INTESTINAL HELMINTHASIS IN IDUMUJE-UNOR, ANIOCHA NORTH LOCAL GOVERNMENT AREA, DELTA STATE, NIGERIA.

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Abstract

This study was undertaken to ascertain the prevalence and risk factors for intestinal helminthiasis inIdumuje-Unor, a rural community in Delta State. Sedimentation technique and formalin Ethyl Acetate Concentration were carried out for the determination of helminthiasis eggs in the stool samples. The study showed that out of the 231 individual samples collected and examined, 149(64.5%) were positive for at least one parasitic infection. The result showed that *Ascaris lumbricoides* was the most prevalent accounting for 60.4% while *Trichuris trichuira* accounted for 39.6%. *A. lumbricoides* was the most prevalent with 67(45.0%) cases in female and 23(15.4%) cases in male. This was followed by *T. trichuira* which recorded prevalence of 18(12.1%) in male and 41(27.5%) in female. *A. lumbricoides* was significantly higher ($P < 0.05$) in the study area and mostly in female compared to male. *T. trichuira* was also significantly higher ($P < 0.05$) in the study area as and mostly in female compared to male. Multiple infections were recorded for both male and females for *A. lumbricoides*and *T. trichuira,* respectively. The study showed that children within age 1 – 15 were more infectedwith helminth parasites followed by age 26 – 35 and 16 – 25, respectively. Females accounted for higher prevalence across the different age groups. Risk Factors related to these parasitic infections in the study area showed that individuals whose water source is the hand dug well have a higher prevalence 95(63.8%) than those who use water from Borehole 54 (36.2%). Similarly, individuals who use dug pit as their refuse dumping site had a higher prevalence 4(80.0%) than those who dump their refuse openly 1(20.0%). These data documented the baseline information on prevalence of intestinal helminthic in the study area.

Keywords: Helminthiasis, Idumuje-Unor, Prevalence, Risk factors,

Introduction

Background to the Study

Sub Saharan Africa (SSA) remains the epicenter of communicable diseases with a significant detrimental impact on health indices of its populace (David *et al*., 2020). The area accounts for about 88% of the global burden of children and adolescents living with several parasitic infections of 2019 (UNICEF, 2020). Hundreds of thousands of avoidable deaths are caused each year by parasitic infections, particularly the intestinal helminthes, and these infectious diseases also affect the nutritional status of most children under the age of five (Kpurkpur *et al*., 2016). It has been estimated to affect about 3.5 billion people globally and caused morbidity in approximately 450 million people (WHO, 2020). Records show that a global estimate of 162 million under-five years old children are documented to be stunted, 99 million underweight and 51 million wasted (WHO, 2012).

Developing countries are the most affected, majority being school children because of their poor personal and environmental hygiene. Approximately 1.5 billion people are infected with Soil- Transmitted Helminths globally and children are most affected. Over 267 million preschool-age children and over 568 million school-age children live in areas where these parasites are intensivelytransmitted and require treatment and preventive interventions (WHO, 2020). Infections with intestinal parasites are of medical and public health problem of growing significance, especially in the rural communities of a developing country like Nigeria (Akpan and Abraham, 2011).Several factors such as food habit, complex social and cultural interactions that bring about body contact, sharing of clothing and low body and environmental hygiene have contributed to an increase in the incidence of parasitic infections in recent years (Abange *et al*., 2020). The climatic conditions in this part of the world favor the development and survival of these parasites and their vectors (Oparae*t al*., 2012).

The most important of these factors is the low hygiene or insanitary living conditions inour environments. Large numbers of our people live and work in areas where they are exposed to parasite infections (Babatunde *et al*., 2010; Yiltok *et al.,* 2014).

These parasitic infections are associated with chronic disabilities of approximately 9.0 million Disability Adjusted Life Years (DALYs) yearly; consequently, increasing morbidity and even mortality arising from these infections (Hotez *et al*., 2014; Murray *et al*., 2012). The chronic disability caused by the infections has a negative impact on childhood growth, neurocognitive development, and vital organs (gastrointestinal system, hepatobiliary nervous system, and thegenitourinary system) functions (Akpan and Abraham, 2011).

