

ASSESSMENT OF THE KNOWLEDGE, ATTITUDE AND PRACTICES RELATED TO THE TREATMENT AND PREVENTION OF LYMPHATIC FILARIASIS AMONG THE ADULT RESIDENTS OF BOKKOS LOCAL GOVERNMENT AREA OF PLATEAU STATE, NIGERIA.

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Abstract

This study reports the knowledge, attitude and practices of the people of Bokkos Local Government Area of Plateau State, Nigeria regarding the cause, transmission, treatment and prevention of lymphatic filariasis during its elimination programme involving mass drug administration. The study which was conducted between May and June 2010 was a descriptive cross-sectional one. Both quantitative and qualitative methods were used for the survey.

The study has shown that most of the residents are knowledgeable about lymphatic filariasis. More than half of the respondents (51%) knew that mosquitoes transmit the disease and majority of them know the clinical presentation, prevention and treatment of the disease. Information about lymphatic filariasis and mass drug administration was received mainly from health personnel. There was a high treatment coverage (82.45%) mostly achieved through house to house distribution and a 95 % compliance to the drugs as well as a low ownership and utilization of insecticide treated bed nets.

There is need to strengthen health education and the distribution mechanism. The importance of daily usage of long lasting insecticide treated nets (LLINs) must be heightened through community based education campaigns.

Key words: *Bokkos, lymphatic filariasis, mass drug administration and insecticide treated nets.*

Introduction

The term “lymphatic filariasis” covers infections with three closely related nematode worms- *wuchereria bancrofti*, *Brugia malayi* and *brugia timori*. All three infections are transmitted to man by the bite of an infected mosquito (*anopheles*, *culex* and *aedes sp*) through the skin.¹ Lymphatic Filariasis is a global Public Health problem with eighty-three Countries endemic for the disease. There are approximately 1.1 billion people at risk for contracting lymphatic filariasis and 120 million people are infected world-wide.² The disease is the second most common vector borne parasitic disease after malaria. It is also the second most common cause of long term disability after mental illness. One third of infected people live in India, one third in Africa, the remainder live in the Americas, the Pacific Island, Papua New Guinea and South-East Asia.³

Four countries- India, Indonesia, Nigeria and Bangladesh account for 70% of all lymphatic filariasis (LF) infections. Nigeria is the third most endemic country in the world for the disease, with an estimated 22 million cases. In Nigeria, 80 million people are at risk of the disease, third

behind India and Indonesia with a Pre-Mass Drug Administration (MDA) baseline circulating filarial antigenaemia ranging from 5% to 64%. Mass drug administration coverage of essential sites is 56.7% in 2001.^{4,5}

Plateau State, Nigeria with a population of about 3 million people has 17 local government areas that are all endemic for the disease.⁶ A survey of 149 villages in the state in 2002 recorded that 90% of the villages had lymphatic filariasis with a mean prevalence of 22.4% (range 0-67%) by blood antigen testing in adult males.⁷ A report submitted to the Plateau state Ministry of Health by the Carter Centre showed that in 2004, of 174 people tested by the Immunochromatographic card test 77 were positive for LF.⁸

Filariae are responsible for a variety of clinical manifestations including lymphoedema of the limbs, genital disease (hydrocele, chylocele and swelling of the scrotum and penis) and acute recurrent secondary bacterial infections known as “acute attacks”. The vast majority of infected are asymptomatic but virtually all of them have sub-clinical lymphatic damage and as many as forty

percent have renal involvement with proteinuria and haematuria.⁹

The fiftieth World Health Assembly on 13th May 1997 decided that the disease should be eliminated as a public health problem. Elimination of the disease means a reduction in incidence close to zero as a result of deliberate effort requiring continued and coordinated activities. WHO's strategy requires two components:-

1. Interruption of transmission through mass drug administration (MDA) once a year for at least five years or until the transmission has been interrupted: 6 ml/kg diethylcarbamazine (DEC) + 40mg albendazole or 150ug/kg / ivermectin + 400 mg albendazole or a treatment regimen using DEC fortified cooking salt daily for a period of 6-12 months
2. Care for those who already have the disease. The Carter centre, a not for profit, non-governmental organization, was first invited by the Federal Ministry of Health, Nigeria and the State Ministries of Health of Plateau and Nasarawa States to help establish a lymphatic filariasis Elimination Program in 1998. The first round of MDA under the programme to eliminate lymphatic filariasis (PELF) began in 2000 with ivermectin / albendazole. By 2003, the programme was extended to all local government areas in the state.

