Prevalence, Knowledge, Attitude and Preventive Practices Regarding Intestinal and Urinary Parasites among Primary School Children in a Rural Community in Ebonyi State, Nigeria

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Abstract

Background: *In developing countries, school age children continue to bear the greatest burden of intestinal parasites and schistosomiasis. This study determined the prevalence, knowledge, attitude and practice of preventive measures of intestinal and urinary parasitic infections among primary school children in Ebonyi, Nigeria*

Methods: *This cross-sectional study was carried out among 120 pupils in two primary schools in Igbeagu community in Ebonyi State, Nigeria. The pupils were purposively selected based on willingness to participate. Data were collected using questionnaires and stool and urine analyses. IBM-SPSS software version 20 was used for data analysis. Chi square test was done at 5% level of significance and 95% confidence interval. Descriptive and inferential analyses were performed.*

Results: *Mean age of respondents was 11.33±2.46, with majority between 6-13 years (102, 85.0%). There were 66 (55.0%) females and 104 (86.7%) respondents had good knowledge about intestinal parasites. Drinking contaminated water (104, 86.7%), using clean toilets (102, 85.9%) and diarrhea (105, 87.5%), were the most identified ways of transmission, prevention and symptomatology respectively. Overall, 117 (97.5%) had good attitude towards prevention and control of intestinal and urinary parasites. Respondents had good preventive practices against intestinal and urinary parasites with majority washing their hands with soap after defecation (100, 83.3%), and before eating (101, 84.2%).*

Conclusion: *This study reported high levels of knowledge, good attitude and preventive practices against intestinal and urinary parasites. No parasites were found. We recommend that caregivers be targeted for behaviour change interventions as this will augment the positive results already being reported.*

Keywords: *Parasites, prevalence, knowledge, attitude, preventive practices*

Introduction

Intestinal parasitic infections are responsible for considerable mortality and morbidity.1 These infections are endemic globally and have been said to constitute the greatest single cause of illness and disease worldwide.[1,2] About one third of the world is infected with intestinal parasites.[2] Intestinal parasitic infections are on the World Health Organization's (WHO) list of Neglected Tropical Diseases (NTDs) and include protozoa and helminthes. *Entamoeba histolytica* and *Giardia lamblia* are common protozoa while *Ascaris lumbricoides* (roundworm), *Trichuris trichiura* (whipworm) and *Necator americanus* (hookworm) are the common helminthes.[3] *Ascaris lumbricoides*, *Trichuris trichiura* and hookworm are collectively referred to as soil transmitted helminths (STHs) and are the most common intestinal parasites.[2] Globally, about 1.221 billion people are infected with *A. lumbricoides*, 795 million with *T. trichiura*, and 740 million with hookworm.[2] The most prevalent protozoan parasite worldwide is g*iardia lamblia,* infecting about 200 million people.[2] Most of the parasitic infections are transmitted through the faeco-oral route.

Parasitic infections which are highly prevalent in the poorest communities of developing countries are among the commonest cause of chronic infection in humans and they are associated with poverty and underdevelopment.[4] In communities in need of better housing, clean water, appropriate sanitation, better access to healthcare, education and increased personal earnings, infections tend to persist.[1,5-8] This is the case for most rural communities and urban slums in Nigeria.[5] Helminthic infection is a major cause of disease burden among children in developing countries especially in sub-Saharan Africa.[5] Malnutrition, growth stunting, intellectual retardation, and cognitive as well as educational deficiencies are some of the health outcomes of intestinal parasitic infections.[3,4]

Urinary schistosomiasis caused by *Schistosoma haematobium* is a major public health problem in many tropical and sub-tropical countries and has been reported to be endemic in the African region.[2] It has been estimated that about 200 million people worldwide are infected with *S. haematobium*[2,9,10] and about 70% of these live in sub-Saharan Africa.[2] Intestinal parasitic infections and urinary schistosomiasis are diseases of poverty and poor development and these infections continue to deprive the poor of health, leading to economic instability.[2] In developing countries, school age children are mostly infected with intestinal parasites and schistosomiasis and continue to bear the greatest health burden as a result of the infections.[4] These infections are influenced by human behaviour especially their hygienic practices and recreational activities.[1]

The basic interventions for the prevention of helminthic infections and schistosomiasis include drug treatment, improvement in sanitation, and health education.[2,9] The mainstay for global Soil Transmitted Helminth (STH) control is periodic administration of benzimidazole drugs but it does not prevent re-infection, and may not interrupt transmission on its own. However, other preventive public health measures, such as health education aimed at improving hygienic behaviour are required in addition, in order to achieve the sustainable control of these parasiticworms.[6,8,11]

The aim of this study was to determine the prevalence of intestinal and urinary

parasitic infections among primary school children in Igbeagu community, Ebonyi State, south-eastern Nigeria and assess their knowledge, attitude and practice of preventive measures regarding the same.