There are four common species of intestinal helminthic parasites, known as geohelminths and soil transmitted helminths (STHs). They are *Ascaris lumbricoides* (roundworm), *Trichuris trichiura* (whipworm), *Ancylostoma duodenale* and *Necator americanus* (hookworms). Helminth infections are most prevalent in tropical and subtropical regions of the developing countries where adequate water and sanitation facilities are lacking (Tefera *et al*., 2015). They are a major health problem in many developing countries infecting an estimated one-sixth of the global population (WHO, 2016).

Factors enhancing exposure to parasitic helminths most especially *A. lumbricoides* eggs identified by previous studies include the lack of latrine (Strunz *et al*., 2014), defecation practices (Odugbemi *et al*., 2014), geophagia, the level of sanitation in households (Benjamin-Chung *et al.,* 2015) and lower socioeconomic status (Al-Delaimy *et al*., 2015.Simply walking barefoot in areas endemic to hookworm leaves people exposed to the disease. As a result, people can be continually re-infected as they work, play, bathe or eat. Children have a high risk of contracting these diseases, because they often play barefoot outside and put their hands in their mouths without washing them (WHO, 2016). In Nigeria, infections caused by intestinal parasites are a public health problem while poor socio-economic environment is a major factor facilitating the

prevalence of the disease (WHO, 2016). The prevalence rate of intestinal parasites varies considerably in different parts of Nigeria. Studies had shown that *A. lumbricoides* is the most prevalent, followed by hookworms, *T. trichiura and Strongyloides stercoralis* (Samaila *et al.,* 2016; Sam-Wobo and Mafiana, 2006). However, in some parts of Nigeria, hookworm has been reported as the most prevalent (Anosike *et al*., 2006; Azoro *et al*., 2015; Nmorsi *et al.,* 2009). Information on intestinal helminthiasis in Idumuje-Unor, a rural and agro based community is lacking. This investigation is therefore undertaken to ascertain the prevalence of intestinal helminthiasis in our study area in Delta State, Nigeria, thereby enriching the epidemiological data of these infection in Nigeria.

Materials and Methods

Study Area

The study was carried out at Idumuje Unor, situated in the Aniocha North Local Government Area of Delta State. The community lies between 6°20' 01.4" N and 6° 22' 06.5" N and between 6°25' 01.4" E and 6°27' 06.6" E. It is located 5 kilometers from Issele-Uku, the headquarters of Aniocha North and has a growing land area of 16sq km and current estimated population of about 10,000 inhabitants. It is bordered to the west by Onicha-Ugbo, to the North by Idumuje-Ugboko and Ewohinmi in Edo State,to the East by Onicha-Uku and to the south by Issele-Uku (Ogbeche, 2007).

The area falls within the rainforest vegetation with a mean annual rainfall of 1500mm. The occupation of the people is mainly farming, and their main agricultural produce are cassava and yam. Several unhygienic practice such as open defecation, poorly managed waste dumpsites are carried out in the village. The village also has poor drainage systems.

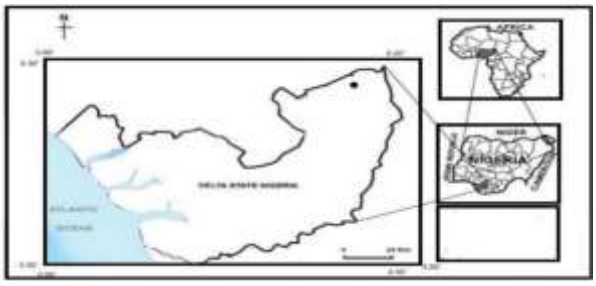

Figure 1. Map of Delta State showing the study are

Community Mobilization

Prior to commencement of the study, meeting was held with the community head who mandated the town crier to request the interested participants to assemble at the community primary health center (PHC). After the explanation of the purpose and procedures to the participants, the consenting volunteers were recruited for the study,