The intervention strategies of mass drug administration, vector control, morbidity management and health education have been instituted in the state by The Carter Center.

There is a growing recognition that community involvement and effective health education play a critical role in the success of elimination of lymphatic filariasis and therefore the need to know about the knowledge, attitude and practices of the people towards lymphatic filariasis. The knowledge gap with regard to the disease and prevailing attitude and perceptions towards the programme may be the source of the major causes of lower compliance.¹⁰ Any successful strategy to eliminate the disease must take into account the range of people's knowledge and perceptions for the program to gain wide acceptance.

The Federal and State Governments are currently collaborating with The Carter Center in the spirit of Public Private Partnership through the payment of counterpart funding and deployment of staff to work for the organization.

Moreover, assessment of knowledge, attitudes and practices (KAPs) of a community is one of the rapid assessment procedures (RAPs) in assessing the burden of the disease and the effectiveness of a lymphatic filariasis elimination program and this has not been done in Bokkos Local Government Area, Plateau State, Nigeria. Results of KAPs studies can be used to develop simple and effective health promotion campaigns to address the possibility of adverse drug reactions, misconceptions and to stress the need for community support and participation in L.F. control activities.

Materials and methods

Study area

Bokkos Local Government Area is located in the Central zone of Plateau State, Nigeria and it is one of the 17 LGAs in the state. The Local Government Area has an estimated population of 206,877 people. Lymphatic Filariasis is endemic in the Local Government Area. The disease is co-endemic with onchocerciasis. This can be attributed to geographical factors like abundance of forests, abandoned mining ponds and rivers especially in the southern part of the Local Government Area. Mass drug Administration (MDA) for LF began in the state in 2000 and involved all LGAs by 2003.

Study population

Males and females aged fifteen (15) years and above resident in Bokkos LGA.

Inclusion Criteria: Adult males and females aged fifteen years and above who are permanent residents of the ward. Those who have lived for six months or more in the area.

Exclusion criteria: Those coming from outside the ward or staying temporarily. Those who did not give consent to participate in the study were also excluded.

Study design

The study was a descriptive cross-sectional study.

Sample size determination

A sample size of four hundred and sixteen (416) respondents was got by using the formula.

$$n = Z^2pq$$

d²

n = desired sample size

z = standard normal deviate set at 1.96 which corresponds to the 95% confidence interval.

p = the proportion in the target population estimated to have a particular characteristic.

$q = 1 - p$

$n = 378$

Total Sample Size = Sample size PLUS 10% to give room for non-response rate.

$= 378 + 38$

$= 416$ respondents

Sampling technique

Multistage sampling technique was used. First stage: the four wards were selected out of the twenty in the LGA. Second stage: one village was selected from each of the wards. All villages in selected wards were listed and one randomly selected from each ward by balloting. Systematic random sampling technique was then used to select the houses. All houses in the selected village were numbered and mini census was done to know the number of people in the area who met the inclusion criteria. This was then divided by the expected sample size (104) to get a sampling fraction and sampling interval. In each house all the people that fulfill the criteria were interviewed.

Data collection technique

This was done using both qualitative and quantitative techniques. Community members aged fifteen (15) years and above were recruited. This was because manifestations of L.F disease occur much later in life.

Quantitative method: Collection of data was done using structured interviewer administered pre-tested questionnaires that contain mostly closed-ended questions. Eight interviewers, four males and four females who are fluent in the local languages spoken in the selected wards were recruited and trained to administer the questionnaires. Equal allocation of one hundred and four (104) subjects were selected from each of the four wards as the communities were relatively of the same size to make a sample size of four hundred and sixteen (416) respondents.

