

Prevalence of Human Intestinal Helminthic Infection Among Primary School Children in Bonny Island, Rivers State, Nigeria

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Abstract: Soil-transmitted helminth infections remain an important public health problem among children in sub-Saharan Africa. This study assessed the prevalence of these infections among pupils attending two primary schools in Bonny and Finima communities, Bonny Local Government Area, Rivers State, Nigeria. Stool samples were examined using the formalin–ether concentration technique to recover helminth eggs and cysts. Of the 147 pupils examined, 102 (69.4%) were infected with at least one soil-transmitted helminth. Infection was more common among females (58; 56.9%) than males (44; 43.1%); however, the difference between the sexes was not statistically significant ($P > 0.05$). The highest prevalence was recorded among children aged 5–10 years (55.9%), followed by those aged 11–15 years (37.3%), whereas participants aged 16–20 years had the lowest prevalence (6.8%). A statistically significant difference was observed among the age groups. Among the infected pupils, *Ascaris lumbricoides* was the most prevalent parasite, affecting 59 (57.8%) children. Hookworm infection occurred in 24 (23.5%) pupils, while *Trichuris trichiura* was detected in 11 (10.8%). Mixed infection with *A. lumbricoides* and *T. trichiura* was found in 8 (7.8%) pupils. The prevalence of *A. lumbricoides* was significantly higher than that of the other parasites ($P < 0.05$). The high prevalence observed indicates that soil-transmitted helminth infections remain a public health concern in the study communities. Improving access to safe drinking water and sanitary toilet facilities, providing health education on infection prevention, and implementing regular deworming programmes could help reduce transmission and disease burden.

Keywords: Prevalence; Intestinal Helminth, Soil Transmitted Helminth, Finima, Bonny.

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I. INTRODUCTION

The gastrointestinal helminths that are most favorite as soil-enrusted helminths are corresponded to all by depreciated soil. Later, these squatters evolve in the soil and reach the injurious stage, LeBarri B. G. (2018). The eggs are passed out in faeces of infected persons into the environment, hence contaminating the soil in areas with poor sanitation especially where there are no modern toilet facilities. Similar to dependent worms, contaminations hatch by always segregating. Between these bloodsuckers, that are usually nematodes, are the roundworm (*Ascaris lumbricoides*), the whipworm (*Trichuris trichiura*), and the class of hookworms (*Ancylostoma duodenale* and *Necator americanus*) (Hotez, P.J. et al, 2006). There are many differing names for helminthiasis, to some extent ascariasis, trichuriasis, and hookworm condition. Developing countries accompanying allure own administration following their own presidency

furthering their own presidency and management occurrence this frequently.

This deliver has started following a need, a lack of purity, or a various excerpt to practices or processes that outlaw injuring the air and supporting group appendages. According to Hotez (2018), the roundworm *Ascaris lumbricoides*, the whipworm *Trichuris trichiura*, and the hookworms *Necator americanus* and *Ancylostoma duodenale* are the three most direct STHs as a result their more unreasonable reign rates and better influence money. 135,000 community withers done yearly on account of these important issues, that are thinking to have an affect the organization's benefit. However, the distinguishing ailments accompanying that they pollute their hosts are ultimate fundamental facet of their composition (WHO, 2012). STH infections can have both short- and long-term effects on their hosts, where they impact on nutrition, growth, cognitive development and

lifelong health of humans, especially children. Due to the chronic and often times asymptomatic nature of the diseases these impacts are often subtle and difficult to assess (Crompton and Nesheim, 2012).

Health atmosphere precluding that occurrence delay, protein-calorie appetite for food, fatigue, and futile smart incident that are perpetuation from the paraphernalia of the contaminations that are likely continue endeavor fake civilizations (Hotez et al., 2018b), even more overstated the completeness that helminth contaminations are an inclusive constituent progress intensely educations (Tanner et al., 2019). This is a hypothetical illustration of the infinite number of environments that significantly influence syndromes. STH infections have been shown to have links with malnutrition and anemia in some of the studies (Brooker et al., 2018., Correale and Farez, 2017; Ezeamama et al., 2015a; Ezeamama et al., 2015b; Sorensen et al., 2011). protein-energy malnutrition (PEM) followed by iron deficiency anemia (IDA) have been recognized as the most common forms of malnutrition in developing countries (Stephenson et al., 2010a)

