

# The Role of Health Education Intervention towards Improving Knowledge, Attitude and Practice of Onchocerciasis in Enugu State, Southern Nigeria

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## Abstract

**Background:** Onchocerciasis or river blindness constitutes a major burden to households especially in resource-poor settings, causing debilitation and reduction in household productivity. It is an endemic disease in Nigeria. The study aimed to determine the effect of health education on knowledge, attitudes and practices towards onchocerciasis.

**Methods:** This study was an intervention study carried out among 282 respondents. A multistage sampling technique was used to select the study sample.

**Results:** Both study and control groups had poor knowledge, 40.4% and 41.2% respectively pre-intervention. However, most of the respondents had good practices, but attitudes towards the disease is poor as most respondents do not see onchocerciasis as a serious problem. Knowledge of respondents improved significantly among the study group ( $X^2=37.814$ ,  $P=0.046$ ) compared to control group ( $X^2=1.756$ ,  $P=0.416$ ) post-intervention. Also, practices ( $X^2=21.378$ ,  $P=0.039$ ) towards onchocerciasis improved significantly, but changes in attitudes was not statistically significant post-intervention among study group ( $X^2=35.908$ ,  $P=0.278$ ).

**Conclusions:** From our study, health education was shown to improve knowledge and practices on onchocerciasis in the study group compared to control group. Health promotion interventions such as health education campaigns should be scaled-up in onchocerciasis-endemic communities.

**Keywords:** onchocerciasis, health education, knowledge, attitudes, Nigeria

## List of Abbreviations

APOC: African Programme for Onchocerciasis Control

CDTI: Community Directed Treatment with Ivermectin

KAP: Knowledge, Attitudes, and Practices

LGA: Local Government Area

CDDs: Community Drug Distributors

FMOH: Federal Ministry of Health

PHWs: Public Health Workers

WHO: World Health Organization

## 1. Background

Onchocerciasis is a chronic parasitic disease caused by the filarial worm *Onchocerca volvulus*. The disease is transmitted from man to man through the bites of the blackfly *Simulium* spp of the family Simuliidae (Eezzuduemhoi & Wilson, 2013). The disease is endemic in 30 African countries, Yemen, and in small foci in Central America and South America (Opara, Usip, & Akpabio, 2018; World Health Organization, 1995; World Health Organization, 2013). Globally, at least 18 million individuals have onchocerciasis, and 99% reside in Africa. Also, WHO estimated that 750,000 people are blind or have reduced vision as a result of the disease. West Africa is among the most endemic areas in the world, and Nigeria has the largest number of persons with onchocerciasis, accounting for about a third of the global prevalence, and as one of the largest countries in West Africa she has been reported to have a high incidence of onchocerciasis infection with 7 million persons infected with the disease and 40 million at risk (Opara, Usip, & Akpabio, 2018). The fear of blindness resulted in depopulation of fertile river valleys, thus onchocerciasis is a major obstacle to socio-economic development in the Savannah regions of West Africa. The fertility of riverine lands and associated high blindness rate are opposing forces which respectively attract and repel human settlement along fast flowing rivers near vector breeding sites.

Although onchocerciasis has existed in Nigeria for centuries, it was not until 1908 that the first report was published (Buddent, 2013). Since then, various authors (World Health Organization, 2015; World Health Organization, 2012; Hoerauf, Buttner, Adjei et al., 2003) have contributed to the existing knowledge of its natural endemicity and the socio-economic importance of the disease. Consequently, many studies have been conducted to assess knowledge, attitude and practices towards onchocerciasis. In a research by Manafa and Isamah conducted in Oji River local government area of Enugu State, Nigeria, questionnaires, focused group discussions and key informant interviews were used to determine the socio-cultural factors affecting the transmission of onchocerciasis. The result showed low knowledge about the cause, prevention and complications of onchocerciasis among members of a community. Majority are aware of the disease which they recognized once their bodies starts itching or musculo skeletal pains develops, but only 64.4, 34.0, 1.4 and 3.6% respectively attributed chronic itching, nodules, had vision and leopard skin to blackfly bites (2013, Manafah & Isamah, 2002).