Qualitative method: For the qualitative method it was through focus group discussions (FGDs) organized in all the selected wards and only community members aged fifteen (15) years and above were recruited. This was to ensure that the respondents properly understood the questions. Eight sessions of focus group discussions were held. Each group was homogenous, made up of young females aged 15-30 years, older females >

30 years of age, young males 15-30 years of age and older males > 30 years of age. Each group was made up of ten people and each session lasted for about two hours.

For the FGDs, the participants were brought to a convenient place in their ward, which was acceptable to all participants. The FGDs had a moderator, a note taker who was also present to note the list of issues discussed and the reactions and responses of the participants. A team member who also monitored the entire process recorded the entire discussion on an audiocassette. Before concluding the discussion, short personal information was obtained from all the respondents. The moderators were provided with a discussion guide, consisting of relevant core questions/issues that were posed to all groups. The questions were on knowledge, attitude and preventive practices of lymphatic filariasis.

Quantitative method: The interviewers administered the questionnaires to the selected respondents. Information collected included demographic characteristics of the respondents. Other information include: knowledge of etiology and symptoms of filariasis, whether people understood the relationship between infection and disease, recognition of the role mosquitoes play in transmission, willingness of the community to participate in a control programme, acceptance and utilization of insecticide treated bed nets, comment on prevalence of lymphatic filariasis in the community, pre and post MDA.

Data analysis

Data cleaning for errors, completeness and consistency checks were done. Information collected were fed into Statistical Package for Social Sciences (SPSS Version 17) for analysis and presented using pie-charts, frequency tables and percentages. Chi-square test was used to test statistical significance of relationship between variables, a p value of <0.005 was considered significant. Content analysis from the focused group discussions was also done.

Ethical considerations

Permission was obtained from department of community medicine, Ahmadu Bello University, Zaria and the state ministry of health before the collation of data from the Carter Centre and before the administration of questionnaires. Permission was also sought from the Local Government Authorities and village/ward heads. Informed verbal consent was also sought and obtained from

each individual concerned before administering the questionnaire. All information obtained was treated with utmost confidentiality.

RESULTS

Knowledge of lymphatic filariasis

Majority of the respondents were knowledgeable about lymphatic filariasis.

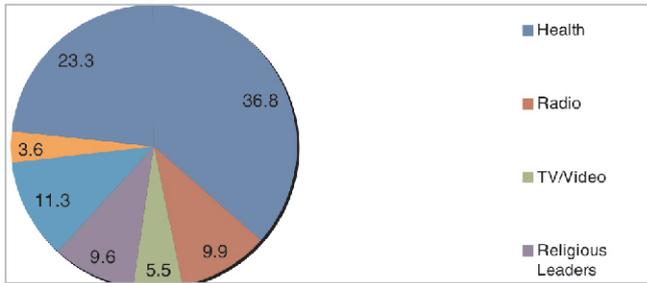


Figure 1: Source of information on lymphatic filariasis

The respondents' sources of information on lymphatic filariasis were as follows: Health personnel 36.8%, radio 9.9%, television/video 5.5%, religious leaders (church/mosque) 9.6%, town crier 11.3%, poster 23.3%, no response to the question 3.6%. About their knowledge of L.F. only 28.4% knew that the disease is diagnosed through blood examination. 92.1% believed that there is treatment for elephantiasis and 92.5% believe that there is treatment for hydrocele. 89.2% believe that L.F. can be prevented.

Table 1: Showing the respondents knowledge of ways of preventing Lymphatic filariasis

Ways of preventing Lymphatic Filariasis	Frequency	Percent (%)
Drug (Mass administration)	212	57.1
Insecticide treated nets	17	4.6
Cleaning of surroundings	33	8.9
Insecticide	2	0.5
All of the above	106	28.6
No response	1	0.3
Total	371	100.0

Of those that believed that the disease can be prevented 57.1% thought this can be done through mass drug administration, 4.6% thought insecticide treated bed nets, 8.9% felt this can be achieved through cleaning of surroundings, 0.5% through the use of insecticides, 28.6% felt the disease can be prevented by all of the above

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Table 2: Showing the respondents' possibility of acquiring (becoming infected with) lymphatic filariasis

Possibility of acquiring lymphatic filariasis	Frequency	Percent (%)
Yes	201	48.3
No	213	51.2
No response	2	0.5
Total	416	100.0

Almost half of the respondents (48.3%) thought they can be infected with lymphatic filariasis while 51.2% felt that they were not at risk of being infected with lymphatic filariasis. 0.5% did not respond.

