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Intestinal Parasites among Children from Two Communities in Rivers State, Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

A cross-sectional study was conducted on the prevalence of intestinal parasites among children residing in Eagle Island in Port Harcourt Local Government Area and Wiiyaakara in Khana local government all in Rivers State, Nigeria. A total of two hundred and twenty (220) faecal specimens were collected from the children aged (2-17) years into a wide-mouthed universal container and were analyzed using wet saline/iodine and formol ether concentration methods for presence of intestinal parasites. Out of the total of 220 samples examined, 44 children were infected with various intestinal parasites with an overall prevalence of 20%. Eagle Island had a higher prevalence

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24(54.5%) than Wiiyaakara, 20(45.5%). The species identified and their prevalence were *Ascaris lumbricoides* 24(54.6%), *Trichuris trichuria*13(29.5%) and *Hookworm* 7(15.9%). The result of this study showed a higher prevalence of infection in male 24(54.5%) than female 20(45.5%) with no significant difference (p>0.05) and children within the age bracket of 10-13 years (27.3%) with the highest prevalence. This study therefore shows that intestinal helminths are prevalent among children residing in Eagle Island and Wiiyaakara Communities in Rivers State. This calls for more enlightenment on measures aimed at reducing parasitic infections among children in these areas, which are associated with poor environmental sanitation and unhygienic personal behaviours among children. Periodic treatment of individual with anti-parasitic drugs should also be encouraged.

Keywords: Intestinal helminths; parasites; faecal specimen; anti-parasitic drugs; protozoa.

1. INTRODUCTION

"Intestinal parasitic infections in children are highly prevalent in regions with limited or no access to safe drinking water, poor sanitary and housing conditions" Kantzanou et al., [1].Studies have shown that "about 24% of the global population are infected with soil-transmitted helminth infections with over 270 million preschool-aged children and over 600 million school-aged children living in areas where helminths and intestinal protozoa are intensively transmitted and thus warrant interventions" [2]. "Intestinal parasitic infections are chronic infections that can have detrimental effects, particularly in children, such as trauma, nutrition-robbing and poisoning, changes in resistance, and immune suppression"[3]. "In African countries, such as Nigeria, the prevalence rate of intestinal parasitic infection in children is estimated to be as high as 80% in some states" [4]. "The majority of infections are caused by *Ascaris lumbricoides*, *Hookworm*, and *Trichuris trichiura*. *Cryptosporidium species, Entamoeba histolytica and Giardia duodenalis* are the most common protozoan infections in children aged under 5 years in sub-Saharan Africa" [1,5].

There are serious concerns about the complications of intestinal parasitic infections in children which may either be short term or long term. Parasites may cause malabsorption and chronic blood loss, with long-term effects on the physical and cognitive development of children [6,7]. "In disadvantaged populations, malnutrition renders children more vulnerable to intestinal parasitic infection which in turn may result in protein-energy malnutrition, iron-deficiency anaemia and subsequent deficits in both mental and physical growth, WHO" [8].

"Infants, toddlers and young children in general are reported to be most vulnerable to the adverse nutritional effects of intestinal parasitic infections. One reason is that they often suffer from an increased intestinal parasitic infection burden associated with a greater exposure to those infectious agents by virtue of unsanitary practice associated with child development including playing in contaminated dirt and water, sucking on dirt finger and other objects" [8]

"In Nigeria high prevalence of intestinal parasitic infection is attributable to factors associated with low socio-economic status such as poor personal hygiene, environmental sanitation, irrigation, overcrowding, resettlement, and low altitude" [9]. Reports from different parts of Nigeria showed that there is a difference in the prevalence and possible associated factors {4}

2. MATERIALS AND METHODS

2.1 Study Area

A cross-sectional study was conducted from March to September, 2023 at two different Towns, Eagle Island, Port Harcourt City Local Government Area and Wiiyaakara Town in Khana Local Government Area of River State, Nigeria.

2.2 Study Population

The study population was made up of school-age children at Eagle Island and Wiiyaakara Town randomly selected within the ages of 2–17 years.

