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Epidemiological Status of Cryptosporidiosis in Children with Diarrhea Attending Township Clinic Gwagwalada, Federal Capital Territory (FCT), Abuja

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ABSTRACT

The study is aimed to the determined Epidemiological Status of Cryptosporidiosis in Children with Diarrhea Attending Township Clinic Gwagwalada, Federal Capital Territory (FCT), Abuja, was conducted between May and June 2022. A total of 80 samples of fruits and vegetables were examined by sedimentation concentration after washing using normal saline. Results. The age group of 2-3 years 10 (59%) had a higher rate of cryptosporidium parasite detection or recovery than the age groups of 0-1 year 3 (18%) and 4-5 years 4 (4%). (23%). This finding is consistent with the findings of (Chalmers and Caccio, 2016), who found that children aged 2-3 years had a higher prevalence rate than those aged 0-1 and 4-5 years. The high frequency in this age range may be attributable to the fact that this age group is prone to diarrhea due to a lack of awareness of or respect for basic hygiene practices, as well as the fact that their immune systems are not sophisticated. Because nursery schooling ages in Gwagwalada are typically around 2-3 years old, the associated higher prevalence rate in children ages 2-3 years could be due to this. Also, in this age group, this predominance can be deduced from the fact that the crest of parasitism occurs during the ages of kindergarten and primary schools when communal games require touching polluted and muddy soil.

Keywords: Epidemiological, Status, Cryptosporidiosis, Children, Diarrhea, Attending, Township, Clinic, Gwagwalada, FCT-Abuja.

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INTRODUCTION

Cryptosporidium species are coccidian parasites, they are single-celled and causes cryptosporidiosis, a diarrheal disease (Razzolini *et al*., 2020). They can be found in soil, food, water, and on surfaces contaminated with feces from infected people or animals.

Cryptosporidiosis can be transmitted through contaminated irrigation or agricultural chemical application water, floodwater, or contact with polluted dump tank or flume water used for post-harvest washing of sick employees (Ogouyèmi-Hounto *et al*., 2017).

Cryptosporidiosis is a parasitic condition caused by *Cryptosporidium parvum*, a phylum apicomplexan protozoan parasite (Paul *et al*., 2014).

In both immunocompetent (those with a normally functioning immune system) and immunocompromised people, it affects the small intestine and can also impact the respiratory tract (persons with autoimmune disorders). Cryptosporidiosis is a common cause of diarrheal sickness in humans, and it affects various different groups of people (Razzolini *et al*., 2020).

The parasite was gradually linked to malnutrition and death in children due to diarrhea in underdeveloped countries or low-and middle-income countries (Ehsan *et al*., 2016). Cryptosporidiosis, which is caused by the *Cryptosporidium parvum* bacterium, is a major public health concern in humans due to its link to economic losses. Over 200 cryptosporidiosis outbreaks have been reported, including those that are water-borne, food-borne, and zoonotic. *Cryptosporidium* spp. is the second leading cause of diarrheal illness and death in children in low-

income countries, and it is the only diarrheal disease for which there is no consistent and effective treatment (Tamomh *et al*., 2021).

Cryptosporidiosis kills 30–50 percent of newborns and children over the world. It is the second largest cause of diarrhea and death in children, after rotavirus (Tombang *et al*., 2019). The most common symptom is diarrhea, although additional signs and symptoms include a loss of appetite, stomach cramps, and weight loss, among others. There are 22 known *Cryptosporidium* species that infect vertebrate hosts, however the zoonotic *Cryptosporidium parvum* and the anthroponotic *Cryptosporidium hominis* are the two most common species that cause cryptosporidiosis in people around the world (Bodager *et al*., 2015).

Cryptosporidium spp., a parasite protozoon, is well-known in developed nations due to major epidemics, although it is untreated and neglected in many underdeveloped countries, such as Nigeria (Tombang *et al*., 2019). Cryptosporidiosis is the second greatest cause of diarrhea and death in children after rotavirus, accounting for 30–50% of deaths in young people (infants and children) globally (Khan *et al*., 2019). Sub-Saharan African countries account for half of all global infant diarrheal illness mortality, and over 2.9 million Cryptosporidium infections are anticipated to occur each year in children under the age of 24 months in Sub-Saharan Africa.