Table 3: Showing the response of eating, living or working with lymphatic filariasis patient by the respondents

Eating, living or working with lymphatic filariasis patient	Frequency	Percent (%)
Yes	354	85.1
No	58	13.9
No response	4	1.0
Total	416	100.0

Majority of the respondents (85.1%) said they can eat, live or work with lymphatic filariasis patients while 13.9% said they cannot. 1.0% did not respond.

Table 4: Showing the respondents response to willingness to marry someone with hydrocele or elephantiasis

Willingness to marry someone with hydrocele or elephantiasis	Frequency	Percent (%)
Yes	120	28.8
No	295	70.9
No response	1	0.2
Total	416	100.0

Less than thirty percent (28.8%) of the respondents said they can marry someone with hydrocele or elephantiasis while 70.9% said they cannot while 0.2% did not respond. Majority (51.2%) said that they were not at risk of being infected by lymphatic filariasis.

Most of them (85.1%) said that they can drink or work with a lymphatic filariasis patient.

However, 70.9% said they cannot marry someone with hydrocele or leg swelling. Practices in relation to the treatment and prevention of lymphatic filariasis Majority of the respondents (82.6%) received drugs distributed during mass drug administration with most of them (86.9%) through house to house distribution. Ninety-five percent (95%) swallowed the drugs. There was no statistically significant relationship between education qualification and the consumption of drugs distributed during MDA (Person chi-square 8.874, at degree of freedom 8, $p = 0.068$).

Those who did not swallow the drugs gave various reasons.

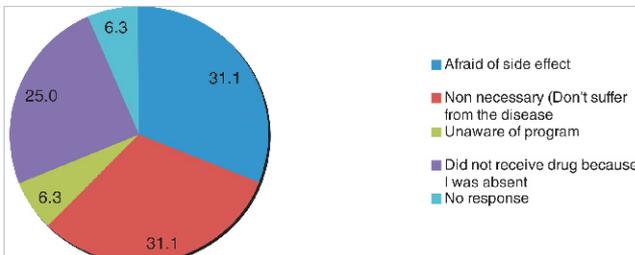


Figure 2: Showing the reasons for non-compliance

Of those that did not consume the drugs, various reasons were given: 31.1% said they were afraid of side effects while another 31.3% said their reason was that they thought it was not necessary since they don't suffer from the disease. Others gave several other reasons.

Only 27.6% of the respondents own insecticide treated bed nets with only 25.2% sleeping under a net the previous night while only 16.1% of them sleep under a net daily. There was a statistically significant relationship between educational qualification and sleeping under a net daily. (Pearson's Chi-square =19.472, at degree of freedom = 8, $p = 0.013$). Some of the respondents (19.5%) believed that they have lymphatic filariasis, 90% were said to have been diagnosed

If yes, place of help	Frequency	Percent (%)
Clinic/hospital	43	64.2
Chemist	3	4.5
Herbalist	9	13.4
Other	9	13.4
Total	64	95.5
No response	3	4.5
Total	67	100.0

Of those who did seek for care, 64.2% did so in a clinic/hospital, 4.5% in a chemist, 13.4% from herbalist while 13.4% did seek for care from other sources like prayers and friends.

Focus group discussions

Six out of the eight groups spontaneously mentioned scrotal swelling and leg swelling, the most common manifestations of LF, as important health problems in their communities. The groups had a good knowledge of the symptoms of LF. They mentioned leg swelling, scrotal swelling, fever, genital swelling, body itching and rashes as common symptoms. The groups said that in Kulere language leg swelling is “mu wom siau” while scrotal swelling is called “mu wom njwal”. In Ron dialect scrotal swelling is called “motan ti shishwal ma fosan” while leg swelling is called “motan ti sakwa ma fosan”.

