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Knowledge of the preventive strategies of onchocerciasis among the inhabitants of riverine areas in southeast Nigeria

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Abstract
This study determined the knowledge of the preventive strategies of Onchocerciasis among the Inhabitants of Riverine Areas in Southeast Nigeria. The study was guided by eight research questions and six null hypotheses. Descriptive survey design was used and the population of the study consisted of 4,177,828 of inhabitants in Anambra State and 3,927,563 of inhabitants of riverine areas in Imo State. The sample consisted of 1,200 inhabitants of the riverine areas in Anambra and Imo state selected using multi-stage procedure. The instruments for data collection Knowledge of the Preventive Strategies for Oncherciasis (KOPSO) It gave a reliability coefficient of 0.88 for section B and section C gave a coefficient of internal consistency of 0.90. Research questions were answered using Aggregate scores. frequencies and percentages were used to answer research questions, Chi-Square, statistics were used to test the hypotheses. The results showed that majority of the in Anambra and Imo states riverine inhabitants have knowledge of the preventive strategies of Onchocerciasis. There were significant differences in the knowledge of the preventive strategies of Onchocerciasis based on their educational Level, occupation and age except for their based on age, which has no significant different in the riverine inhabitants in their knowledge of Onchocerciasis. The following recommendations were made among others: There should be Community-based Campaigns on the knowledge and preventive strategies of Onchocerciasis for the Inhabitants of Riverine areas.

Keywords: knowledge, onchocerciasis, inhabitants

Introduction

Modification of lifestyle has been a problem to many. That may be the reason people are infected with most of the preventable diseases. The adage that says that prevention is better as well as cheaper than cure is a common saying, yet people find it very difficult to adhere to it. Today, the world is ravaged by diseases. One of the commonest of such diseases among riverine inhabitants is onchocerciasis which is otherwise known as river-blindness. Onchocerciasis according to Michele (2018) [18] is an infectious disease caused by the filarial worm Onchocerca volvulus and is one of the neglected tropical diseases (NTD). Onchocerciasis is transmitted by the bite of blackfly simulium damnosum which breeds in fast flowing streams and rivers. The disease is also termed river blindness because the vector, the blackfly, is commonly found in areas where there are rapidly flowing streams and rivers. The common manifestation of the infection is blindness. The disease is also known for causing skin lesions with severe itching, a serious eye lesion and blindness known as river blindness. It is a chronic and slowly progressive disease (Beteab and Abiyu 2019) [4].

According to Robyn (2020) [24], Onchocerciasis, or river blindness, is caused by the tiny parasite worm Onchocerca vovulus, which is passed on to humans after being bitten by an infected blackfly. Most of the physical discomforts people experience when they have river blindness happen when the worms die which can happen years after becoming infected. The disease causes blindness, lifelong human suffering, and grave socio-economic problems (Nworie *et al*., 2014) [20]. Other Socio- economic effects of infection with Onchocerciasis include abandonment of farmlands leading to food insecurity, poor school attendance, sometimes, resulting from children having to drop out of school to assist blind parents/guardians, terrible itching and skin diseases and disfiguring leading to stigmatization of infected people by their healthy counter parts. Individuals with symptomatic infection have been found to spend an additional 15 percent of their annual income on healthcare which contribute to poverty (Fischer and Butter, 2002).

The knowledge riverine inhabitants have of the aetiology and preventive strategies for onchocerciasis are not clearly understood. The term knowledge is a fluid mix of framed experiences, values, contextual information and expert insight that provide a framework for evaluating and incorporating new experiences and information (Bolisani and Bratianu, 2018) [5]. It is the fact or condition of knowing something with familiarity gained through experience, education or association. According to Damina and Julia (2013), health practitioners generally agree that health knowledge consisting mainly in the aetiology of common diseases within one's immediate surroundings is important for a healthy living. The knowledge of the aetiology and preventive measures taken to reduce river blindness are varied among riverine inhabitants in Anambra state. Some of the inhabitants believe

that the disease is caused by witchcraft, some see it as ancestral curse; others see it as being caused by having sexual intercourse with already infected persons. Some inhabitants believe that it is caused by insect bite. Adequate knowledge of inhabitants of riverine areas of the aetiology of this disease may, therefore, play significant role in the reduction of the endemic.