Sample Size Determination

Sample size of two hundred and thirty-one (231) used for this study was determined according toNaing et al. (2006), using the formula:

Where:

n = sample size

z = statistic correspondence to level of confidence (95%)

p= Exceptional prevalence (from most recent study)

d= Precision (corresponding to effect size)

Inclusion and Exclusion Criteria

The inclusion criteria were based on participants who gave informed assent or whose parents/guardians gave informed consent. Subjects with gastrointestinal disorders manifesting as diarrhea, dysentery, abdominal pain, bloating and nausea. The volunteer who have received anti-parasitic drugs two weeks preceding the study was excluded.

Sample Collection

Each enrolled participant was given a sterile specimen bottle for stool sample collection, which after collection was transported immediately to the Department of Animal and Environmental Biology Laboratory of the Delta State University, Abraka, Nigeria, for examination for the presence of helminth parasites using sedimentation technique and formalin Ethyl Acetate Concentration.

Results

Helminths Prevalence by Sex of Respondents

The study showed that out of the two hundred and thirty-one (231) individual samples collected and examined, 149(64.5%) were positive for at least one parasitic infection. Females had higher prevalence of (117)78.5% than their counterparts male (32) 21.5%. This difference is statistically significant ($P < 0.05$).

The prevalence of intestinal helminthes in Idumuje Unor community Aniocha North Local Government Area of Delta State is presented in Table 4.2. The result showed that *Ascaris lumbricoides* was the most prevalent accounting for 60.4% while *Trichuris trichuira* accounted for 39.6%. Based on sex, *Ascaris lumbricoides* was the most prevalent with 23 (15.4%) cases in male and 67 (45.0%) cases infemale. This was followed by Trichuris trichuira which recorded prevalence of 18(12.1%) in male and 41 (27.5%) in female. A. lumbricoides was significantly higher ($P<0.05$; $P=0.001$) in the study area as and mostly in female compared to male. T. trichuira was also significantly higher ($P<0.05$; $P=0.003$) in the study area as and mostly in female compared to male. Multiple infections were recorded for bothmale and females for *A. lumbricoides* and *T. trichuira* ($P<0.05$; $P=0.111$).

Table 4.1: Percentage prevalence of helminthes infection among males and females

Age Group	Total Number Examined			Number Infected		Total Number Infected
	Male	Female	Total	Male	Female	Total
1-15	10	23	33	9	23	32
16-25	13	28	41	6	20	26
26-35	11	28	39	8	21	29
36-45	6	21	27	3	18	21
46-55	11	31	42	2	16	18
≥56	13	36	49	4	19	23
Total	**64(27.7%)**	**167(72.3%)**	**231**	**32(21.5%)**	**117(78.5%)**	**149**

	231(100%)	149(64.5%)

Table 4.2: Prevalence of intestinal helminthes in Idumuje Unor community Aniocha NorthLocal Government Area of Delta State

Helminth Parasites	Total Number Infected	Male		Female		p-value
		No. of Positive Cases	% Prevalence	No. of Positive Cases	% Prevalence	
Ascaris lumbricoides	149	23	15.4	67	45.0	0.001
Trichuris trichuira	149	18	12.1	41	27.5	0.003
Multiple infections	149	11	7.4%	27	18.1	0.111
Overall prevalence	149	52	34.9	137	90.6	0.000

Risk Factor of Intestinal Helminthes

Risk factors associated with intestinal helminthes in Idumuje Unor community Aniocha North Local Government Area of Delta State shows that individuals who their source of water is the hand dug well have a higher prevalence 95(63.8%) than those who use water from Borehole 54 (36.2%). Similarly, Individuals who use the pit latrine as their toilet facility had the highest prevalence of81(54.4%), this was followed by those who use the water closet system with prevalence of 43(28.8%). Those who use the bush had the least prevalence of 25(16.8%) (Table 4.7).