Five out of the eight groups opined that the disease is common in their communities, with some of the discussants stating that they have the disease. Five of the groups identified mosquitoes as the cause of L.F. One group agreed that walking barefooted on pig's faeces and sexual contacts cause LF. Another group stated that the disease is caused by excessive sexuality, witchcraft and kissing. The last group said it was due to poor personal hygiene, dirty environment and extreme heat. However, most of the groups agreed that the disease can be prevented by vector control measures, swallowing MDA drugs and use of LLINs. One group however stated that keeping pigs in clean environment so that people do not step on their faeces plus MDA drugs and vector control measures.

Prevent LF. Another group was of the opinion that LF is prevented by avoiding sex, drinking good water and vaccination.

All the groups agreed that if they have leg or scrotal swelling they would go to see a doctor in a hospital but some discussants preferred seeing a herbalist or friend for leg swelling. They also stated that LF patients deserve love and care and should be supported. Most of the groups agreed that Government or an organization is helping them with mosquito nets and MDA drugs. Two of the groups however stated that Government is not helping them. All the groups agreed that LLINs prevent mosquitoes and LF. Except 60 % of one group that stated that LLINs prevent mosquitoes but not LF.

Discussion

The respondents, major source of information on lymphatic filariasis (L.F.) and mass drug administration (MDA) were from health personnel and posters. The findings contradicted that of Aswarthy S. and colleagues in a study in a rural community in Kerala, India where most (62.3%) of his respondents, obtained information from television or radio programmes.¹¹

The respondents were knowledgeable about the presence of leg swelling and scrotal swelling as the symptoms of L.F. This finding was consistent with that of Hopkins et al in a study in Pankshin and Akwanga LGAs in Plateau and Nasarawa states respectively where they reported that community members were generally aware of the manifestation of L.F as hydrocele and leg swelling.¹² This contradicted the findings of Mark and colleagues in a study in Haiti in which all the people knew of the clinical conditions of hydrocele and elephantiasis.¹³

Majority of the respondents believed that LF is transmitted by mosquitoes. The finding is similar to that of Sherchand and colleagues who reported from a study in Nepal that 49.3% of respondents said that mosquitoes cause L.F.¹⁴ This however contradicted the findings of Hopkins, Ramaiah, Rath and Kelias and their colleagues who reported a low to absent knowledge on the cause of L.F by mosquitoes.^{12,15,16,17}

There was no statistically significant relationship between the knowledge that mosquitoes transmit L.F and sex, occupation, age, and educational qualification. This contradicted the report from Philippines by Wynd and colleagues in which

correct knowledge of disease transmission was associated with the highest level of formal educational attainment.¹⁸

Of those who said there is treatment for elephantiasis, majority believed it can be treated by drugs (tablets), others believe it can be treated by herbs or prayers. Majority of those who believe there is treatment for hydrocele believes it is through surgery, others thought it can be done with drugs, few do not know the treatment while others believed in other treatment like prayers and herbs. The findings are similar to that of Mark and colleagues in a survey conducted in Haiti.¹³

Majority of the respondents knew that lymphatic filariasis (L.F) can be prevented. They believed this can be achieved through mass drug administration and vector control measures. This contradicted the study of Wynd and colleagues that endemic communities do not know the importance of minimizing mosquito contact for preventing infection.¹⁸

In the respondents' attitude to L.F about half of them felt that they were not at risk of (or vulnerable) to being infected with L.F. This supported the findings of Lawrence and colleagues from a survey in Lau Local Government Area of Taraba State, Nigeria where a low perception of personal susceptibility to lymphatic filariasis (L.F) was identified among the people.¹⁹ However, majority of them said they cannot marry someone with hydrocele or elephantiasis and about half of them believed that L.F is infectious. This finding corroborated the study of Wynd and colleagues who reported in some studies that women and men with L.F disease are considered to have limited marriage prospects.¹⁸ There was no statistically significant relationship between the attitude to lymphatic filariasis (eating, living or working with L.F patient) and age, gender and educational qualification.