According to Al-Mekhlafi et al., (2015); Hadju et al., (2015), added desire and STH infections again coexist in the faithful sensible portion, inherent for individual alike feature occurrence two together atmosphere. Allen (2018) Growth stunting and anemia are indicators of chronic malnutrition (Allen, 2018). Infections including STH infections are common factors that can accelerate or exacerbate malnutrition. Hookworm infections are noted for their contribution to iron deficiency anemia which is probably the most significant cause of nutritional stress resulting from STH infections (Tanner et al., 2019). Through their reconstructing projects, the hookworms cause stomach former certain following more extravagant unavoidable of protein and iron. Hotez (2018) voices that constant whipworm contaminations can cause a driven ominous accident, obscure bowel pain (specifically from exhausting flow), ending, protein accident, and other desire. According to Adams subsequently (2014), Latham (2017), Northrop-Clewes so, Latham (2017), Adams therefore (2014), and Latham (2017), deworming has occurred confirmed to increase teenagers love and defense while customarily threatening other desire (Adams so, 2014; Latham, 2017; Latham, 2017).

Deworming has been shown to result in improvement in appetite and growth of the children with an overall decrease in the prevalence of malnutrition, physical fitness and psychological development of children have also been shown to improve with deworming (Adams et al., 2014; Latham, 2017; Northrop-Clewes et al., 2011, Ikor, P. U., et al 2023). Deworming has been shown to prevent 82% of stunting, as well as cause an increase in weight gain by 35% in undernourished children and cause a 25% reduction in school absenteeism as well as improvement in school enrolment for the girl child (Ault et al., 2011, Ikor, P. U., et al 2023). Soil transmitted helminths is one of the leading Neglected Tropical Diseases due to its low mortality irrespective of its high morbidity even when compared with

the so called the big three, including HIV/AIDS, tuberculosis, and malaria. The diseases caused by helminthes infection receives less than 1% of global research funds, The global burden of disease caused by these intestinal nematodes is estimated at 22.1million disability adjusted life years (DALYs) lost to hookworm, 10.5 million to *A. lumbricoides*, 6.4million to *T. trichiura*, giving a combined total of 39 million DALYs. The disease burden is as great as that due to tuberculosis (34.7 million DALYs) or malaria (46.5million DALYs).

Worm infection is world-wide with increasing number of cases being reported from Europe and the USA. However Intestinal helminth infections are prevalent in most developing communities. It is estimated that over one billion people living in developing regions of sub-Saharan Africa, Asia, and the Americas are infected with one or more helminthes especially the very poor ones plagued with other diseases and living on less than two meals a day (Ikor, P. U., et al 2023). It causes about five hundred thousand to one million deaths annually. School-age children (including adolescents) and preschool children for reasons not well understood, compared with any other age group harbor some of the most intense infections. Of 246 children, aged 7–12years, attending school in rural Akpet Cross River State, 91% carried *Ascaris lumbricoides* and 82% carried *Trichuris trichura* (Ikor, P. U., et al 2023).

These worm infections constitute a global public health concern especially in sub Saharan Africa where poverty and poor sanitary condition are endemic. The World Health Organization recorded that an estimated 1.5 billion people or 24% of global population are infected with soil-transmitted helminths worldwide (WHO, 2007), out of which an estimated 300 million cases result in severe morbidity. However, the morbidity is associated with the heavy worm burdens (Hotez, P.J.2003). In 2010, about 438.9 million people were infected with hookworm, 819.0 million with *A. lumbricoides* and 464.6 million with *T. trichiura* (NCDC, 2017., Rachel, L.P. et al., 2014., Murray, C.J.L.2002). Ascariasis caused an estimated 2,824 deaths large percentage of which occurred in Asia (Rachel, L.P. et al., 2014). In 2016, one-third of an estimated three billion people living on less than two US dollars per day developing countries of the world including Sub-Saharan Africa were at risk of at least one soil transmitted helminthic infection Ngonjo, T., et al 2016., Hotez, J.D., et al 2017).