2.3 Inclusion and Exclusive Criteria

Children within the ages of 2-17 years resident in Eagle Island and Wiiyaakara were included but children who had a history of anti-helminthes drug in two (2) weeks prior to screening was excluded.

2.4 Sampling Method

The participants were randomly selected using a balloting system where every participants were given equal opportunities to choose from a numbering system of “1” and “2” such that participants who picked “1” were selected while those who picked “2” were not selected to continue with the study [10].

2.5 Sample Collection

Stool samples was collected into a wide mouthed dry container with a tight cover.

The stool was collected directly into the container in the morning of the investigation day and sent to Rivers State college of health science and Management Technology laboratory for analysis; it was collected randomly to a total of 220 samples.

2.6 Sample Analysis

2.6.1 Macroscopic

Visual examination of the stool sample was carried out, noting the appearance, the colour, the consistency and the presence or absence of blood, mucus, and pus.

2.6.2 Saline preparation

A drop of physiological saline was placed on a clean grease-free slide. Using an applicator stick, a little quantity of properly mixed stool sample was collected and emulsified on the drop of the saline. The preparation was covered with a cover-slip and examined with light microscopy at 10x and finally with 40x magnifications.

2.6.3 Formol-ether concentration technique

One milliliter of a well-mixed stool sample was put in a tube containing 4mL of 10% formalin. Three milliliters of the 10% formalin was again added and mixed by shaking. The suspension was sieved using a coffee strainer into a centrifuge tube. Three milliliters of diethyl ether was added , stoppered and was then shaken vigorously for 1 min. The stopper was removed and the suspension centrifuged for 1min at 400 rpm. The entire column of the fluid below the faecal debris and ether was carefully removed using a Pasteur pipette and transferred into another centrifuge tube. Ten percent formalin was added to the transferred suspension to make up to 10mL. It was then centrifuged at 1000 rpm for 10mins. The supernatant was decanted and the bottom of the tube tapped to re-suspend the deposit. The deposit was examined by light microscopy at 10x and 40x magnifications for the presence of ova or cyst of parasites.

3. RESULTS

Out of 220 stool samples that were randomly collected from the children residing in Eagle Island Community in Port Harcourt Local Government Area and Wiiyaakara Town in Khana local government area, all in Rivers State, 44 (20.0%) were positive for intestinal parasites. A total of 100 male children were involved in the study with 54.5% infected while 45.5% of the 120 female children were also infected (Table 1). Table 2 shows the age-related prevalence with a higher rate of infection in children older than 6years when compared with the younger children. Eagle Island also showed higher prevalence of infection 54.5% than Wiiyaakara community (45.5%). The male children also were shown to have higher prevalence of *Ascaris lumbricoides* infection 14(58.3%), while the females had higher infection of *Tricuristricuria* 8(40.0%) as indicated on Table 3.

Table 1. Gender-related prevalence of intestinal parasites among the children

Gender	No. Tested	Infected (%)	Non-infected (%)
Male	100 (45.5)	24 (54.5)	76 (43.2)
Female	120 (54.5)	20 (45.5)	100 (56.8)
To tal	220 (100)	44 (20.0)	176 (80.0)

Table 2. Age related prevalence of intestinal parasites among children in the communities

Age (Years)	Wiiyaakara(% Infected)	Eagle Island(% Infected)	Total (% Infected)
2-5	5 (25.0)	5 (20.8)	10 (22.7)
6-9	5 (25.0)	6 (25.0)	11 (25.0)
10-13	3 (15.0)	9 (37.5)	12 (27.3)
14-17	7 (35.0)	4 (16.7)	11 (25.0)
Total	20 (45.5)	24 (54.5)	44 (100)

Table 3. Distribution of parasites among the infected subjects

Gender	Male (%)	Female (%)	Total
A. lumbricoides	14 (58.3)	10 (50.0)	24 (54.5)
Tricuristricuria	7 (29.2)	8 (40.0)	15 (34.1)
Hookworm	3 (12.5)	2 (10.0)	5 (11.4)
Total	24 (54.5)	20 (45.5)	44 (100)