Almost all those who received the drugs consumed them while few did not swallow the drugs. The findings contradicts that of Padhy and colleagues in a study in Gudiapokhari, Puri district of India where of 170 respondents only 160 or 93.9% had received the drugs distributed during MDA but only 106 or 66.25% consumed them and 54 or 33.7% did not consume.²⁰ The findings also contradict the report from Kenya by Njeri and colleagues who had low treatment coverage of 46.5% and 88%.²¹ Mukhopadiyay and colleagues also reported low treatment coverage of 64.64% from Andra Pradesh, India.²²

There was no statistically significant relationship between the awareness of MDA and age, gender and educational qualification. Similarly there was no statistically significant relationship between the consumption of MDA drugs and age, gender and educational qualification.

Of those who swallowed the drugs, majority did so after eating while the minority on empty stomach. Most of them experienced no side effect after taking the drugs while the rest experienced minor side effects like vomiting, fever, drowsiness and swelling/Oedema). Of those who did not consume the drugs various reasons were given: Some were afraid of side effects, others thought it was not necessary since they do not suffer from the disease, a quarter of them do not receive drugs because they were absent at time of distribution and others were unaware of the MDA program. The findings were similar to that of Aswathy and colleagues in a study in a rural community in Kerala, India in which of those who did not ingest the MDA drugs. 39.4% said they were fearful of the drugs and 12.5% had misconceptions about the aims of MDA. However most of the (66.3%) considered MDA to be useful.¹¹ The findings contradicts that of Padhy and colleagues from Puri district, India in which reasons for non-consumption among 54 respondents were:

More than half of the respondents (62.9%) were afraid of side effects and 25.9% felt the drugs to be unnecessary as they themselves do not suffer from L.F diseases, 11.0% were unaware of program.²⁰

Only about one third of the respondents have received LLINs distributed during the programme. Only a quarter of them slept under a net the previous night and only 16.1% sleep under an LLIN daily. This finding is similar to that of Wagbatsoma and Onwujekwe and colleagues in their studies, in Etsako West LGA, Edo State, Nigeria and Enugu State, South-Eastern Nigeria respectively, where there was low ownership and utilization of LLINs.^{23,24} Mukhopadhyay and colleagues also reported low Mosquito nets (ownership and utilization) from their study in Andra Pradesh, India where of 7168 respondents only 1204 (16.79%) had mosquito nets in their homes but only 9.02% use mosquito nets daily.²² The study however contradicts that of Abebe and colleagues in a study in Ethiopia in which majority of the respondents (85.7%) used nets daily and history of sleeping under LLINs the previous night was 81.6%.²⁵

There was a statistically significant relationship between educational qualification and sleeping under a bed net daily but no statistically significant relationship between sleeping daily under an LLIN and gender. Similarly there was no statistically significant relationship between sleeping under an LLIN and knowledge that mosquito transmit L.F.

Of the 416 respondents, 81 believed that they are suffering from L.F. Of this number 38 said they have scrotal swelling while 32 said they have leg swelling. Other manifestation of the disease included genital swelling (23), breast swelling (20) and skin hardening/thickening (24). Majority of the respondents who believed they have the disease said they were diagnosed in a clinic/hospital; others were diagnosed at home by village health worker or in a herbal/traditional medicine home. Only 43 out of 81 did seek for help for their condition. Majority went to a clinic/hospital to seek for help; others went to a chemist, a herbalist /traditional medicine practitioner, prayer houses and friends for help. There is a statistically significant relationship between ward of residence and presence of disease. Toff and Kamwai wards have most of the cases. This could be related to their topography, abundance of mining ponds, vegetation and rivers and their proximity to another endemic LGA, Wamba in Nasarawa State. There is also a statistically significant relationship between the presence of disease and age. The disease is most common in the 45-49 years age group and least common in the 20-24 years age group. There is no statistically significant relationship between gender and period of stay in residence and the presence of L.F disease. These findings were similar to that of Hopkins and colleagues from their studies in Pankshin LGA and Akwanga LGAs in Plateau and Nasarawa States respectively, in which affected persons themselves sought both traditional and modern remedies. Sherchand and colleagues in a study in Nepal reported the treatment seeking behaviour of L.F patients in which only 38% went to modern medicine practitioners, 30% consulted traditional healer, 22% used herbal medicine for self treatment and 10% did not seek treatment.^{14,26} This finding however contradicts that of Omude and colleagues who revealed preference of traditional medicine over modern medicine by L.F disease patients from a study in Benue state, Nigeria.²⁷

Conclusions

The study has shown that most of the residents are knowledgeable about lymphatic filariasis. More

than half of the respondents knew that mosquitoes transmit the disease and majority of them know the clinical presentation, prevention and treatment of the disease. Information about L.F and MDA was received mainly from health personnel. There was high treatment coverage (82.45%) mostly achieved through house to house distribution and a 95% compliance. However, there was a low ownership and utilization of insecticide treated bed nets.