Knowledge, Attitudes and Practices (KAPs) was low in another recent study in four endemic communities in Ondo State Nigeria, where in-depth interviews were conducted on people's knowledge, attitudes, and practices regarding onchocerciasis. However, health education intervention showed a significant improvement in the knowledge attitudes, and practices (KAP) of the respondents. The knowledge of Onchocerciasis aetiology increased to 79.8%, 71.5%, 81.2% and 74% from 48.5%, 48.7%, 34% and 45.3% respectively post-intervention. The study demonstrated that a community-based health education can be effective in Onchocerciasis control (Manafa, Awolola, & Isamah, 2003).

According to World Health Organization (WHO), health education is defined as any combination of learning experience designed to help individuals and communities improve their health by increasing their knowledge or influencing their attitude (Nandha & Krishnamoorthy, 2011). Health education has been linked to improvement in knowledge, attitude and practices of various diseases, especially vector borne disease such as onchocerciasis (World Health Organization, 2013), and it has been recommended as a way of influencing people's knowledge about onchocerciasis (Ogbuokiri, 2013; Shu, Nwadike, Onwujekwe et al., 1999; Adeoye, Ashaye, & Onakpoya, 2010). Some studies conducted in Nigeria showed that higher proportion of people had improved knowledge about onchocerciasis post health education intervention (Shu, Okonkwo & Onyejekwe 2008, Manafa, Awolola, & Isamah 2003).

Knowledge, Attitudes and practices is crucial for the African Program for Onchocerciasis Control (APOC) to achieve the ultimate goal of reducing the public health and socio-economic problems associated with the disease within a period of 12-15 years using the strategy of yearly community directed treatment with ivermectin (CDTI). It is expected that health education should be designed in such a way as to improve the community awareness of the etiology, symptoms treatment, prevention and control of onchocerciasis and the need to comply with the treatment plan as a strategy for controlling the disease (Mbanefo, Eneanya, & Nwaorgu, 2010). This study was therefore conducted to determine the effectiveness of health education intervention on the knowledge, attitude and practice on onchocerciasis in this part of Nigeria.

## 2. Methods

### 2.1 Study Area

This study was carried out in Enugu state, Southern Nigeria. The state is made up of 17 LGAs, and has a population of 5,590,513 according 2006 population census. The State is predominantly agricultural with yam tubers, palm

produce and rice being their main produce (Nigeria Business Directory, 2013).

### *2.2 Study Population*

The study population was randomly selected from adult males and females aged 15 years and above. Inclusion Criteria are those who were permanent residents (i.e., residents for at least a year) in each ward in the selected communities.

Visitors from outside the selected communities or staying temporarily and children who were less than 15 years were excluded.

### *2.3 Sampling Method*

All the LGAs in Enugu State except Enugu North and Enugu South were reported to be onchocerciasis endemic (Shu, Okonkwo, & Onwujekwe, 2008). Two LGAs were randomly selected by balloting, then one community was randomly selected from each of the selected LGA. By use of balloting, one community was chosen for the intervention while the other community served as control. Cluster units such as town halls, schools, churches-were randomly selected.

### *2.4 Study Design*

This was an intervention study carried out from April to June, 2013. It comprised of a study and a control group. The control group was similar to the study group in terms of endemicity of onchocerciasis, population density and socio-economic status. The community selected as the study group was in Enugu East LGA and the community which served as the control was in Nkanu West LGA. The study was carried out in 3 phases for the study group and 2 phases for the control group a distance of about 10km apart.

**Phase 1:** Two hundred and eighty two (282) respondents participated in the baseline survey.

**Phase 2:** Health education on onchocerciasis was carried out in the study area only; health education was done in 3 different clusters in the intervention community-the local government council hall, the community town hall and the premises of the community secondary school-in three sessions, each session lasting for 40 minutes, for 3 days.