Methods

Study Area

The study was carried out in primary schools in Igbeagu community in Izzi Local Government Area(LGA) of Ebonyi State, which is located in the south eastern part of Nigeria. According to the 2006 census, the population of Ebonyi State was approximately 2,176,947. Using a growth rate of 2.7%,[12] 2021 population is estimated to be approximately 3,058,610. It shares boundaries with Benue State to the north, Cross River State to the east, Enugu State to the west and Abia State to the south. Igbeagu is a large community in Izzi LGA where the Primary Health Care (PHC) centre run by the Department of Community Medicine of the Alex Ekwueme Federal University Teaching Hospital,Abakaliki (AEFUTHA) is situated. Agriculture is the main occupation of the population of Igbeagu community. There are 161 government approved primary schools and 32 government approved secondary schools (public and private) in Izzi LGA.

Study population and design

The study population included all children in primary schools in Igbeagu Community of Izzi LGA and the inclusion criteria consisted of children who were enrolled in primary schools. Primary school children who were ill or absent at the time of the study or whose parents did not give consent for participation were excluded from the study.

Sample size determination and sampling technique

The minimum sample size was calculated using the formula ($n = Z^2PQ\backslash d^2$)[13] where n is the minimum sample size, Zα is the standard normal deviate corresponding to a 2-sided level of significance of 5% , P is the proportion of the outcome of interest from a previous study or report, Q = 1-P,and d is the desired level of precision (usually at 5% for single proportions). A prevalence of intestinal parasites taken as 8.1%,[14] was used to arrive at a minimum sample size of approximately 114, and adjustment with non-response rate of 10% was used to arrive at a sample size of 127. Two primary schools were purposively selected for this study from the 183 schools on the list of primary schools. This selection was informed by the proximity of these two schools to the PHC facility of AEFUTHA which serves as a training center for residents in the Community Medicine Department of AEFUTHA. Sixty children were selected from each school since both schools had approximately equal number of school children (190 and 200 pupils). The sample size was not proportionately allocated to the classes because majority of the parents and children declined consent and assent respectively.

Study instruments and data collection

The questionnaire used for this study was modified from previous studies.[15,16] The questionnaire was structured, interviewer administered and was used to collect information on the socio-demographic characteristics of the school children, their knowledge about parasitic infections, attitude towards parasitic infections and preventive practices. Stool and urine analysis was conducted to determine the prevalence of parasitic infections among the children. An oral description and specific instructions for handling and avoidance of contamination of the stool and urine specimens were given to all the study participants. Specimen containers

with applicator stick were distributed to all of them to collect about 2g of fresh stool specimen. A separate specimen container was also given for urine. The bottles were labeled with the pupil's name, age and sex. Upon collection, the stool samples were taken to the parasitology laboratory for processing and examination for urinary and intestinal parasites using direct wet smear method by standard parasitological laboratory procedure.

Data management and analysis

Independent variables included socio-demographic characteristics of the children (age, class, religion, sex, father's occupation, mother's occupation) while dependent variables included knowledge, attitude and practice of preventive measures against parasitic infections. Knowledge was measured using 24 questions with "Yes" or "No" options. Each correct answer was given a score of two while a wrong answer or non-response was scored 0. The total score varied from 0 to 48 points and was classified into two levels: poor knowledge 0 to 23 points and good knowledge 24 to 48 points.

Attitude was measured using five likert scale questions with five options including: strongly disagreed scored as 1, disagreed=2, indifferent=3, agreed=4, and strongly agreed=5. The total score for attitude ranged from 5 to 25 and was classified into two levels: poor attitude 5 to 14 points and good attitude 15 to 25 points. Attitude answers were clearly explained to the pupils and for the younger children in primaries one to three who could still not understand, local dialect was used for explanation.

Preventive practices were measured using 7 questions with "Yes" or "No" options. Each correct answer was given a score of two while a wrong answer or non-response was scored 0. The score varied from 0 to 14 points and was classified into two levels: poor practice 0 to 6 points and good practice 7 to 14 points.