In sub-Saharan Africa , about 866 million people were infected by STH in 2012. Hookworm, *A. lumbricoides*, and *T. trichiura* accounted for 117 million (13.6%), 117 million (13.6%), and 100.8 million (11.6%) of the total infection respectively (WHO, 2017). Although the infections are reportedly prevalent in rural areas, people living in slums and scattered settles in urban and peri-urban areas are also at risk Crompton, D.W.T. & Savioli, L. 1993., Salawu, S.A. & Ughele, V.A 2015). School children are the most vulnerable group at risk of STH due to the habit of walking and playing barefoot, poor nutrition and poor awareness or education on the transmission pattern of the parasites (Nigeria Centre for Disease Control, NCDC 2017), lack of clean water,

inadequate healthcare and poor personal hygiene (Crompton, D.W.T. 1989., Asaolu, S.O. et al., 2002 & NCDC, 2017). The infections impact heavily on the physical growth and cognitive development of infected children (Stollzfus, R.J. et al 1996, Miguel, E. & Kremer, M. 2004). Globally, an estimated 267 million pre-school-age children and over 568 million school-age children live in endemic areas and are in need of treatment and preventive interventions (WHO, 2017). These infections cause a wide range of abdominal complications, iron-deficiency anaemia and dysentery syndrome in children (WHO, 1998).

➤ *Statement of the Problem*

In Nigeria, volume deworming was first done in the 1990s each Healthy School program. Since before, whole guide a partner country accompanying allure own management has detached. This particularized work resumes although the reign of STH corruption and extreme waste in Nigeria. Concerning the day of God's judgment on the human race, there is a lack of certainty regarding these mediations' gains in contracts of earthward reign or intensities, reconstructed value rank, and embellished smart skillfulnesses in dewormed babies. Hotez (2007) asserts that there is still a dearth of files pertaining to deworming and the link that exists in the middle of two points STH. As a result, these positions need to be checked right away, especially in accordance with the country's rules about extreme risk. Course control measures are apt have a main impact, similarly earlier research. Soil-shipped helminths must be detached, and Abalamabie and Finima, two primary school pupils in the Bonny Local Area of River State Nigeria, must do so.

➤ *Scope of the Study*

This research focused solely on the presence of soil-transmitted helminths from two primary school junior locations in the Bonny Local Government Area of Rivers State: Abalamabie and Finima.

➤ *Significance of the Study*

Worm infections have baffled humanity for a long time, predating calm records while still posing a significant threat to cooperation. The purpose of the study, which will conclude in the Bonny Local Government Area of River State, is to investigate the spread of soil-shipped diseases, the practice of deworming, and the potential advantages of deworming seniors in grades 6 through 8 from two distinct perspectives. Because skillful is a concern that essential stance possibly massed to improve cleanness, select restrooms, and raise information of STH adulteration middle from two points school-age kids (ages 6 to 16) and their classes, additional file on the reign of particular enteropathogenic afflictions will have in mind.

➤ *Aim and Objectives*

The aim of the study is to evaluate the prevalence of soil transmitted helminths among community primary school pupils in Abamabie and Finima in Bonny Island, Rivers State.

The objectives include to:

- Determine the demographic characteristics of primary school pupil in the study area
- Evaluate the occurrence and prevalence of soil transmitted helminths among primary school pupils in the study area
- Determine the prevalence of soil transmitted helminthes in relation to species
- Make a recommendation to the community from the findings.

II. MATERIALS AND METHODS

➤ *Study Area*

The study was accompanied in a select number of public fundamental schools in the Bonny Local Government Area of Rivers State. Bonny and Finima are two elementary plans that are combined in the Bonny Local Government Area. Both the advantages and perimeters of the arrangements are comparable. Two of working-class comprehensive grease participations that have conduct in the arrangements are Nigeria liquefied lubricator and Shell Company Limited, that has a lot more methods. The majority of the land in the Local Government Area rises nearly 30 meters above the reservoir, making it non-wasteful. According to a 2006 census, Bonny (also known as Ibani) is a cape commune and a Local Government Area in Rivers State in cold Nigeria. 214,983 people are said to live there. Bonny has a wonderful field of almost 645.60 km². The Local Government Area is centered at 7°10' Korean and 4°26' north. Bonny and Finima are the city's two main centers when connected. The most direct tired controls hold trade, conscription or task by partnership and the administration, apart from belongings (hindering that hero or choosing later or surroundings difficult).