**Phase 3:** It took place one month after the intervention in the study area. Same questionnaire as in the baseline survey was administered to the study and control groups.

### *2.5 Educational Content of Study Intervention*

Content of the health education intervention included lessons on the causative agent, transmission, clinical manifestations, treatment and control of onchocerciasis. Lessons were delivered both in English and in Igbo (the local dialect). It involved the use of illustrated pictorial materials. Questions were entertained from the participants after each session.

### *2.6 Man Power Training and Supervision*

Two field workers (one for each group) helped in administering the questionnaires. The field workers were trained, this is to enhance the validity of the study. The field workers were supervised by the researchers.

### *2.7 Data Analysis*

Data were analyzed using Statistical package for social Sciences (SPSS) Inc., Chicago, II, USA and the level of significance was at 5% confidence.

### *2.8 Scoring of Knowledge, Attitude, and Practice*

Ten (10) questions on knowledge of onchocerciasis were scored, each right answer was one point. The scores less than 40% (0 to 4 points) were poor knowledge; 41% to 60% (5 to 6 points) fair knowledge greater than 60% (greater than 6 points) good knowledge. The same was done for practice with five (5) key questions. Those who got 3 and above questions right had good practice, while 1 or 2 had poor practice. For attitude, there are three key questions (3) in which those who got all three questions right have good attitude, those who got 2 questions right had fair attitude and those who got only 1 question right had poor attitude.

### *2.9 Limitation of the Study*

Mobilization of community members to participate in the health education intervention.

## **3. Results**

Two hundred and eight two community members participated in the research, and the response rate was 100% in the pre-intervention and post intervention.

Table 1. Demographic characteristics of the participants

Demographic characteristics	Study group		Control group	
	N=141	%	N=141	%
<b>Sex:</b>				
Male	51	36.2	41	29.1
Female	90	63.8	100	70.9
<b>Age Group (Years):</b>				
15-24	88	62.4	78	55.3
25-34	15	10.6	31	22.0
35-44	18	12.8	11	7.8
45-54	13	9.2	15	10.6
55-64	0	0.0	5	3.6
>64	7	5.0	1	0.7
<b>Educational status:</b>				
No- formal	12	8.5	13	9.2
Primary	19	13.5	15	10.6
Secondary	94	66.7	74	52.5
Tertiary	16	11.3	39	27.7
<b>Occupation:</b>				
Unemployed	0	0.0	22	15.6
Student	80	56.7	67	47.5
Farming	27	19.1	11	7.8
Trading	5	3.6	10	7.1
Civil servants	28	19.9	29	20.6
Others	1	0.7	1	1.4
<b>Marital status:</b>				
Married	46	32.6	43	30.5
Single	89	63.1	93	66.0
Divorced/separated	0	0.0	2	1.4
Widowed	6	4.3	3	2.1
<b>Tribe:</b>				
Igbo	140	99.3	134	95.1
Yoruba	1	0.7	4	2.8
Others	0	0.0	3	2.1
<b>Religion:</b>				
Christianity	139	98.6	141	100.0
Islam	1	0.7	0	0.0
Others	1	0.7	0	0.0

Table 1 shows Two hundred and eight two (282) persons participated in the study of which 141 belonged to the study group and 141 to the control group. Majority are females in the study group 63.8% and control group 70.9%. The mean age is  $28.0 \pm 13.8$  for the study group and  $28.32 \pm 11.8$  for the control group.