Table 4.7: Risk factor related data of intestinal helminthes in Idumuje-Unor communityAniocha North Local Government Area of Delta State

	No Examined	Positive	% Prevalence
Source of Water:			
River/stream	-	-	-
Borehole	121	54	36.2
Hand dug well	110	95	63.8
Toilet Facility			
Water closet	87	43	28.8
Pit Latrine	113	81	54.4
Bush	31	25	16.8

Discussion

The study recorded a prevalence of intestinal helminthes of 64.5% which denotes high level of prevalence and related to the poor level of hygiene in our study area. The prevalence of helminthiasis recorded in this study was higher compared to 6.6-25.8% reported in Abeokuta, Ogun State by Sam-Wobo *et al.* (2012) and Akingbade *et al.* (2013). Similar prevalence has previously been reported by Egwunyenga and Ataikiru (2005), Nmorsi *et al.* (2009), Prosper *et al.* (2014) and Ito and Egwunyenga (2017). The prevalence rate in our study area appears lower than the reports Ugbomoiko *et al.* (2006), who conducted a study in Oba Ile, Osun State and reported helminth prevalence of 95.7%. Other studies across Nigeria had reported prevalent values of helminths between 75% and 90% (Ejima and Ajogun, 2011; Auta *et al.*, 2014). This high prevalence rate calls for public health concern taking into consideration the possible ill-health effects caused by helminth parasites infections (Taiwo *et al.*, 2017).

This study reported that *Ascaris lumbricoides* was the most prevalent accounting for 60.4%. This does not agree with the study by Tunrayo *et al.*, (2017) where hookworm was the most prevalent helminth observed in Mawuko and Isolu communities at 21% and 18%, respectively. The disparity in this study could be related to related to factors such as different sampling areas, types of ethnic groups in the study locations, disposition of individuals to hygiene and sanitation and ignorance.

In this study, female volunteers were more infected than their male counterparts this observation deviates from the reports of Tunrayo *et al.*, (2017), where higher cases of infections were observed in males (46%) at the intervention community (Mawuko) than female gender (32%). However, in non-intervention community (Isolu) the overall prevalence was significantly higher in female (39%) than male subjects (32%).

Also, the findings in this study agrees with Akingbade *et al.*, (2012); Idowu *et al.*, (2022), where *Ascaris lumbricoides* was reported to be the most prevalent. The difference observed could be attributed to low socio-economic status especially among the rural communities. Studies have demonstrated an inverse relationship between socio-economic status and prevalence of *A. lumbricoides* (Ojurongbe *et al.*,2014). The low socio-economic status (e.g., lack of toilet facilities and being unable to afford sandal for their children) as well as poor environmental hygiene practices demonstrated by the participants from this rural community studied could explain why significantly high

proportion of the respondents were infected with *A. lumbricodes* compared with their urban counterparts in other investigations.

Based on age, more infection was recorded for individuals in age group 1-15 followed by 26-35 and 16-25. This is in correspondence with the investigation of Tunrayo *et al*., (2017), where the highest prevalence was established for respondents in the age bracket 1–10 years, followed by 11–20 years and 31–40 years. Studies have showed that in developing countries, young children crawl and play in areas where they may come into contact with soil that is contaminated with human and animal feces (Francis *et al*., 2013). All these factors linked with the poor standard of living and a hygiene practice predisposes these young children to STHs and this poses a serious threat on their growth and development.

The occurrence of multiple infections of *Ascaris lumbricoides* and *Trichuris trichuira* in the present study was recorded. The existing is low standard of living and poor hygiene practices as reported by Ojurongbe *et al*., (2014) and observed in our study area can be the contributing factors for this pattern of multiple infection.

The data on risk Factors associated with intestinal helminthes in Idumuje-Unor community Aniocha North Local Government Area of Delta State shows that individuals who their source of water is the hand dug well and use the pit latrine as their toilet facility had the highest prevalence prevalence rate, thereby constituting the major risk factor of transmission of intestinal helminthiasis in our study area.

Conclusively, the data in the present study will enrich the epidemiological picture of intestinal helminthiasis in Nigeria, an invaluable tool in public health control of these infections.

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