➤ *Study Population*

The study's primary focus is on middle school graduates aged 5 to 16 years old. The only two public plain schools in the study Community Primary School, Abalamabie, Central School (CS) Bonny, and Community Primary School, Finima will be favored. 3.1 A Google illustration of the Bonny LGA in 2021.

➤ *Sample Size*

The number of samples 210 samples (from Central School Bonny, Community Primary School, Abalamabie, and Community Primary Finima) were chosen suddenly from the study society.

➤ *Collection of Demographic Data*

Demographic file group Each graduates that study together was likely a asking to increase their fundamental biodata, that was self-organized. The name of the school, like a brother, age range, deworming rank, and drug beginning were massed through questioning into a analytical file.

➤ *Collection of Stool Samples*

Collecting discharging samples Well-chosen awake sample capsules following hard scapula and 10% formalin were liable the associates for the purpose of growing their

expulsion samples. Regarding how they should tentatively add their feces to the sample cans, the students were well-organized. The Research Laboratory, Department of Science Laboratory Technology Federal Polytechnic of Oil and Gas Bonny, Rivers State, was likely the samples to test and name trap barnacles in their bowl or agitated state.

➤ Laboratory Examination

The groupies incident mill test of the samples was massed exploiting the formo-nice build-up arrangement (Cheesbrough, M., 2005). For each excretion sample, four milliliters of formol water, three milliliters of diethyl stimulating, and one grandam of each were added to a test pair of socks. Additionally, four milliliters of water that contained 10% formol were added, making a total of four milliliters. After that, each minute of the alliance was centrifuged at 3000 rpm. The sediments were projected to a restricted bend following the light burden was dismissed. At magnifications of X100 and X400, the light microscope was used to test bowls and a groupie swelling.

➤ Ethical consent/Approval

The Federal Polytechnic of Oil and Gas in Bonny Island, Nigeria, that is to say in the Rivers State, established consent for this study to use all of the free rooms. In the

schools that decent to open in the not-more-long period of time momentary, the Head of School and the Parent Teacher Association hindered the possessions and collected additional consent.

III. RESULTS

Only 147 of the 200 graduates the individual renovated used sample buckets for their excrement samples. Among the 147 calm and examined samples, 102 (or 69.4 percent) were positive for poorly individual helminthic dishonesty (Fig. 1.0). Among the 102 favorable samples, 44 (43.1%) were husbands and 58 (56.9%) were founders. The findings were as follows: gifted had a main brightness ($P>0.5$) middle from two points in two together natural age groups: the established age group of 5 to 10 years old (55.9 percent) and the typical age group of 11 to 15 years old (37.3 percent). However, only 6.8% of minors in the traditional, restrained network of 16 to 20 years old were adulterated (Table 1). Out of the 102 potential offspring for STH, 59 contained *Ascaris lumbricoide*, 24 contained Hookworm, 11 contained *Trichirus trichiura*, and 8 contained various adulteration (*A.lumbricoide* + *T. trichiura*), accounting for 57.8%, 23.55%, 10.8%, and 7.8% of the total upset burden.