Table 2. Knowledge of respondents on Onchocerciasis

Variables	Study group		Control group	
	N=141	%	N=141	%
<b>What is Onchocerciasis:</b>				
Disease	57	40.4	58	41.2
Type of blindness	41	29.1	56	39.7
River	37	26.3	20	14.2
Drug	1	0.7	2	1.4
Fly	1	0.7	1	0.7
Not known	4	2.8	4	2.8
<b>Symptoms of onchocerciasis:</b>				
Stooling and vomiting	47	33.3	37	26.2
Blindness	41	29.1	38	27.0
Nodules	23	16.3	20	14.2
Leopard skin	11	7.8	5	2.5
Rashes	13	9.2	19	13.5
Not known	6	4.3	22	15.6
<b>Causes of onchocerciasis:</b>				
Contaminated food/water	43	30.5	32	22.7
Bite of black fly	34	24.6	35	24.8
Mosquito bite	29	20.6	15	10.6
Contact with infected person	7	5.0	13	9.2
Witchcraft	19	13.5	25	17.7
Not known	9	6.4	21	15.0
<b>Prevention of onchocerciasis;</b>				
Drinking clean water	55	39.0	44	31.2
Protection from mosquitoes	30	21.3	10	7.1
Protection from black flies	27	19.1	46	32.6
Avoid contact with infected person	9	6.4	15	10.6
Not known	20	14.2	26	18.5
<b>Choice of drugs:</b>				
Ivermectin	78	55.3	71	50.3
Malaria tablets	27	19.1	10	7.1
Haematinics	16	11.4	18	12.8
Herbs and concoctions	9	6.4	15	10.6
Not known	11	7.8	27	19.2

Table 2 shows that 40.4% and 41.2% of respondents in study and control groups respectively knew that onchocerciasis is a disease. Among the study group, 36.2% of respondents believed that onchocerciasis is caused by drinking contaminated water, while it was 29.8% in control group. Study group (30.5%) believed that River Blindness is transmitted through contaminated food/water, while Control group (24.8%) knew that the disease is transmitted through the bite of the black fly. 13.5% and 17.7% of study group and control group respectively believed witchcraft is the cause of onchocerciasis.

Table 3. Heard of onchocerciasis and sources of information by the respondents

Variables	Study group		Control group	
	N = 141	%	N = 141	%
<b>Heard of onchocerciasis before:</b>				
Yes	71	50.4	90	64.0
No	70	49.6	51	36.0
<b>Sources of information:</b>				
Health worker	21	30.4	17	19.1
Radio/Television	13	18.4	29	31.9
Neighbor	2	2.8	4	4.3
School	13	18.4	19	21.3
Church	3	3.6	9	10.6
No idea	18	26.2	12	12.8

Table 3 shows that 50.4% and 64% of respondents among the study and control groups respectively had heard onchocerciasis. Health workers 30.4% were the major sources of information for study group, while it was radio/television 31.9% for the control group.

Table 4. Respondent's attitudes and practices towards onchocerciasis

Variables	Study group		Control group	
	N =141	%	N=141	%
Is it important to know more about onchocerciasis?				
Yes	102	72.3	137	97.2
No	23	16.3	4	2.8
Don't know	16	1.4	0	0.0
Are you satisfied with receiving drugs from CDDs?				
Yes	59	42.0	42	30.0
No	82	58.0	99	70.0
Do you think it is important to take drugs as at when given by CDDs?				
Yes	110	78.0	124	84.9
No	31	22.0	17	12.1
Have you participated in the CDTI program before?				
Yes	35	25.0	21	15.0
No	106	75.0	120	85.0
Do you take the drug Mectizan?				
Yes	61	43.3	43	30.5
No	80	56.7	98	69.5
Do black flies interfere with your occupation/				
Yes	48	34.0	31	22.0
No	26	18.5	59	41.8
Not known	67	47.5	51	36.2
Do you control the black flies?				
Yes	117	83.0	55	39.0
No	24	17.0	86	61.0
Have you missed any dosing round for ivermectin before				
Yes	65	46.1	42	29.8
No	76	53.9	99	70.2
Do you have challenges getting drugs from the CDDs?				
Yes	34	24.0	37	26.0
No	107	76.0	104	74.0

Table 4 shows that most respondents in the study group (78.0%) and control group (84.9%) think it is important to take the drugs as at when given by the CDDs. Majority of the respondents both in the study and control groups, 75% and 85% respectively have not participated in the CDTI Programme at one time or the other before. In addition, majority of the respondents in the study group (56.7%) and in the control group (69.5%) claimed that they do not take ivermectin.