Data was cleaned and entered for analysis using statistical package for social sciences (IBM-SPSS) for Microsoft Window version 20 software. Frequency tables were used to present the descriptive statistics of the variables. Relevant means, standard deviations, and proportions were calculated. Chi-square test was carried out to test for association between dependent and independent variables. The level of significance was set at $P < 0.05$ and confidence interval at 95%.

Ethical considerations

Ethical clearance for this study was obtained from the Research and Ethics Committee of Alex Ekwueme Federal University Teaching Hospital, Abakaliki, Ebonyi State. Permission to carry out the study was also obtained from the headmaster/school authorities of the selected schools. Assent was obtained from the children after explaining fully the purpose of the study and their rights as participants, while informed consent was obtained from the parents/caregivers of the children. Participation was voluntary and confidentiality was ensured. All the study participants were given relevant information at the beginning of the data collection about the aim and significance of the study.

Results

Majority of the respondents (102, 85%) were less than 14 years, in primaries four to six, and had parents who were employed. Slightly more than half of the respondents (66, 55%) were females (Table 1). Table 2 shows that overall, 104 (86.7%) of the children had good knowledge about intestinal parasites. Majority of the respondents were knowledgeable about transmission, signs and symptoms, and methods of prevention and control of

intestinal and urinary parasites. Table 3 shows that majority (117, 97.5%) of the respondents had overall good attitude towards prevention and control of intestinal and urinary parasites with an overall mean attitude score of 4.29±0.75. Majority strongly agreed that poor hygiene causes intestinal/urinary parasite infections, that infections can be treated or prevented, that health education can reduce the prevalence of intestinal parasites, and that the use of soap when washing hands can help prevent intestinal parasites. However, less than half strongly agreed that if left untreated, infection can be transmitted to other family members and cause growth retardation. Respondents had good preventive practices against intestinal and urinary parasites with majority washing their fruit before consumption (108, 90%), cutting their finger nails when they grow (109, 90.8%), washing their hands with soap and water after defecation (100, 83.3%), and washing their hands before eating (101, 84.2%). Slightly over half (69, 57.5%) took drugs for prevention of infection while less than half avoided open defaecation and drank chemically treated or tap water (Table 4). No intestinal or urinary parasites were identified in the stool and urine samples investigated. Tables 5a and 5b show that there was no factor associated with good knowledge, attitude or preventive practices towards intestinal and urinary parasites.

Table 1: Socio-demographic characteristics of the respondents

Variable	Frequency	Percent
Age group (years)		
6 -13	102	85
14-17	18	15
Mean age ± SD	11.33±2.46	
Gender		
Male	54	45.0
Female	66	55.0
Class		
Primary1-3	20	16.7
Primary 4-6	100	83.3
Father's Employment Status		
Employed	116	96.7
Unemployed	4	3.3
Mother's Employment Status		
Employed	112	93.3
Unemployed	8	6.7

Table 2: Knowledge about intestinal and urinary parasites and their preventive measures among respondents

Knowledge about transmission	**Yes** **Freq (%)**	**No** **Freq (%)**
Consumption of contaminated food	102 (85.0)	18 (15.0)
Consumption of raw meat	101 (84.2)	19 (15.8)
Drinking contaminated water	104 (86.7)	16 (13.3)
Playing with soil	80 (66.7)	40 (33.3)
Not cutting nails regularly	92 (76.7)	28 (23.3)
Eating soil	101 (84.2)	19 (15.8)
Swimming in the river	94 (78.3)	26 (21.7)
Walking barefooted	85 (70.8)	35 (29.2)
Poor Hygiene	93 (77.5)	27 (22.5)
Knowledge about signs and symptoms		
Abdominal pain	104 (86.7)	16 (13.3)
Diarrhea	105 (87.5)	15 (12.5)
Itching of anal area	95 (79.2)	25 (20.8)
Dysentery	96 (80.0)	24 (20.0)
Weight loss	105 (87.5)	15 (12.5)
Vomiting	96 (80.0)	24 (20.0)
Loss of appetite	81 (67.5)	39 (32.5)
Blood in urine	85 (70.8)	35 (29.2)
Blood in stool	99 (82.5)	21 (17.5)
Knowledge of methods of prevention and control		
Washing of hands before eating	103 (85.8)	17 (14.2)
Wearing shoes	95 (79.2)	25 (20.8)
Cutting fingernails	101 (84.2)	19 (15.8)
Taking de-worming drugs	102 (85.0)	18 (15.0)
Using clean toilet	102 (85.0)	18 (15.0)
Not swimming in the river	96 (80.0)	24 (20.0)
Overall Knowledge score	**Freq**	**(%)**
Good	104	86.7
Poor	16	13.3