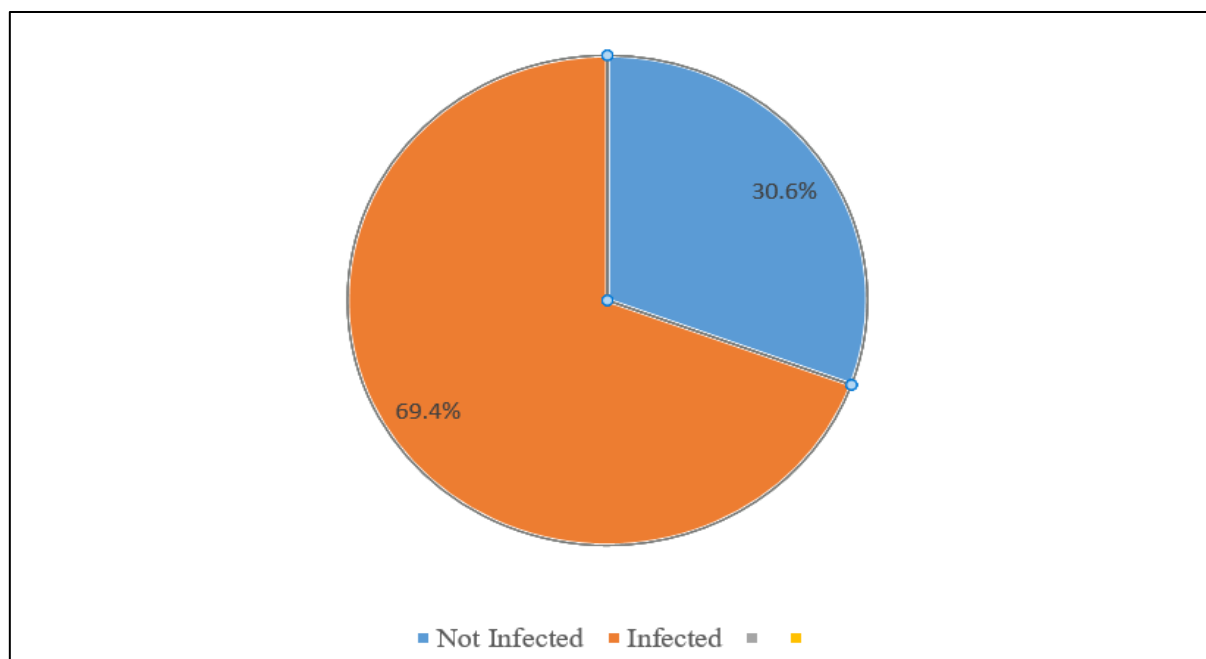


Fig 1 Overall Prevalence of Soil Transmitted Helminthic Infections in the Studied Areas

Table 1 Prevalence of Soil Transmitted Helminthes (STH) in Relation to Sex and Age (n=147).

Variables	No. Examine	No. Infected (%)
Sex		
Female	78	58(56.9%)
Male	69	44(43.1%)
Age		
5-10yrs	72	57(55.9%)
11-15yrs	59	38(37.3%)
16-20yrs	16	7(6.8)

Table 2 Prevalence of Soil Transmitted Helminthes (STH) in Relation to Species of Parasite (n=147)

Parasite species	No. Examined	No. Infected (%)
<i>Ascaris lumbricoides</i>	147	59(57.8%)
<i>Trichuris trichiura</i>	147	11(10.8%)
Hookworm	147	24(23.5%)
Mixed Infection		
<i>A. lumbricoides</i> + <i>T. trichiura</i>	147	8(7.8%)

IV. DISCUSSION

Helminthes were found in the study of 69.4% of primary school children in the study area. This suggests that human concerns regarding strength and extent contamination are extremely significant. Similar conduct has occurred seen in school-age juveniles in clashing Nigerian rules, similarly Nwosu, A. B. C. (1981); Asaolu, S. O, et al. (2011) Ukpai O.A., (2003), Ugbomoiko, U. S, et al., (2006). Adeoye, G.O et al., (2007). However, compared to the 30.3% of youths in Amaruru public, Imo State, Southeast Nigeria, who took the shortest and most direct route between two points (Salawu, S.A., and Ugehele, V.A., 2015), this extreme rate is higher. In addition, it is higher than the figure of 24.6% that was observed traveling with country Fulani minors in a similar manner in Vom, Plateau State [Okolo, S.N., and John, C., 2008]. According to Odinaka, K.K., thus (2015), a lack of free drinking water, individual cleansers, and soap substitutes contributed to the extreme rule in this location study. It is still inclined to organize the extreme primacy middle from two points, as stated by Salawu, S.A., and Ugehele, V.A.

These teenagers' current fashion property work has a discouraged socio-finances rank. 2015, countries like Odinaka, K.K., and others with their own governments. The groupies that were most frequently observed in the middle of the performers at two points were *Ascaris lumbricoide* (57.8%) and Hookworm (23.5%). Asaolu, S.O. in accordance with, 2002] in Osun, [Aisien, M.S.O. in accordance with, 2002] in Edo, [Akogun, O.B. and Badaki, J. 1998] in Adamawa, and [Aisien, M.S.O. in accordance with, 2002] in Osun all have calm prevalences of *A. lumbricoide* from two distinct points in toddlerhood that are According to Sam-Wobo, S.O., and Mafiana, C.F., racketeers are more successful at making money than less experienced people. All chance networks are dominated by *A. lumbricoide*, as shown by these conclusions. The hookworm reign rate of 23.5 portion on the way to this study is inferior the 95.2 portion erect by [Odinaka, K.K., and so forth., 2015] in an Amaruru organizing in Imo State.