It is discovered that cryptosporidium is an important parasite that causes Children under the age of 15 years old have recurrent diarrhea, particularly in impoverished nations such as Nigeria. As a result, it's critical to research the disease's prevalence and emphasize the need for measures to treat, diagnose, prevent, and control cryptosporidiosis.

MATERIALS AND METHODS

Study area

The study was conducted in the Federal Capital Territory. Nigeria's capital city is the Federal Capital Territory. It is situated in Nigeria's central region. The city is situated at 9.072264^0 latitude and 7.491302^0 longitude, with a height of 491 meters (1,611 feet) and a land area of 8,000 square kilometers. Abaji, Abuja Municipal Area Council, Gwagwalada, Kuje, Bwari, and Kwali are the six area councils that make up the territory. The city of Abuja has a population of 776,298 people in 2006, making it one of Nigeria's ten most populous cities (Figure 1).

Research design

The research design to be adopted for this study is the survey method.

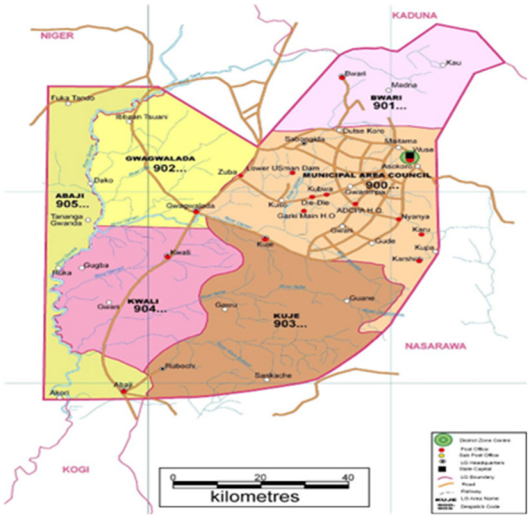

Figure 1: Map of Abuja showing the study area and location Source: Abuja municipal Area Council Population Management Centre (2014)

Population of Study

From February through April of 2021, the study's population will include all children (patients) with diarrhea who visit the Gwagwalada Area Council Township Clinic and the Dagiri Clinic.

Sample Size

The sampling size will be determined using the descriptive survey sampling method. In preliminary and exploratory studies, descriptive survey research designs are used to allow researchers to gather information, summarize, present, and interpret it for the purpose of clarification.

Method of data collection

Data will be collected based on records of cryptosporidiosis positive cases in children with diarrhea who attended the Gwagwalada Area Council Township Clinic and Dagiri Clinic from February to April. The health records under research will be sampled using a systematic randomized sampling procedure every 7 days for a period of 12 weeks. Age, gender, number of diarrhea samples, and number of cryptosporidiosis infections will be grouped demographically. These details will be recorded in the patient's file. All children aged 0 to 5 years who attend the Gwagwalada Area Council Township Clinic and Dagiri Clinic in Gwagwalada are sampled.

Methods of data analysis

Simple percentage and frequency tabular method will be

Table 1: Gender prevalence of Cryptosporidiosis in children with diarrhea attending Gwagwalada Area Council Township Clinic from the period of February 2021 to April, 2021

Gender		
February	**No. of Examined**	**Incidence of Cryptosporidiosis**
Male	10	1
Female	8	0
Total	18	1
March		
Male	7	1
Female	9	1
Total	16	2
April		
Male	15	2
Female	21	5
Total	36	7
Total	70	10

Table 2: Age prevalence of Cryptosporidiosis in children with diarrhea attending Gwagwalada Area Council Clinic from the period of February, 2021 to April, 2021

Age group (Years)		
February	**No. of Examined**	**Incidence of Cryptosporidiosis**
0 - 1	4	0
2 - 3	6	1
4 - 5	8	0
March		
0 – 1	8	0
2 - 3	3	1
4 - 5	5	1
April		
0 - 1	10	1
2 - 3	18	5
4 - 5	8	1
Total	70	10

employed for data analysis, with descriptive analysis being performed to analyze the data in each table.

Statistical analysis

The data from this study will be examined statistically using Analysis of Variance (ANOVA) in Ms Excel Statistics (Window 10 version), using the F-test statistic at P = 0.05 as the test.

RESULTS

Prevalence of Cryptosporidiosis in children with diarrhea attending the Gwagwalada Area Council Township Clinic (GTC).

Tables 1 and 2 indicate the prevalence of cryptosporidiosis in children with diarrhea who attended the Gwagwalada Area Council Clinic between February and April 2021, broken down by gender and age. (Tables 1, 2)

Prevalence of Cryptosporidiosis in children with diarrhea attending the Gwagwalada Area Council Township Clinic.