Awareness of the cause of the disease, the relationship between infection and disease, the importance of daily usage of mosquito nets, and goals of the MDA Programme must be emphasized through community based education campaigns to increase the possibility of acceptance and sustain the high compliance. The house to house distribution of MDA drugs has to be strengthened and the need to improve on the access and usage of LLINs must be achieved to reduce L.F transmission.

Competing interests

The authors declare that they have no competing interests.

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REFERENCES

1. Park K. Epidemiology of communicable diseases. In Park, K. 18th Edition Park's Textbook of Preventive and Social Medicine. Ms Banarsidas Bhanot Publishers India, 2005: 211-216.
2. Global Program to Eliminate Lymphatic Filariasis. WHO 2009. Lymphatic filariasis <http://www.who.int/lymphatic/filariasis/disease/en>. accessed on 20th April 2009
3. Wynd S, Melrose W, Durrheim D, Carron J and Gyapong M. Understanding the community impact of lymphatic filariasis: a review of socio-cultural literature. Bulletin of the world Health Organization 2007 June; (85)6:493-8.
4. World Health Organization. Global Programme to Eliminate Lymphatic Filariasis. Annual Report on Lymphatic Filariasis 2001. Geneva, World Health Organization 2001. Ref CDS/CPE/CEE 2002: 43.
5. World Health Organization. Global Programme to Eliminate Lymphatic Filariasis. Annual Report on Lymphatic Filariasis 2002. Geneva, World Health Organization 2001. Ref CDS/CPE/CEE 2003: 38.
6. Richards FO Jr, Eigege A, Pam D, Kal A, Lenhart A. Oneyka JOA, et al. Mass Ivermectin treatment for onchocerciasis: lack of evidence of collateral impact on transmission of wuchereria bancrofti in areas of co-endemicity. Filaria Journal 2005; 4:6. <http://www.filariajournal.com/content/4/1/6>. Accessed on 4th March 2009.
7. Hopkins D R, Eigege A, Miri E S, Gontor I, Ogah G, Umaru J, et al. Lymphatic Filariasis and Schistosomiasis control in combination with onchocerciasis control in Nigeria. American Journal of Tropical medicine and Hygiene 2002; 67(3): 266-272.
8. Eigege, Abel. Plateau-Nasarawa Integrated Programs: LF transmission eliminated in some Local Government Areas in Plateau/Nasarawa. A report submitted to the Plateau State Ministry of Health by the Carter Centre in 2009.
9. David G. Addis and Molly A. Brady. Morbidity Management in the Global Program to Eliminate Lymphatic Filariasis: a review of scientific literature. Filaria Journal 2007;6:2. <http://www.filariajournal.com/content/6/1/2>. Accessed on 20th April 2009.
10. Rath, K., Nath, N., Mishra Shaloumy, Swain, B.K., Mishra Suchismita and Babu, B.V. Knowledge and perceptions about lymphatic filariasis: a study during the programme to eliminate lymphatic filariasis in an urban community of Orissa, India. Tropical Biomedicine 2006; 23(2): 156-162.
11. Aswathy S. Beteena K., Leelamoni K. Mass drug administration against filariasis in India: Perceptions and practices in rural community in Kerala. Annals of Tropical Medicine and Parasitology 2009 Oct; 103(7): 617-24.
12. Hopkins D.R, Eigege A, Miri E.S, Gontor I, Ogah G, Umaru J, et al. Lymphatic Filariasis Elimination and Schistosomiasis control in combination with onchocerciasis control in Nigeria. American Journal of Tropical Medicine and Hygiene, 67(3), 2002: 266-272.