*multiple responses were entertained for knowledge

Table 3: Attitude towards prevention and control of intestinal and urinary parasite infection among respondents

QUESTION	**Strongly Disagree**	**Disagree**	**Indifferent**	**Agree**	**Strongly Agree**	**Mean±SD**
	Freq (%)	**Freq (%)**	**Freq (%)**	**Freq (%)**	**Freq(%)**	
Poor hygiene causes intestinal/urinary parasite infections	6(5.0)	7(5.8)	6(5.0)	21(17.5)	80(66.7)	4.35±1.14
Intestinal/urinary parasite infections can be treated or prevented	2(1.7)	10(8.3)	2(1.7)	27(22.5)	79(65.8)	4.43±1.0
Health education can reduce the prevalence of intestinal parasites	3(2.5)	8(6.7)	3(2.5)	33(27.5)	73(60.8)	4.38±1.0
If intestinal parasite is untreated, it can be transmitted to other family members and cause growth retardation?	14(11.7)	22(18.3)	3(2.5)	25(20.8)	56(46.7)	3.73±1.5
Use of soap when washing hands can help prevent intestinal parasite?	1(0.8)	6(5.0)	2(1.7)	26(21.7)	85(70.8)	4.57±0.8
Overall Mean attitude score						4.29±0.75
Overall attitude score	**Freq**	**(%)**				
Good	117	97.5				
Poor	3	2.5				

Table 4: Preventive practices regarding intestinal and urinary parasite infection among respondents

Variables	Yes Freq(%)	No Freq(%)
Do you practice open defecation?	64(53.3)	56(46.7)
Do you wash fruit before consuming them?	108(90.0)	12(10.0)
Do you cut your finger nail s when they grow ?	109(90.8)	11(9.2)
Do you wash your hands with soap and water after defecation?	100(83.3)	20(16.7)
Do you drink chemically treated or tap water?	49(40.8)	71(59.2)
Did you take drugs for the prevention of intestinal parasites?	69(57.5)	51(42.5)
Do you wash your hands before eating?	101(84.2)	19(15.8)
Overall Practice score	**Freq**	**(%)**
Good	102	85.0
Poor	18	15.0

Table 5a: Factors associated with knowledge, and attitude regarding intestinal and urinary parasite infection among the respondents

Variable	Knowledge level Poor	Good	χ^2	*Pvalue*
Age group				
=13 years	15 (14.7)	87(85.3)	1.11	0.29
>13 years	1(5.6)	17 (94.4)		
Class				
Pry 1-3	5(25)	15(75)	2.83	0.09
Pry 4-6	11(11)	89(89)		
Gender				
Male	7(13)	47(87)	0.012	0.91
Female	9(13.6)	57(86.4		
Father's employment Status				
Unemployed	0(0)	4(100)	FT	1.0
Employed	16(13.8)	100(86.2)		
Mother's employment status				
Unemployed	2(25)	6(75)	FT	0.29
Employed	14(12.5)	98(87.5)		
	Attitude level Poor	**Good**	χ^2	*Pvalue*
Age group				
=13 years	1(1)	101(99)	FT	0.06
>13 years	2(11.1)	16(88.9)		
Class				
Pry 1-3	0(0)	20(100)	FT	1.0
Pry 4-6	3(3)	97(97)		
Gender				
Male	2(3.7)	52(96.3)	FT	0.59
Female	1(1.5)	65(98.5)		
Father's employment Status				
Unemployed	0(0)	4(100)	FT	1.0
Employed	3(2.5)	117(97.5)		
Mother's employment status				
Unemployed	0(0)	8(100)	FT	1.0
Employed	3(2.7)	109(97.3)		

FT: Fishers exact test

Table 5b: Factors associated with preventive practices regarding intestinal and urinary parasite infection among the respondents

Variable	Practice level			
	Poor	Good	χ^2	*P value*
Age group				
=13 years	15(14.7)	87(85.3)	FT	0.73
>13 years	3(16.7)	15(83.3)		
Class				
Pry 1-3	6(30.0)	14(70.0)	FT	0.078
Pry 4-6	12 (12.0)	88 (88.0)		
Gender				
Male	11(20.4)	43(79.6)	2.22	0.14
Female	7(10.6)	59(89.4)		
Father's em ployment Status				
Unemployed	0(0)	4 (4.0)	FT	1.0
Employed	18 (15.5)	98 (84.5)		
Mother's employment status				
Unemployed	1 (12.5)	7 (87.5)	FT	1.0
Employed	17 (15.2)	95 (84.8)		