Tables 3 and 4 indicate the prevalence of cryptosporidiosis in children with diarrhea who visited the Dagiri Clinic in Gwagwalada between February and April of 2021, with respect to gender and age respectively. (Table 3, 4)

Figure 2 shows 37% and 63% prevalence respectively of *Cryptosporidium* infection in Dagiri Clinic, Gwagwalada and Gwagwalada Township Clinic.

Figure 3 shows 18%, 59% and 23% prevalence of *Cryptosporidium* infection in children ages 0-1, 2-3 and 4-5 respectively.

Table 3: Gender prevalence of Cryptosporidiosis in children with diarrhea attending Dagiri Clinic, Gwagwalada from the period of February 2021 to April, 2021.

Gender		
February	**No. of Examined**	**Incidence of Cryptosporidiosis**
Male	2	0
Female	2	0
Total	4	0
March		
Male	7	1
Female	4	0
Total	11	1
April		
Male	15	3
Female	21	2
Total	36	5
Total	70	**6**

Table 4: Age prevalence of Cryptosporidiosis in children with diarrhea attending Dagiri Clinic, Gwagwalada from the period of February, 2021 to April, 2021.

Age group (Years)		
February	**No. of Examined**	**Incidence of Cryptosporidiosis**
0 - 1	1	0
2 - 3	1	0
4 - 5	2	0
March		
0 – 1	1	0
2 - 3	4	1
4 - 5	6	0
April		
0 - 1	5	1
2 - 3	12	2
4 - 5	8	2
Total	70	6

Figure 4 shows 50% and 50% prevalence of *Cryptosporidium* infection in both male and female children of ages 0-5yrs respectively.

DISCUSSION

According to the data, the age group of 2-3 years 10 (59%) had a higher rate of *cryptosporidium* parasite detection or recovery than the age groups of 0-1 year 3 (18%) and 4-5 years 4 (4%). (23%). This finding is consistent with the findings of (Chalmers and Caccio, 2016), who found that children aged 2-3 years had a higher prevalence rate than those aged 0-1 and 4-5 years.

The high frequency in this age range may be attributable to the fact that this age group is prone to diarrhea due to a lack of awareness of or respect for basic hygiene practices, as well as the fact that their immune systems are not sophisticated. Because nursery schooling ages in Gwagwalada are typically around 2-3 years old, the associated higher prevalence rate in children ages 2-3 years could be due to this. Also, in this age group, this predominance can be deduced from the fact that the crest of parasitism occurs during the ages of kindergarten and primary schools when communal games require touching polluted and muddy soil.

Further research revealed that the incidence was moderately scattered across both male and female youngsters in both examination areas. This could be attributed to the fact that Gwagwalada Area Council has a mixed-sex school system, which allows all children to socialize, play, and mingle on the same playground. Furthermore, using contaminated bare hands to feed children increases the possibility of foodborne infections like Cryptosporidiosis being transmitted from sick adults to children.

These behaviors increase the risk of consumption of contaminated food and water containing oocysts shed by *Cryptosporidium*-infected people. This explains why *cryptosporidium* is ranked fifth among the world's most important foodborne parasites.

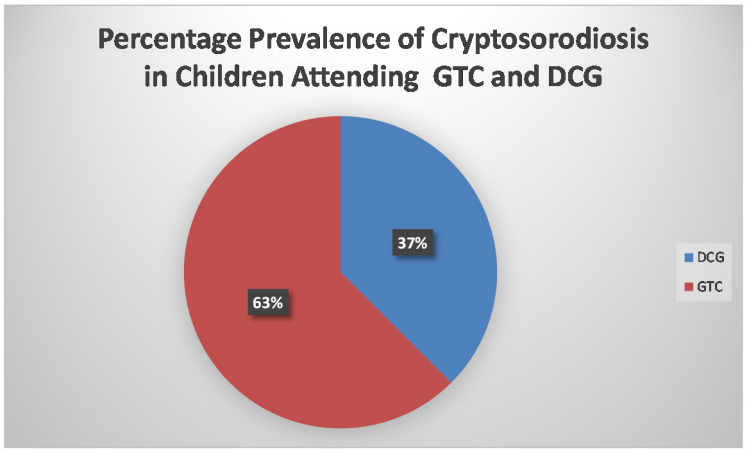

Figure 2: A Pie Chart Showing Percentage Prevalence of Cryptosorodiosis in Children age 0-5 years in Gwagwalada Area Council

