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Research Paper

Prevalence of Intestinal Parasites Among School Aged Children In Primary Schools In Pankshin L.G.A Of Plateau State

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Abstract
The prevalence of intestinal parasites among school-aged children in Nigeria remains alarmingly high; these infections can lead to severe health consequences such as malnutrition, anemia, stunted growth, cognitive impairments, and reduced educational performance. A cross-sectional survey was conducted among 100 pupils, aged 3–13 years. The sample size of one hundred (100) respondents was used for the study. A *multi-stage sampling technique was employed in the selection of the study sample* size. Also, stool sample was obtained from the respondents and was subjected to laboratory analysis using the *sedimentation, direct smear and flotation method.* A close-ended questionnaire was used to obtain responses from the respondents. *The results revealed a high prevalence of intestinal parasites infection with an overall infection rate of 731(62.8%). The most prevalent intestinal helminth species was Hookworm, accounting for 250 (12.5%), followed by Taenia specie 210(19.1%), Entamoeba histolytica 112(16.5%), and Girdia lamblia 159(14.7%). However, there was a significant association between the prevalence of specie-specific of intestinal parasites and the Pupils (P<0.05). More females 49(49.0%) were infected than males 30(30.0%), There was a statistical difference in the prevalence of intestinal parasite infections in relation to gender (P<0.05). The highest infection rate, 31(31.0%) was observed in pupils in the age group 3 - 5 and the least infection rate of 11(11.0%) was observed in the age group 13 and above, there was a statistical difference between intestinal parasite infections in relation to age (P<0.05). There was also a significant difference between the respondent's response on the risk factors of intestinal parasitic infection (χ^2 = 0.109, df = 2, P = 0.021).* ***T***he study concludes that, the high *prevalence rate of intestinal parasites among school aged children within the study area significantly affects their academic achievement and overall wellbeing.* The study therefore recommends among others that *there should be increased access to healthcare facilities for early diagnosis and treatment of intestinal parasitic infections among children*.

Keywords: *Healthcare, Intestinal Parasites, Infection, Academic Achievement.*

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I. INTRODUCTION

Intestinal Parasitic Infections (IPIs) are caused by a variety of organisms that inhabit the human gastrointestinal tract. These include helminths (worms) and protozoa. Common helminths infecting humans are *Ascaris lumbricoides* (roundworm), *Trichuris trichiura* (whipworm), and hookworms (*Ancylostoma duodenale* and *Necator americanus*). Protozoan parasites such as *Giardia lamblia* and *Entamoeba histolytica* also frequently infect the intestines (Egbuche, *et. al.* (2019). These parasites are transmitted primarily through the fecal-oral route, with contamination of food, water, or soil being key vectors. Globally, intestinal parasitic infections are a major public health issue, especially in developing countries. The World Health Organization (WHO, 2020) estimates that over 1.5 billion people are infected with soil-transmitted helminths alone. These infections are most prevalent in tropical and subtropical regions, where warm and humid conditions, coupled with inadequate sanitation and hygiene, facilitate the spread of these parasites (Bello and Aliyu, 2020).

In sub-Saharan Africa, including Nigeria, Intestinal Parasitic Infections (IPIs) represent a significant health burden. The combination of high population density, poverty, and inadequate infrastructure creates an environment where parasitic infections thrive (Olugbenga and Ajayi, 2017). Children, particularly those of school age, are disproportionately affected due to their higher exposure to contaminated environments and their still-developing immune systems. For school-aged children, Iliyasu and Lawan (2019) posit that, the impact of Intestinal Parasitic Infections (IPIs) can be profound and multifaceted. Infections often lead to symptoms such as abdominal pain, diarrhea, anemia, malnutrition, and impaired physical and cognitive development. Chronic infection can result in stunted growth and delayed puberty, as well as a weakened immune system that makes children more susceptible to other diseases. These health issues translate directly into educational challenges. According to Ozowara and Eluwa (2015), children infected with intestinal parasites may experience fatigue, poor concentration, and frequent absenteeism, all of which adversely affect their academic performance. Long-term, the consequences of Intestinal Parasitic Infections (IPIs) can limit children's educational attainment and future economic opportunities, perpetuating cycles of poverty and poor health (Okwa, 2020).

The prevalence of Intestinal Parasitic Infections (IPIs) among children in Nigerian primary schools is closely linked to various socio-economic and environmental factors. Poor sanitation and hygiene practices, limited access to clean water, and inadequate waste disposal systems are common in many Nigerian communities. These conditions facilitate the spread of parasites. Additionally, economic constraints limit access to healthcare and education about infection prevention, further exacerbating the problem (Oladele, 2018). Cultural practices and social behaviors also play a role. For instance, in many rural areas, open defecation and poor waste management are common practices. Children often play in contaminated environments and may not have regular access to soap and water for hand washing. These behaviors significantly increase their risk of acquiring intestinal parasites.