Table 5. Effect of Health Education on knowledge, attitude and Practices towards onchocerciasis

Variables	Study Group				X <sup>2</sup>	P-Value	Control Group				X <sup>2</sup>	P-Value
	Pre-Intervention		Post-Intervention				Pre-Intervention		Post-Intervention			
	N	%	N	%			N	%	N	%		
What is Onchocerciasis:												
Disease	57	40.4	88	26.4			58	41.2	62	44.0		
Type of blindness	41	29.1	21	15.0			56	39.7	53	37.6		
River	37	26.3	14	10.0			20	14.2	21	14.9		
Drug	1	0.7	8	5.7			2	1.4	1	0.7		
Fly	1	0.7	9	6.4	27.879	0.038	1	0.7	3	2.1	5.153	0.094
Not known	4	2.8	1	0.7			4	2.8	1	0.7		
What causes onchocerciasis?												
Drinking contaminated water	43	30.5	13	9.2			32	22.7	35	24.8		
Bad blood from mosquitoes	34	24.6	35	24.8			35	24.8	20	14.2		
Filarial worm (Arikwa)	29	20.6	55	39.0	46.851	0.047	15	10.6	43	30.5	7.657	0.634
Strange body sensations	7	5.0	12	8.5			13	9.2	14	10.0		
Witchcraft	19	13.5	8	5.7			25	17.7	4	2.8		
Not known	9	6.4	17	12.0			21	15.0	25	17.7		
Transmission of onchocerciasis:												
Through contaminated food/water	34	24.0	85	60.3			35	24.8	49	34.8		
Through mosquito bite	29	20.6	22	15.6			15	10.6	13	9.2		
Contact with infected person	50	35.5	7	5.0	16.296	0.037	13	9.2	1	0.7	16.296	0.079
Can not be transmitted	19	13.5	12	8.5			25	17.7	22	15.6		
Not known	9	6.4	7	4.9			21	15.0	32	22.7		
Drug of choice for infected person:												
Ivermectin (Mectizan)	78	55.3	103	73.3			71	50.3	75	53.2		
Malaria tablets	27	19.1	10	7.1			10	7.1	5	3.5		
Haematinics	16	11.4	2	1.4	22.395	0.0246	18	12.8	18	12.8	8.554	0.086
Herbs and concoctions	9	6.4	10	7.1			15	10.6	15	10.6		
Not known	11	7.8	16	4.2			27	19.2	28	19.9		
Is it important to know more about onchocerciasis?												
Yes	102	72.3	119	84.4			137	97.2	113	80.2		
No	23	16.3	22	15.6	17.331	0.043	4	2.8	16	11.3	21.066	0.028
Don't know	16	11.4	0	0.0			0	0.0	12	8.5		

Table 5 shows there is a statistically significant difference between pre and post intervention among study group on the knowledge of what is onchocerciasis ( $X^2=27.879$ ,  $df=4$ ,  $P=0.038$ ), the causative agent of onchocerciasis ( $X^2=46.851$ ,  $df=5$ ,  $P=0.047$ ) and mode of transmission of onchocerciasis ( $X^2=16.296$ ,  $df=5$ ,  $P=0.037$ ). In the control group, there is no statistically significant difference in their response on the knowledge of what is onchocerciasis ( $X^2=5.153$ ,  $df=4$ ,  $P=0.094$ ), the causative agent of onchocerciasis ( $X^2=7.657$ ,  $df=5$ ,  $P=0.634$ ) and mode of transmission ( $X^2=16.296$ ,  $df=5$ ,  $P=0.079$ ).