Ideally, onchocerciasis also known as river blindness or Robles disease is vector born and is characterised by dermatologic, ophthalmologic, lymphatic and sometimes systemic manifestations. The parasite is transmitted from human to human through the bites of blackfly, vector of the genus Simulium, (WHO, 2011) [31]. Simulium (blackflies) breed in fast-flowing rivers and streams, thereby increasing the risk of infections among people living around such habitats. The true knowledge of diseases such as onchocerciasis and their aetiology may enables one to avoid lifestyles, practices and occasions that may constitute risk factors for onchocerciasis. Exposure to knowledge of the aetiology of onchocerciasis may also help individuals to adopt effective preventive strategies to reduce that cause.

Preventive strategy is a concept that refers to upstream interventions which seek to help people maintain or improve their health before it is compromised, (Centre for Disease Control (CDC), 2010). Preventive strategy stands in contrast to the traditional role of health care system that seek to restore health once it has already come under threat. In the present study, prevention strategies are interventions directed at averting the occurrence of specific disease, reducing its incidence and prevalence across generations, in a given population. Prevention strategy as conceived in the present study could either be intervention to stop occurrence or to slow the progression of the disease and prevent complications. They should be among the commonest measures taken traditionally by riverine inhabitants to reduce the menace of onchocerciasis in the communities. It is important for them to stay healthy and to reduce overall health challenges.

In most riverine areas, some of the riverine inhabitants believe that the disease would be prevented by removal of the nodules of the growing worm while some believe it could be prevented through taking local potions and concoctions. Some believe also that it could be prevented by spiritual bath and avoidance of sexual intercourse with infected persons. Some inhabitants also believe that it could be prevented by burning weeds in the farms to drive insects away. All over the world, the best preventive approaches for onchocerciasis control is the broad spectrum therapy ivermectin. Removal of nodules from infected people and control of vector, blackflies, are often also adopted as strategies to minimize and prevent reinfection, (Adesina, Awosolu, and Olusi, 2017) [3].

Onchocerciasis was first reported in Northern Nigeria by Pearson, (1908). Anierobi (2010) found microfilariae of oncho-volvulus in skin of 55 out of 100 prisoners in Kaduna. In Anambra and Imo States, there are so many towns and villages located in riverine areas, which makeindividual in those states vulnerable to Onchocerciasis disease. A study by Michele (2018) [18] showed that in a previously hyperendemic rainforest area with a nodular rate of 40 percent in Anambra State, a cross-sectional survey of 894 subjects after a decade of Community Directed Treatment with Ivermectin (CDTi) identified nodules in 86 (9.62%) persons and 186 (20.81%) had one or more forms of onchocercal skin disease. There was a total absence of onchocercal skin disease (OSD) in children less than 10 years old and only 5 (5.43%) with OSD in the second decade of life, indicative of some encouraging success of the community-directed use of ivermectin (CDTi) programme (Ogbonna and Ikani, 2020) [21].

The rate of African Programme for Onchocerciasis (APOD), however, increased with age up to the third decade and decreased thereafter suggesting on-going transmission, either due to poor compliance, low coverage of treatment and poor knowledge of the aetiology and preventive measures. Dozie, Onwuliri and Nwoke (2004), investigated human infection with Onchocerca volvulus in 13 rural communities in the upper Imo basin, Imo State Nigeria, between March 1997 – December 2000, using the skin snip method. Of the 3,311 persons examined, 889 (26.8%) had microfilariae. First vector contact occurs when children visit streams to swim, to fetch water for domestic use or for other purposes. Later in life, exposure continues during farming and other adult occupations like fishing. Resistance development is limited and the age related prevalence and intensity, therefore, shows a gradual increase. In the highly endemic areas where there is frequent exposure to infective vectors from early childhood, infection is contracted early in life (Uttah 2010) [28].

According to Adesina *et al*., (2017) [3] Africa has been estimated to have approximately 85 million people who are at risk of the onchocerciasis infection. At present, approximately 20 million people are infected with O. volvulus, the aetiologic agent of the disease. Earlier studies by Dori, Belete, Panicker and Hailu (2012) [9] showed that Africa including Nigeria was estimated to have nearly 99 percent of the cases of prevalence of onchocerciasis related diseases. Nigeria of all the countries of the world has the greatest number of persons with onchocerciasis, (Evans, *et al*., 2011; Okanlawon and Osanyintolu, 2012) [10]. Visual impairment due to onchocercal eye disease was demonstrated in about 30 percent of children aged 5years who live in hyper-endemic communities in Nigeria; 35 percent of males and 27 percent of females in such riverine communities are visually impaired at the age of 30years (Uttah, 2009) [29]. The knowledge about the aetiology of disease and the possible preventive strategies seem not to be known among the riverine inhabitants, hence, the disease has continued to ravage them (Onowhakpor, Okojie and Wagbatsoma, 2016) [22].