13. Eberhard ML, Walker E.M. Addiss DG, Lammie PJ. A Survey of knowledge, attitudes, and perceptions (KAPS) of Lymphatic Filariasis, elephantiasis and Hydrocele among residents in an endemic area in Haiti. *American Journal of Tropical Medicine and Hygiene* 1996 Mar; 54(3): 299-303.
14. Sherchand J.B, Obsomer V, Thakur G.D. and Hommel M. Mapping of Lymphatic Filariasis in Nepal. *Filaria Journal* 2003; 2:7. [Http://www.filariajournal.com/content/2/1/7](http://www.filariajournal.com/content/2/1/7). Accessed on 20th September 2010.
15. Ramaiah KD, Kumar KN, Ramu K. Knowledge and beliefs about transmission, prevention and control of Lymphatic Filariasis in rural areas of South India. *Journal of Tropical Medicine and International Health* 1996 Aug; 1(4): 433-8.
16. Rath, K, Nayak, A.N. and Babu, B.V. (2007). Community's knowledge and perceptions about filarial Elephantiasis and Hydrocele in Coastal Orissa, India. *Asia Pacific Journal of Public Health*. 2007; 19(1): 28-33.
17. Kelias Msyamboza, Bagrey Ngwira, Richard Banda, Square Mkwanda, Bernard Brabin Schistosomiasis, Soil transmitted helminthes and malaria in rural southern Malawi. *Malawi Medical Journal* March, 2010; 22(1):12-4.
18. Wynd S, Melrose W.D, Durrheim D.N, Carron J, Gyapong M. Understanding the community impact of Lymphatic Filariasis: a review of sociocultural literature. *Bulletin of the World Health Organization*, June 2007; (85), 6: 421-500.
19. Lawrence Uku Ogbonnaya and Joseph C. Okeibunor. Socio-cultural factors affecting the prevalence and control of lymphatic filariasis in lau local government Area, Taraba State. *International quarterly of community Health Education*. Issue 2004-2005, (23)4: 341-371.
20. Padhy G.K, Pani M.R, Choudhury K.C, Sahu K.K. Study of knowledge regarding lymphatic filariasis and mass drug administration among residents of Gudiapokhari of Puri district. *Journal of community medicine*, January 2009, (5): 1-4.
21. Njeri Wamme, Sammy M. Njenga, Wifred M. Kisingu, Pauline, W. Muthiagani and Karanja Kiiyu. Community directed treatment of lymphatic filariasis in Kenya and its role in the National programme for elimination of lymphatic filariasis. *Africa Journal of Health Science* January-June 2006; (13), 1-2: 69-79.
22. Mukhopadhyay A.K, Parknaik S.K, Babu P.S and Rao K.N.M.B. Knowledge on lymphatic filariasis and mass drug administration (MDA) programmes in filarial endemic districts of Andhra Pradesh India. *Journal of vector Borne diseases* March 2008; 45(1):73-5.
23. Wabgatsoma and E.E. Aigbe. ITN utilization among pregnant women attending ANC in Etsako West LGA, Edo State, Nigeria. *Nigeria Journal of Clinical practice* 2010; 13(2) 144-8.
24. Onwujekwe O.E, Akpala C.O, Ghasi F, Shu E.N and Okonkwo P.O. How do rural households perceive and prioritise malaria and mosquito nets? A study in five communities in Nigeria. *Nigeria Journal of Public Health* September 2000; (114), 5:407-410.
25. Abebe A, Teshome G, Girmay M, Mesheba B, Seife B, Aklilu S. Assessment of distribution, knowledge and utilization of insecticide treated nets in selected malaria prone Areas of Ethiopia. *Ethiopia Journal of Health Development* 2008; 22(3): 268-274.
26. Omadu E.A, Okafor F.C. Rapid Epidemiological and sociocultural appraisal of lymphatic filariasis amongst the Igede ethnic group in Benue State, Nigeria. *Nigeria Journal of Parasitology* 2007, 28(2): 118-124.
27. Omudu E.A Okafor F.C. Perception, practices and health seeking behaviour of Lymphatic filariasis patients in some endemic communities in Benue State. *Nigeria Journal of Parasitology*, 2008; 29(2): 140-146.