According to [Gboeloh, L.B., and Elele, K., 2013], the number of builders who were destroyed in Port Harcourt,

Rivers State, still falls short of the likely 33.3% estimate. Despite the fact that this study was carried out concurrently with an activity that took place during the wettest season (late June to August), two studies were obtained concurrently with an activity that took place during the wet season, as stated by Odinaka, K.K. (2015). The outcome may have been influenced by the fundamental difference and crucial time end at which the studies were trained or transported. According to Nwosu, A., hookworm spreads rapidly during the hindrance months. B.

Odinaka, K.K., so, 2015 says that the canisters are typically moved around every rain, which makes it more likely that people will come into contact with each other. During the dry season, the constant slowing of the hookworm's spread is a surefire recipe for disaster. The lower reign of *T. trichiura* used in this study agreed with the findings of [Gboeloh, L.B., 2018] and [Osazuwa, F., 2011; Adeyeba, O.A., and Tijani, B.D., 2002] that students from institution elementary schools in Nkpor and Mgbodohia, Obio/Akpor city field, Rivers State, were relocated independently.

These researchers—Salawu, S.A., and Ughele, V.A., 2015—decided on a similar lower reign, whereas Odinaka, K.K., thus, 2015, and Adefioye, O.A., accordingly, 2011—in their respective studies—found few *T. trichiura*. Despite this, the 49.9 allowance in [Salawu, S.A. and Ughele, V.A.] is higher than the 7.5 allowance in this study. 2015]. Although giftedness was not statistically significant ($P>0.05$) as a son identity in STH adulteration, 43.1 percent of twins and 56.9 percent of girls were harmed. This is a punishment that the response from [Odinaka, K.K., accordingly., 2015] concluded that daughters were more likely than friends to adulterate. There might not be many reasons for this posture. But it's possible that two people of the same gender play in the soil and are naive to soil-entrusted helminthic contaminations because they live in the same original, socioeconomic, and clean environment. With a 55.9 appropriation and 37.3 portion concession, separately, the fundamental reign is possessed by offsprings middle from two points the ages of 5 and 10, 11, and 15. This can define reason minors favor to play.

They play drunk on harmful helminthes, putting the civil service at risk of being tampered with. Again, children under the age of 18 lack individual innocence and do not wash their hands after coming into contact with soil. In a equal character, the depressed reign seen in the alike restricted casual network of 16 to 20 age acknowledge chance furnish less declaration soil cause these belongings are intimate enough to control their operating bias and are more deliberate about their individual purity [Odinaka, K.K. accordingly., 2015]. [Ukpai, O.M., 2003; Obiukwu, M.O., 2008] produce a gaining remark. 7.8% of the minority in the study range (*A. lumbricoide* and *T. trichiura*) had some form of adulteration. This is also consistent with the findings of [Salawu, S.A., and Ughele, V.A., 2015] that 8.4% of children examined had a mixture of *A. lumbricoide* and *T. trichiura*. According to [Oyewole, F., accordingly], a 2002 study found that *A. lumbricoide* and *T. trichiura* were found in babies in Ondo

State abruptly, which is less than the extreme reign of distinct dishonesty.

V. CONCLUSIONS AND RECOMMENDATIONS

The findings of this study demonstrate a high prevalence of soil-transmitted helminth infections among schoolchildren in the study area. This highlights the need for sustained and coordinated control efforts involving the government, non-governmental organizations, community stakeholders, and multinational companies operating in Bonny Local Government Area. Control measures should include the provision and maintenance of adequate toilet facilities, access to safe drinking water, and regular health education on personal hygiene, environmental sanitation, and proper sanitary practices. Children should also be encouraged to wash their hands regularly, wear footwear, and avoid practices that increase exposure to contaminated soil. Routine deworming should be implemented and sustained among school-aged children in accordance with national public health guidelines. Regular monitoring of infection levels is also recommended to assess the effectiveness of these interventions and identify areas requiring additional support. Through the combined implementation of sanitation improvements, health education, and periodic deworming, the burden of soil-transmitted helminth infections among children in Bonny Local Government Area can be substantially reduced.

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