Riverine areas are inland or coastal areas comprising both land and water, characterized by limited land lines of communication, with extensive water surface and inland waterways that provide natural routes for surface transportation and communications (United Nations Education Scientific and Cultural Organization (UNESCO, 2020). Riverine areas are mostly located along edges of rivers, streams and creeks and include rivers,

floodplains, marshes, and lakes. They mostly have freshwater with some basic features such as unidirectional flowing water erosion, downstream transportation, and deposits of sediment links to floodplains.

Purpose of the Study

The main purpose of this study was to determine the percentage of the riverine inhabitants with knowledge aetiology and the preventive strategies of onchocerciasis among the inhabitants of the riverine areas in Southeast, Nigeria.

1. preventive strategies of onchocerciasis.
2. preventive strategies of onchocerciasis based on their age.
3. preventive strategies of onchocerciasis based on their educational level.
4. preventive strategies of onchocerciasis based on their occupation.

Research Questions

1. riverine inhabitants in Anambra and Imo states that have the knowledge of the preventive strategies for onchocerciasis?
2. riverine inhabitants in Anambra and Imo states that have the knowledge of the preventive strategies for onchocerciasis based on their ages?
3. riverine inhabitants in Anambra and Imo states that have the knowledge of the preventive strategies for onchocerciasis based on their educational level?
4. riverine inhabitants in Anambra and Imo states that have the knowledge of the preventive strategies for onchocerciasis based on their occupation

Hypotheses

1. There will be no significant difference in the percentage of riverine inhabitants in Anambra and Imo states on their knowledge of preventive strategies for onchocerciasis based on their age.
2. There will be no significant difference in the percentage of the riverine inhabitants in Anambra and Imo states on their knowledge of preventive strategies for onchocerciasis based on their educational levels.
3. There will be no significant difference in the percentage of the riverine inhabitants in Anambra and Imo states on their knowledge of preventive strategies for onchocerciasis based on their occupation.

Methods

The design that was adopted for this study was a descriptive survey design. The study was be carried out in two states of South East Nigeria, Southeast. Southeast is one of the six geopolitical zones in Nigeria representing both a geographic and political region of the country. Anambra state has a population of 4,177,828 (2006 census), and a population density of 862.The states account for 2.97 percent of Nigeria's total population (Zaccheus Onumba Dibiaezue Memorial Libraries 2022). The sample size for the study which comprises of 1,200 Anambra and Imo states riverine inhabitants were used for the study. Multistage sampling procedure was employed to draw sample for the study. The first stage involved the use of sample random sampling of balloting without replacement, sampling to select two states in South East Nigeria namely, Anambra and Imo states. The second stage involved the use of simple radon sampling technique to select six Local Government Areas, each from Anambra and Imo states respectively, producing a total of 12 Local Government Areas. The third stage involved the use of convenience sampling technique to draw five towns each from the sampled Local Government Areas. This produced a total of sixty communities used for the study. Furthermore, 20 riverine inhabitants were equally drawn from each of the sampled communities to produce a total of 1200 riverine inhabitants used for the study. The instrument for data collection was a test developed by the researcher. Construction of the text items was done based on the literature review and interactions with the inhabitants of riverine areas on onchoncerciasis. The test titled 'Knowledge of the preventive strategies of Onchoerciasis (KOPSO). The data generated for the study were analysed using, descriptive statistics of frequencies and percentages to answer the research questions. Chi Square statistics was used to test the hypotheses, at 0.05 level of Significance The decision rule was that whenever p-value (Probability Value) was less than or equal to 0.05, the null hypothesis was rejected; otherwise, the null hypothesis was accepted.

Presentation and Analysis of Data

Research Question 1

What percentage of riverine inhabitants in Anambra and Imo states have the knowledge of the preventive strategies for onchocerciasis?

Table 1: Percentages of Riverine of Inhabitants in Anambra and Imo States with Knowledge of Preventive Strategies of Onchocerciasis

	N	%
Knowledgeable	1035	88.5
Not Knowledgeable	135	11.5
Total	1170	100.0

The results presented in Table 1 shows that out of total respondents, 88.5% have knowledge of preventive strategies of onchocerciasis while 11.5% do not have knowledge of preventive strategies of onchocerciasis.