Table 6. Knowledge, Attitude and Practices of Respondents Before and after Health Education

Variables	Study Group					Control Group						
	Pre-Intervention		Post-Intervention		X <sup>2</sup>	P-Value	Pre-Intervention		Post-Intervention		X <sup>2</sup>	P-Value
	N	%	N	%			N	%	N	%		
Knowledge of Respondents												
Poor	49	30.0	20	14.2	37.814	0.046	42	29.8	43	30.5	1.756	0.416
Fair	72	51.0	57	40.4			76	53.9	67	47.5		
Good	20	14.0	64	45.5			23	16.3	31	22.0		
Attitude of Respondents												
Poor	80	56.7	81	57.5	35.908	0.278	99	70.2	106	75.2	1.757	0.415
Fair	36	25.5	34	24.1			27	19.2	26	18.4		
Good	25	17.8	26	14.2			15	10.6	9	6.4		
Practice of Respondents												
Good	117	82.9	113	80.0	21.378	0.539	65	48.9	66	46.8	12.532	0.246
Poor	24	17.1	28	20.0			76	51.1	75	53.2		

Table 6 shows that there is a statistically significant difference in knowledge of respondents in the study group before and after intervention ( $x^2=37.814$ ,  $P=0.046$ ), while there is no statistically significant difference in the knowledge of Respondents in control group before and after intervention ( $x^2= 1.756$ ,  $p = 0.416$ ). On the attitude of respondents there is no statistically significant difference in the study group and control group before and after intervention ( $x^2 = 35.908$ ,  $P=0.278$ ) and ( $x^2 = 1.757$ ,  $P = 0.415$ ) respectively. There is also, no statistically significant difference in the practice of respondents in the study and control groups before and after intervention ( $x^2=21.378$ ,  $P= 0.539$ ) and ( $x^2 = 12.532$ ,  $P=0.246$ ) respectively.

Table 7. Effect of Educational status on the Knowledge, Attitude and Practices of Respondents in study and control groups before intervention

Variables	Knowledge													
	Study Group					X <sup>2</sup>	P Value	Control Group					X <sup>2</sup>	P value
	Poor	Fair	Good	N	%			Poor	Fair	Good	N	%		
Educational Status														
Non-formal	12	8.5	6	4	2	23.452	0.032	13	9.2	4	5	4	33.237	0.026
Primary	19	13.5	9	7	3			15	10.6	4	6	5		
Secondary	94	66.7	31	28	35			74	52.5	29	19	26		
Tertiary	6	11.3	1	1	4			39	27.7					
Attitude														
Non formal	12	8.5	7	4	1	15.259	0.018	13	9.2	3	5	5	21.872	0.037
Primary	19	13.5	12	4	3			15	10.6	4	4	7		
Secondary	94	66.7	27	37	30			74	52.5	28	16	30		
Tertiary	6	11.3	1	2	3			39	27.7	7	12	20		
Practice														
Non formal	12	8.5	5	3	4	3.176	0.038	13	9.2	7	3	3	8.793	0.042
Primary	19	13.5	9	4	6			15	10.6	6	7	2		
Secondary	94	66.7	22	30	4			74	52.5	24	18	3		
Tertiary	6	11.3	0	2	4			39	27.7	2	14	23		

Table 7 shows that the effect of educational status on knowledge ( $\chi^2 = 23.452, P=0.032$ ), attitude ( $\chi^2=15.259, P=0.018$ ) and practice ( $\chi^2=3.176, P=0.038$ ) of Respondent is statistically significant in both the study and control groups.

