2 Local Government Areas in Ogun State, Nigeria. It forms one of our various efforts to reduce the burden of neglected tropical parasitic diseases in the areas.

The information gathered in this study was obtained from the communities' dwellers through house-to-house survey. Moreover, trained scientists and research assistants were used to source information from the participants. The past efforts toward

**Table 3. Attitudes and Predisposition Factors to Elephantiasis (n = 203)**

Variables	Response	No.	Proportion (%)	P
Type of sickness				<.0001
	Typhoid	12	5.9	
	Headache	54	26.3	
	Malaria	92	44.9	
	Fever	14	6.8	
	Others	15	7.3	
	No response	18	8.8	
Frequency of visits to hospital when sick				<.0001
	Often	16	7.9	
	Sometimes	46	22.7	
	Rarely	81	39.9	
	Never	60	29.6	
History of elephantiasis				<.0001
	Yes	34	16.7	
	No	95	46.8	
	No response	74	36.5	
Mosquito net usage				<.0001
	Yes	67	33.0	
	No	124	61.1	
	No response	12	5.9	
Treatment-seeking patterns for elephantiasis patients				<.0001
	Did nothing	132	65.0	
	Visit hospital for treatment	39	19.2	
	Self-medication	5	2.5	
	Visit traditional healer for treatment	16	7.9	
	Sought spiritual solution	11	5.4	
Elephantiasis is a health problem				<.0001
	Agree	63	31.0	
	Neither agree nor disagree	125	61.6	
	Disagree	15	7.4	
Reasons why elephantiasis is a health problem				<.0001
	Many people have it	6	3.0	
	Someone in our family have it	4	2.0	
	People who have it cannot work	49	24.1	
	Others	23	11.3	
	Don't know	121	59.6	
History of treatment as a result of elephantiasis				<.0001
	Yes	6	3.0	
	No	109	53.7	
	No response	88	43.3	

the eradication of another neglected tropical disease (schistosomiasis) in some of the areas facilitated their compliance and cooperation to provide honest information.

In communities where there seem to be more women than men, lymphatic filariasis becomes an even a greater burden. Marriage and partnership sustenance is to a large extent dependent on women's physical outlook,<sup>11</sup> with those manifesting the clinical signs of lymphatic filariasis leading a reclusive existence in order to hide their condition.<sup>12</sup> Although

men suffering from lymphatic filariasis also experience social stigma regarding marriage, their gender roles and prevailing power structures often leave the women in a relatively powerless position. The age profiles of the participants having significant variation suggests greater risk in some age groups. Although a previous report in Nigeria observed occurrence of microfilaremia in all age groups, the presence of clinical manifestation was more pronounced among adults age 30 years and older.<sup>7</sup> Poor level of education of the respondents, with

about 50.0% within the range of no education and primary school education, can pose greater risk to transmission. The most predominant occupation in Nigerian rural settings is farming, and participants in present study were not an exception. Farmers had earlier been reported to be most predisposed to lymphatic filariasis because of greater exposure of the lower extremity to mosquito vectors.<sup>7</sup> Christians, who dominated the population group, may have a higher risk of exposure to the mosquito vectors of the disease because of their habit of observing night prayers and sometimes in open places, a usual habit among Christians in Nigeria.

The low awareness level of the disease among communities' residents despite the high claims of having heard of the disease may not be a true representation of the situation in the communities. This is not surprising because lymphatic filariasis-affected individuals in endemic rural communities often keep it secret because of its associated stigmas. Poverty and the neglected nature of the disease in terms of public awareness are cardinal to the poor information level about the disease in the communities. Although more than half of the respondents have no source of information, for others, notable sources included mass media (radio and television), health centers, and community members. Other studies have reported schools as source of information, in addition to mass media and health centers.<sup>10,13</sup> Attaining a greater awareness level in the communities will require additional information campaigns, especially at schools and through house-to-house visits.<sup>10</sup> This study, like several others,<sup>14,15</sup> found that respondents had no knowledge about the role played by mosquitoes in the transmission of lymphatic filariasis. This undermines control measures because people may fail to put in place appropriate measures to protect themselves,<sup>10</sup> especially with the high number of the respondents not using bed nets.

Three local names, *Ipa* (swollen scrotum), *Keredugbe* (swinging scrotum), and *Ese-Erin* (elephant-like leg), were noted in this study. These names differ from region to region; for example, in Indonesia, elephant leg is called *kaki gajah*, whereas big fruit/ball (swinging scrotum related) is regarded to as *boa besar*.<sup>15</sup> In India, it is locally known as *haathi paon*.<sup>16</sup> It is obvious the study area is endemic for lymphatic filariasis; however, the majority of the respondents' very poor knowledge of the disease and mode of transmission support the claim that information about the disease was not effectively conveyed to the general public.<sup>10</sup> Similar observation

had been reported in Ghana,<sup>17</sup> India,<sup>15,18</sup> and Tanzania.<sup>19</sup>

Generally the people in the study areas are highly predisposed to lymphatic filariasis. This is evident in the high incidence level of malaria, poor hospital consultation, and treatment-seeking behaviors among lymphatic filariasis patients, as well as the respondents' general indifference about the health implications of the disease. Poor hospital treatment among lymphatic filariasis patients in this study compared with previous studies in Nigeria and elsewhere<sup>10</sup> could be due to poor medical facilities in the areas. These areas rely on poorly equipped primary health centers whose workers sometimes lack adequate knowledge about some of these neglected tropical parasitic diseases. Although about one-quarter of the respondents see lymphatic filariasis as abominable, the disease seems not to pose serious stigmas on the affected individuals. Social stigmas associated with lymphatic filariasis in upper socioeconomic groups seem to be of great significance, whereas in lower socioeconomic group population stratum, like the population in our study, it seemed not.<sup>16</sup>

## CONCLUSIONS

The study presented data on level of knowledge and awareness of and predisposing factors to lymphatic filariasis in Nigerian rural communities. Although the WHO has identified lymphatic filariasis as eradicable, many approaches are centered on chemotherapy, with neglect of the social aspects of the disease undermining the control efforts. Integrated approaches involving mosquitoes control and chemotherapy are obviously essential, but a sound knowledge of transmission indices at the grassroots level will further augment these control

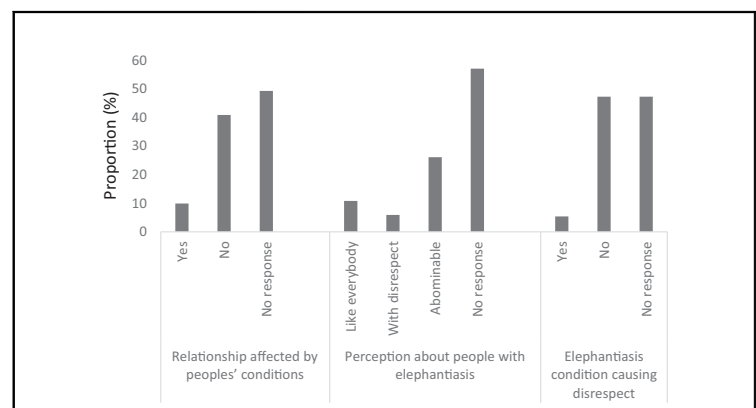


Figure 1. Associated stigmas with people living with elephantiasis (n = 203).



strategies. Thus there is a need to translate these research findings into practical ways of improving lymphatic filariasis control through the development of community-specific health education curricula.

## ACKNOWLEDGMENTS

We acknowledge the participation of the volunteered residents of the communities whose co-operations have led to the success of the study.

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