Research Question 2
What percentage of riverine inhabitants in Anambra and Imo states have the knowledge of the preventive strategies for onchocerciasis based on their ages?

Table 2: Percentage of Riverine Inhabitants in Anambra and Imo States with Knowledge of Preventive Strategies of Onchocerciasis Based on their Age

Knowledge of Preventive Strategies	15-24	25-34 years	35-44 years	45+	Total
	N (%)	N (%)	N (%)	N (%)	N (%)
Knowledgeable	119 (10.2)	221 (18.9)	400 (34.2)	295 (25.2)	1035 (88.5)
Not Knowledgeable	12 (1.0)	16 (1.4)	48 (4.1)	59 (5.0)	135 (11.5)
Total	131 (11.2)	237 (20.3)	448 (38.3)	354 (30.3)	1170 (100)

Results displayed in Table 2 shows that 10.2% of the total respondents between 15-24 years have knowledge of preventive strategies of onchocerciasis while 18.9% of those between 25-34 years have knowledge of the preventive strategies of onchocerciasis. Again, 34.2% of respondents between 35-44 years have knowledge of preventive strategies of onchocerciasis whereas 25.2% of those 45 years have knowledge of preventive strategies of onchocerciasis.
The percentage distribution of those that do not have knowledge of preventive strategies of onchocerciasis according to age range is 1.0, 1.4, 4.1 and 5.0 percent of those between 15-24, 25-34, 35-44 and 45 years and above respectively.

Research Question 3
What percentage of riverine inhabitants in Anambra and Imo states that have the knowledge of the preventive strategies for onchocerciasis based on their educational level?

Table 3: Percentage of Riverine Inhabitants in Anambra and Imo States with Knowledge of Preventive Strategies of Onchocerciasis Based on their Educational Level

Knowledge of Preventive Strategies	Educational Qualification					Total
	Illiterate	FSLC	WASSCE	BSc/HND	MSc & PhD	
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Knowledgeable	86 (7.4)	181 (15.5)	458 (39.1)	303 (25.9)	7 (0.6)	1035 (88.5)
Not Knowledgeable	18 (1.5)	36(3.1)	59 (5.0)	21 (1.8)	0.1	135 (11.5)
Total	104 (8.9)	217 (18.5)	517 (44.2)	324 (27.7)	8 (0.7)	1170 (100)

As shown in Table 3, 7.4% of illiterates among the total respondents have knowledge of preventive strategies of onchocerciasis while 15.5% of those with FSLC have knowledge of preventive strategies of onchocerciasis. 39.1% of those with WASSCE have knowledge of preventive strategies of onchocerciasis while 25.9% of those with B.Sc/HND have knowledge of the preventive strategies of onchocerciasis. However, only 0.6% of the holders of M.Sc/PhD out of the total respondents have knowledge of preventive strategies of onchocerciasis.
On the other hand, the percentages of those that do not have knowledge of preventive strategies of onchocerciasis based on their educational level are 1.5, 3.1, 5.0 and 1.8 percent of illiterates, holders of FSLC, WASSCE, BSC/HND and MSc/PhD respectively.

Research Question 4
What percentage of riverine inhabitants in Anambra and Imo states have the knowledge of the preventive strategies for onchocerciasis based on their occupation?

Table 4: Percentage of Riverine Inhabitants in Anambra and Imo States with Knowledge of Preventive Strategies of Onchocerciasis Based on their Occupation

Knowledge of Preventive Strategies	Occupation					Total
	Civil servant	Farmer	Fisherman	Trader	Student	
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Knowledgeable	185 (15.8)	418 (35.7)	183 (15.6)	148(12.6)	101 (8.6	1035 (88.5)
Not Knowledgeable	22 (1.9)	43 (3.7)	37 (3.2)	19 (1.6)	14 (1.2)	135 (11.5)
	207 (17.7)	461 (39.4)	220 (18.8)	167 (14.3)	115 (9.8	1170 (100)

The results displayed in Table 4 shows percentage distribution of riverine inhabitants that have knowledge of preventive strategies of onchocerciasis based on their occupational groups. The table reveals that 15.8, 35.7,

15.6, 12.6 and 8.6 percent of total respondents categorized as civil servant, farmer, fisherman, trader and student respectively, have knowledge of preventive strategies of onchocerciasis. On the other hand, 1.9, 3.7, 3.2, 1.6 and 1.2 percent of these occupational groups do not have knowledge of the preventive strategies of onchocerciasis.