4. DISCUSSION

In this study, the overall prevalence of Intestinal parasites was 44(20.0%) which shows a general spread in Eagle Island Community in Port Harcourt Local Government Area and Wiiyaakara in Khana local government area of Rivers State. The rate is almost the same with the 21.0% recorded among primary school children in Gokana and Kana Local Government Areas (LGAs) of Rivers State [11]. It is, however, slightly lower than the 27.66% reported in Port Harcourt [12] and 23.95% reported in Southern Nigeria [13]. Location, sanitation, and level of awareness may have contributed to this variation. The three different helminths identified in this study were; *Ascaris* (54.5%) which is the most prevalent, *Trichuris trichuria* 15(34.1%) and Hookworm 5(11.4%). Abah and Arene also reported *Ascaris lumbricoides* as the most prevalent, 51.78% among pre-school and school children from different local government area of Rivers State [14]. However, this result is lower in comparison with the findings of Paul, (2018) that recorded 41.0% on the prevalence of intestinal parasites in Diobu, Port Harcourt Local Government Area where the prevalence of helminths like *G. lamblia*, *Hookworm* and *T. trichuria*were high among children of age 0-9 years attributing this to the use of untreated water and inability to wash hands before and after domestic activities [15].

This study found Ascaris *lumbricoide*as the most prevalent, 54.5% and agrees with the study by Ngonjoet and associates [16] and Mamandouet and assocites.[17] who noted higher prevalence of Ascaris *lumbricoide* amongst school children in Diobu, Port Harcourt Local Government Area and Obio-Akpor Local Government Area, Rivers State.

Similarly,in this study, children of both sexes was infected with parasites but the male gender recorded a slightly higher percentage infection 24(54.5%) than the females 20(45.5%). This could be probably be due to the fact that male children are generally known for outdoor plays and are more involved in scavenging activities than the females. Ishaku et al., [18] in a study on the prevalence of intestinal parasites in Nasarawa State also reported a higher risks prevalence in males compared to females and associated it with daily activities carried out by the males. He noted that most males do manual jobs far from their homesteads where they are more likely to eat food and drink water from outlets such as side kiosks hence increasing their chance of infection.

Age-related prevalence showed that children older than 6 years of age had a higher infection rate than those younger. The findings of this study also revealed that children from Eagle Island have a higher prevalence (54.5%) of intestinal parasites than children from Wiiyaakara (45.5%). Older children are likely to engage more in risky practices such as playing activities outside the homes and parents tend to pay less attention to them compared to the younger children. Most studies have also revealed higher prevalence of intestinal parasites among children and associated with this factors such as ; low immunity against various pathogen leading to less resistance to diseases, overcrowding and low socioeconomic status , in addition to playing anywhere irrespective of the cleanliness or dustiness of playing ground

5. CONCLUSION

The prevalence of intestinal parasites is quite high in these communities of Rivers State and it is attributed to poor environmental sanitation, low educational level, behavioural and socioeconomic activities that the children are exposed to.

Factors such as poor access to safe water contribute to transmission of this intestinal of intestinal parasite, indiscriminate defecation and lack of follow up of regular de-wormimg by the government and non-governmental bodies in the State. The common practice of burying faeces in the soil which leads to contamination of underground water, irregular hand washing practices after toilet usage, contact with soil, poor personal hygiene and living condition contributes to the prevalence of these infections among the children. This could also be an indication that

children walk barefooted and play with soil contaminated with larva.

Some intestinal helminths like tapeworm were not identified in this study, this may probably be due to proper cooking of beef/fish/pork before consumption. The observed prevalence of intestinal parasites in this study is both low and high compared to the finding of some researchers. This could be due to increased health education awareness on the sources of infection on maintenance of personal hygiene and higher due to improper allocation of drinkable water supply.

CONSENT

Verbal consent was sought and obtained from the parents and guardians of the children. The parents/guardian and children were instructed on how to collect the samples which were collected and processed on the same day.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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