FT: Fishers exact test

Discussion

Overall, majority of the respondents had good knowledge about intestinal and urinary parasites. This high level of knowledge among school children may be as a result of frequent health education programs targeted at school children being carried out by the PHC centre and other health agencies as part of the efforts to prevent these infections. The proximity of these study schools to a PHC facility may have exposed the children to frequent health education sessions. In addition, health personnel from this PHC facility which belongs to the teaching hospital in the State and serves for training of resident doctors in Community Medicine may have also visited the schools for other health promotion activities. It is important to note that majority of these school children knew what they should do to prevent being infected such as washing of hands before eating, wearing of shoes, cutting of fingernails, using clean toilet, and taking deworming drugs. Some similar previous studies have however reported poor knowledge of intestinal parasites. A study that assessed knowledge, attitude and practice of intestinal parasitic infection among school children in Asmara, Eritrea revealed poor knowledge.[17] A similar study among mothers in Ethiopia also reported poor knowledge of intestinal parasites.[16]

Majority of the respondents had overall good attitude towards prevention and control of intestinal and urinary parasites. However, less than half strongly agreed that if untreated, infection can be transmitted to other family members and cause growth retardation. This may suggest that these children do not see treatment when infected as a priority; probably because some children, parents and caregivers as a result of ignorance, take the symptoms unserious especially if they do not cause them much discomfort. A good attitude is very necessary for any behavioral change to occur and attitude can be improved through health education which will in turn lead to better preventive practices and prevention of diseases. Health education has been identified as one strategy that has been used to reduce re-

infection after deworming.[18] Many studies have shown that health education has a positive impact in reducing transmission and re-infection of intestinal parasites.[1,6,7,18,20]

Furthermore, the study revealed that overall, majority of the respondents had good preventive practices against intestinal and urinary parasites. This high level of good practice could be due to the fact that these school children have good knowledge of the transmission and preventive practices. This suggests that the knowledge among these children translated to good practice. This is commendable since not all knowledge translates to practice. Studies have shown poor preventive practices despite good knowledge of various conditions. A community based study carried out in Ethiopia showed that although 94.4% had good knowledge, 35.9% of them had poor practices towards intestinal parasite and schistosomes infection prevention.[15] Another study carried out in a rural community in Yemen revealed similar results.[21] The few respondents who reported taking drugs for infection reflects the possibility that treatment may not yet be considered important by parents or caregivers since these are children and will ideally only take drugs when given to them by caregivers. This highlights the need to also target parents and caregivers in the fight against these parasitic infections in addition to focusing on the children.

Additionally, more than half of the school children still practiced open defaecation. Open defaecation is one of the factors fuelling the persistence of soil transmitted helminthes and other intestinal and urinary parasites, and therefore, must be addressed, particularly in the rural areas if progress must be made in curbing these infections. Also, we found that only few of the respondents used chemically treated or tap water for drinking. This is not surprising because some communities in the rural areas do not have access to pipe-borne water. Many still rely on rain water during the rainy season or have to travel far to access bore holes leading to some resorting to nearby streams or rivers. Availability of potable water is a key component of the water sanitation and hygiene (WASH) program,[22] and should be implemented in the rural communities as well as urban areas.

There were no intestinal or urinary parasites identified in the stool and urine samples investigated. This can be explained by the fact that majority of these children reported good preventive practices and could also be as a result of the deworming programs that are carried out by the PHC centre near the schools and other health agencies for prevention of these parasites. This finding however does not agree with results of other studies carried out among school children in Ebonyi, Enugu and Ogun States of Nigeria.[2,7,23]

Limitations

Some of the limitations of this study include the fact that it was carried out in only two schools chosen purposively which may limit the extent to which the study can be generalized. Furthermore, self-reported practice may not be reliable and may have affected the findings of this study.

Conclusion

This study reported a high level of knowledge about intestinal and urinary parasites and a good attitude towards its prevention. Most of the school children also reported good preventive practices against intestinal and urinary parasites. None of the stool and urine samples examined had any parasites. We recommend that in addition to focusing on school children, parents and caregivers

should also be targeted for behavioural change interventions as this will augment the effect already being seen among children. Components of school health program include provision of health services such as deworming and also school health education and efforts should be made to enforce implementation of the school health policy in primary schools in Nigeria. This will be of benefit in preventing re-infection among these school children. Further studies should include measures to inspect and validate reported practice of preventive measures.

Conflict of Interest

Authors declare that they have no conflicts of interest

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