Hypothesis 1
There will be no significance difference in the percentage of the riverine inhabitants in Anambra and Imo states on their knowledge of preventive strategies for onchoerciasis based on their age.

Table 5: Chi-Square Analysis on Knowledge of Preventive Strategies of Onchocerciasis Riverine Inhabitants by Age (N=1170)

Knowledge of Preventive Strategies	15-24	25-34years	35-44years	45+	df	X^2	p-value	Decision
	N (%)	N (%)	N (%)	N (%)				
Knowledgeable	119 (10.0	221 (18.9)	400 (34.2)	295 (25.2)				
					3	15.47	.001	S
Not Knowledgeable	12 (1.0)	16 (1.4)	48 (4.1)	59 (5.0)				

The X^2 result in Table 5 shows that riverine inhabitants of different age range are significantly different in their knowledge of preventive strategies of onchocerciasis, X^2 (df,3) = 15.47, p-value < 0.05. Since the p-value was less than 0.05, the null hypothesis was rejected.

Hypothesis 2
There will be no significance difference in the percentage of the riverine inhabitants in Anambra and Imo states on their knowledge of preventive strategies for onchoerciasis based on their educational levels.

Table 6: Chi-Square Analysis on Knowledge of Preventive Strategies of Onchocerciasis Riverine Inhabitants By Educational Levels (N=1170)

Knowledge of Preventive Strategies	Educational Qualification					df	X^2	p-value	Decision
	Illiterate	FSLC	WASSCE	BSc/HND	MSc & PhD				
	N (%)	N (%)	N (%)	N (%)	N (%)				
Knowledgeable	86 (7.4)	181 (15.5)	458 (39.1)	303 (25.9)	7 (0.6)	4	16.95	.002	S
Not Knowledgeable	18 (1.5)	36 (3.1)	59 (5.0)	21 (1.8)	1 (0.1)				

The result displayed in Table 6 shows that riverine inhabitants of different educational levels differ significantly in their knowledge of preventive strategies of onchocerciasis, X^2 (df,4) = 16.95, p-value < 0.05. The null hypothesis was rejected since the p-value was less than 0.05.

Hypothesis 3
There will be no significance difference in the percentage of the riverine inhabitants in Anambra and Imo states on their knowledge of preventive strategies for onchoerciasis based on their occupation.

Table 7: Chi-Square Analysis on Knowledge of Preventive Strategies of Onchocerciasis Riverine Inhabitants by Occupation (N=1170)

Knowledge of Preventive Strategies	Occupation					df	X^2	p-value	Decision
	Civil servant	Farmer	Fisherman	Trader	Student				
	N (%)	N (%)	N (%)	N (%)	N (%)				
Knowledgeable	185(15.8)	418(35.7)	183 (15.6)	148 (12.6)	101(8.6)				
						4	8.43	.077	S
Not Knowledgeable	22 (1.9)	43 (3.7)	37 (3.2)	19 (1.6)	14 (1.2)				

Result displayed in Table 7 indicates that riverine inhabitants of different occupations do not differ significantly in their knowledge of preventive strategies of onchocerciasis, X^2 (df,4) = 8.43, p-value > 0.05. The null hypothesis was not rejected since the p-value was greater than 0.05.

Summary of findings
About 88.5% of riverine inhabitants in Anambra and Imo states of this study had knowledge of the preventive strategies of onchocerciasis.
The highest percentage (34.2%) of the riverine inhabitants in Anambra and Imo states between the ages of 35-44years had the knowledge of preventive strategies of onchocerciasis while the lowest (10.2%) were those between 15 and 24 years. The highest percentage (39.1%) of the riverine inhabitants in Anambra and Imo states with WASSCE had knowledge of the preventive strategies of onchocerciasis while 0.6 percent of them with M.Sc/PhD were ignorant of the disease. The highest percentage (35.7%) of the riverine inhabitants in Anambra

and Imo states who were farmers had the least knowledge of preventive strategies of onchocerciasis and 8.6 percent of students had knowledge of preventive strategies of the disease. There was significant difference in the percentages of the riverine inhabitants in Anambra and Imo states with knowledge of preventive strategies of onchoerciasis based on their age. There was significant difference in the percentages of the riverine inhabitants in Anambra and Imo states with knowledge of preventive strategies of onchoerciasis based on their educational levels. There was significant difference in the percentages of the riverine inhabitants in Anambra and Imo states with knowledge of preventive strategies of onchoerciasis based on their occupation.

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