Table 8. Effect of occupation on the Knowledge, Attitude and Practices of Respondents in study and control groups before intervention

Variables	Knowledge													
	Study Group		Poor	Fair	Good	X <sup>2</sup>	P Value	Control Group		Poor	Fair	Good	X <sup>2</sup>	P value
	N	%	N	N	N			N	%	N	N	N		
Occupation of Respondents														
Unemployed	0	0.0	0	0	0	32.648	0.001	22	15.6	7	8	7	46.852	0.002
Student	80	56.7	25	29	26			67	47.5	13	26	28		
Farming	27	19.1	13	7	7			11	7.8	8	1	2		
Trading	5	3.6	1	2	2			10	7.1	6	2	2		
Civil Servant	28	19.9	3	9	16			29	20.6	5	11	13		
Others	1	0.7	1	0	0			1	1.4	1	0	0		
Attitude														
Unemployed	0	0.0	0	0	0	16.883	0.077	22	15.6	9	9	4	23.892	0.065
Student	80	56.7	19	29	32			67	47.5	26	17	24		
Farming	27	19.1	10	11	6			11	7.8	6	3	2		
Trading	5	3.6	3	1	1			10	7.1	4	4	2		
Civil Servant	28	19.9	6	14	8			29	20.6	4	10	15		
Others	1	0.7	0	1	0			1	1.4	0	0	1		
Practice														
Unemployed	0	0.0	0	0	0	24.862	0.002	22	15.6	8	10	4	19.452	0.004
Student	80	56.7	37	29	14			67	47.5	19	28	20		
Farming	27	19.1	14	7	6			11	7.8	3	6	2		
Trading	5	3.6	2	2	1			10	7.1	3	4	3		
Civil Servant	28	19.9	3	20	5			29	20.6	10	7	12		
Others	1	0.7	1	0	0			1	1.4	0	1	0		

Table 8 shows that the effect of occupation on knowledge ( $\chi^2 = 32.648, P = 0.001$ ) and practice ( $\chi^2 = 24.862, P=0.002$ ) of Respondents is statistically significant in both the study and control groups. However, its effect on attitude is not statistically significant in both the study and control groups ( $\chi^2=16.883, p=0.077$ ).

#### 4. Discussion

Our study examined the effect of health education intervention towards improving the knowledge, attitudes and practice (KAP) on onchocerciasis among residents of Enugu State. Most respondents in the study and control groups pre-intervention knew that onchocerciasis is a disease and that blindness is one of the symptoms of the disease. This may probably be due to the endemicity of the disease in the study area. However, majority of the respondents in both the study and control groups, 51 (36.2%) and 42 (29.8%) respectively believed that onchocerciasis is caused by drinking of contaminated water. This study also revealed that a good number of the respondents do not know the mode of transmission of onchocerciasis. Only 34 (24.0%) in the study group and 35 (24.8%) in the control group that onchocerciasis can be transmitted through black flies. Majority of the respondents both in the study group 43 (30.5%) and in the control group 32 (22.7%) believed that the disease can be transmitted through contaminated food and water. Misconceptions about the mode of transmission of onchocerciasis by majority of the respondents in this study is consistent with the findings of a study conducted in

Quara District, North Western Ethiopia, in which majority of the participants held at least one misconception about the mode of transmission of disease (Weldegereal, Medhin, & Weldegbriel, 2014). Majority of the respondents 78 (55.3%) in the study group and 71 (50.3%) in the control group, however, knew that ivermectin (Mectizam) is the choice drug for treatment of onchocerciasis. This high percentage of knowledge of ivermectin as choice drug for treatment of onchocerciasis and the corresponding significant increase in the knowledge of ivermectin as choice drug for treatment of onchocerciasis after the health education intervention show that the CDDs and other public health workers (PHWs) concentrate more on the treatment aspect of their job which includes public health education on the aetiology and control of the disease. This is similar to the findings in a study by Brieger et al in which the post-intervention showed an increase in the number of villagers from 1.6% to 19.3% who could identify tablets as a form of treatment, and this also showed that PHWs concentrate on the treatment aspect of their job (Brieger, Ramakrishna, & Adeniyi, 2008).