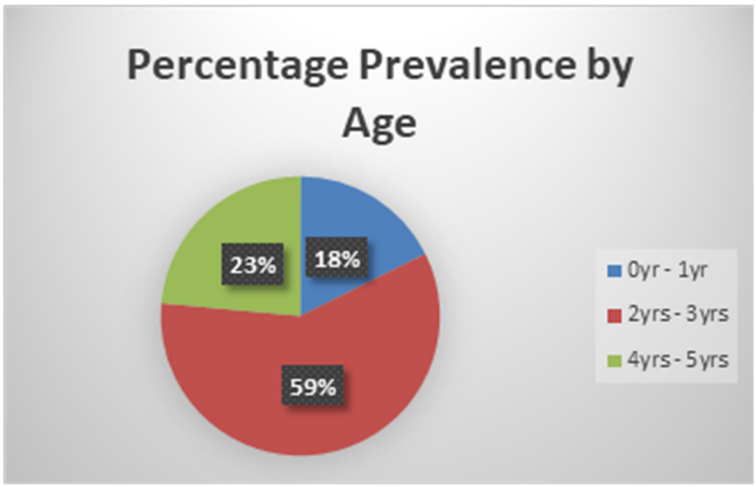

Figure 3: A Pie Chart Showing Prevalence of Cryptosorodiosis in Children by age.

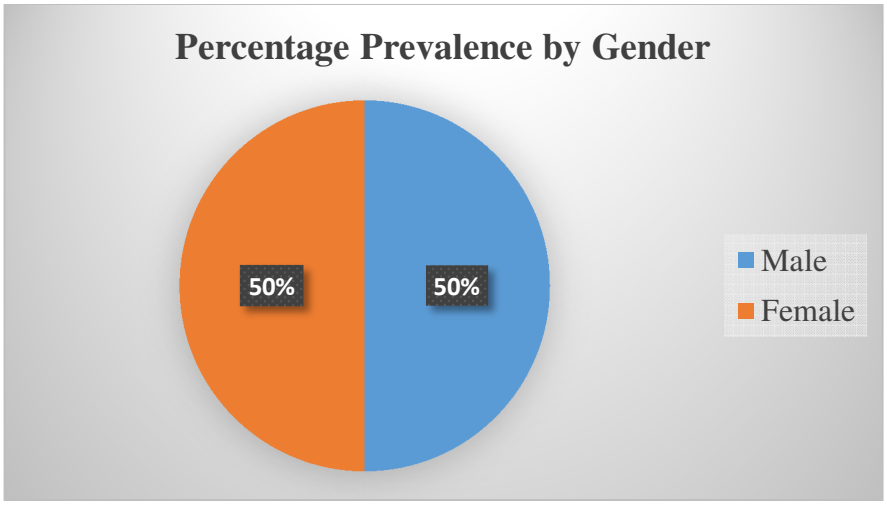

Figure 4: A Pie Chart Showing Prevalence of Cryptosorodiosis in Children by Gender.

Conclusion

Finally, *Cryptosporidium* spp. is becoming more widely recognized as a serious protozoan parasite that causes diarrhea in children. The lifecycle of *Cryptosporidium* spp. is complicated, with multiple modes of transmission. The oocysts are tough, may survive for a long period in the environment, and are resistant to most chemical disinfectants, making it difficult to remove from drinking water. Cryptosporidiosis has been identified as a disease of concern in the Gwagwalada Area Council among children under the age of five, according to the findings of this survey. Though the prevalence ratio isn't particularly high, transmission potential is a major concern because case management is difficult and can be mistaken for other diseases such as typhoid.

Recommendations

On the basis of these observations, it is recommended that:

1. *Cryptosporidium oocysts* should be tested routinely in children under the age of five who present to the hospital with diarrheal diseases, especially in children above the age of five.
2. Through water source protection, good hygiene procedures should be maintained to prevent oocyst contamination of food and water supplies.
3. To prevent the disease from spreading, nursing women and child care workers should be encouraged to properly prepare and purify their food and drinking water.
4. Because some species are zoonotic in nature, health precautions should be taken into account in nursery and pre-nursery schools or day cares to protect children from contracting disease from the environment.

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