In our study, majority of the respondents both in the study group 80(56.8%) and the control group 98(69.5%) do not take ivermectin. Among those that do not take ivermectin, 14(17.5%) in the study group and 20(20.4%) in the control group believed incompetence of the CDDs was the reason for not taking the drug. These findings may be attributed to poor health seeking behavior similar to the findings of a study by Adeoye et al which showed that respondents do not see onchocerciasis as a serious health problem (Manafa, Awolola, & Isamah, 2003). Those who claimed to control the vector in the study group and control groups was 117 (83.0%) and 79 (56%) respectively. Most respondents claimed that they protect themselves from the bites of black flies by putting on clothes that covers the arms and goes down to the ankles e.g, long sleeve shirts and trousers, wrappers etc.

The respondents in the study group showed a statistically significant difference in their response before and after the health education intervention concerning the knowledge on onchocerciasis. Our findings are similar to what was reported in a study among school children in Okpatu, Nigeria, where a statistically significant higher proportion of the children knew about causative agent, clinical manifestation, diagnosis, treatment, and prevention of onchocerciasis post intervention (Shu, Okonkwo, & Onwujekwe, 2008). Our study also revealed that only 26 (14.0%) and 23 (16.3%) of respondents in the study and control groups respectively have good knowledge, and only 25 (17.8%) and 15 (10.6%) have good attitude towards onchocerciasis both in the study group and in the control group. This is consistent with the findings of a study by Weldegebreal et al, where the values for good knowledge and attitude were below average (Brieger, Ramakrishna, & Adeniyi, 2008). Another study reported a significant increase in knowledge of respondents, when the results of the pre-intervention was compared to post intervention survey, which took place about one month after the health education intervention among the study group (Aireen, 2014). However, the findings of our study showed there was no significant increase in the attitude and practice of respondents before and after health education intervention. This is contrary to the result of the study conducted in Osse, Ondo State Nigeria, where a significant increase in the knowledge, attitude and practice of respondents was reported (Manafa, Awolola, & Isamah, 2003). However the difference could be attributed to difference in socio-cultural beliefs and health seeking behaviour of the respondents. The findings of this study showed that the effect of Educational status on knowledge, attitude and practice was statistically significant in the study and control groups. Also in this study, occupation was shown to have a statistically significant effect in knowledge and practice, but not on attitude.

## 5. Conclusion

Majority of the respondents in this study do not have good knowledge and attitude on onchocerciasis. However, most of the respondents have good practice on the disease which is mostly due to protection from the flies during occupational activities and the CDDs concentration on the treatment aspect of their job. From this study, health education was shown to significantly improve knowledge on onchocerciasis in the study group, which can subsequently influence their attitude and practice.

## 6. Recommendations

In view of the findings from this study, it is recommended that regular community-based health education become an important part of the onchocerciasis control programme.

Community Directed Distributors and other health workers in these communities should not only focus on the distribution aspect of the CDTI programme, but should equally focus on conducting health education, just before the drug distribution exercise, in order to sensitize and improve participation of community members.

## Ethics Approval and Consent to Participate

Approval for the study was obtained from the ethical committee of the University of Nigeria Teaching Hospital, Enugu. Written consent was obtained from all respondents. The same type of health education given to the

intervention group was offered to the control group at the end of the study.

#### **Consent to Publish**

All authors consented to publish in the Global Journal of Health Science.

#### **Availability of Data and Materials**

Some materials such as administered questionnaires are still available, but the data stored in SPSS is not longer available. The research was conducted about two years ago

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#### **Authors Contribution**

Omotowo participated in study design, analysis, interpretation and revised the manuscript. Ezeoke participated in study design and revised the manuscript. Ajuba participated in data collection, analysis. Ogochukwu participated in study design, data collection and written the manuscript, while Meka participated in data collection and analysis. Eyisi participated in study design and data analysis. All authors read and approved the final manuscript.

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#### **Competing Interests Statement**

The authors declare that there are no competing or potential conflicts of interest.

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