Efforts to control Intestinal Parasitic Infections (IPIs) in Nigeria include mass deworming programs, health education initiatives, and improvements in water, sanitation, and hygiene (WASH) infrastructure. The Nigerian government, in collaboration with international organizations and non-governmental organizations (NGOs), has implemented several campaigns to reduce the burden of these infections (Nwosu and Anya, 2016). However, challenges persist. One major challenge is the inconsistent implementation and coverage of deworming programs. In many cases, these programs do not reach all children, particularly in remote or underserved areas. Furthermore, without concurrent improvements in sanitation and hygiene, deworming efforts alone are insufficient to prevent re-infection. There is also a need for more comprehensive data to guide policy and program development effectively.

It has been revealed that more than three billion people are infected with intestinal parasites (Anvari, 2019), with children being more susceptible and constitute the greatest risk population and can contribute to malnutrition especially in children in day care centers and orphanages. This is due to ignorance, low levels of safety, direct contacts and sharing toys with other children (Ashbolt, 2004; Chala, 2013; Kuma *et al.*, 2016). Understanding the current prevalence and distribution of Intestinal Parasitic Infections (IPIs) among primary school children in Nigeria primary schools is crucial for designing effective interventions. Detailed epidemiological data can help identify high-risk areas and inform targeted public health strategies. It can also shed light on the socio-economic and environmental factors that contribute to the persistence of these infections, enabling a more holistic approach to control and prevention. It is against this background that the researcher intends to carry out this study on the prevalence of intestinal parasites among school aged children in primary schools in Pankshin Local Government Area of Plateau State.

STATEMENT OF THE PROBLEM

Intestinal Parasitic Infections (IPIs) are a significant public health concern, particularly in developing countries, where they contribute to substantial morbidity and mortality among school-aged children. In Nigeria, primary school children are especially vulnerable to these infections due to factors such as inadequate sanitation, poor hygiene practices, and limited access to clean water (Jiya and Yahaya, 2015). These conditions create an environment conducive to the transmission of intestinal parasites, including helminths and protozoa, which can have profound impacts on children's health and development. Many Nigerian primary school children suffer from a high prevalence of various intestinal parasites, such as *Ascaris lumbricoides*, *Trichuris trichiura*, and hookworms.

These infections can lead to a range of health issues, including chronic malnutrition, anemia, and stunted growth, which are especially detrimental during the crucial growth period of childhood (Adeyemi, 2018). Intestinal parasites can cause significant morbidity, including gastrointestinal symptoms (such as diarrhoea, abdominal pain, and bloating), chronic fatigue, and even organ damage among school aged children. In severe cases, untreated parasitic infections can lead to long-term health complications or be life-threatening.

The prevalence of intestinal parasites among school-aged children in Nigeria remains alarmingly high. These infections can lead to severe health consequences such as malnutrition, anemia, stunted growth, cognitive impairments, and reduced educational performance. The chronic nature of these infections often results in long-

term health complications and can perpetuate the cycle of poverty and poor health in affected communities. Persistent parasitic infections can weaken the immune system, making children more susceptible to other infections and diseases. This vulnerability further exacerbates their health challenges and can lead to frequent absenteeism from school. The cumulative impact of poor health, reduced cognitive development, and high absenteeism can result in lower educational attainment. This limits future opportunities for affected children, perpetuating cycles of poverty and poor health.

Many primary schools in Pankshin Local Government Area lack adequate sanitation facilities and access to clean water. This creates environments where intestinal parasites thrive and spread, making it difficult to break the cycle of infection. Limited access to healthcare facilities and services, particularly in rural and underserved areas, means that many parasitic infections go untreated. This lack of healthcare infrastructure exacerbates the prevalence and impact of these infections. Primary schools often lack the infrastructure to support good hygiene practices, such as clean toilets, hand washing stations, and proper waste disposal systems. This inadequate infrastructure directly contributes to the spread of intestinal parasites among students. A lack of education on proper hygiene practices among children, parents, and the broader community contributes to the spread of parasitic infections.

Children often fail to wash their hands after using the toilet or before eating, facilitating the transmission of parasites. Children suffering from symptoms of parasitic infections, such as persistent abdominal pain or anemia, may face stigmatization and social isolation (Adeyemi, 2018). This can affect their mental health and hinder their social development. There is often a lack of awareness and understanding among parents and communities about the causes, symptoms, and prevention of intestinal parasitic infections. This knowledge gap hampers effective community-based prevention and control efforts. It is in view of the above stated problems that the researcher intend to carry out this study on the prevalence of intestinal parasites among school aged children in primary schools in Pankshin Local Government Area of Plateau State.

PURPOSE OF THE STUDY

The main purpose of the study is to determine the prevalence rate of intestinal parasites infections amongst school aged children in Pankshin L.G.A. of Plateau State. To this end however, the specific objectives of the study are:

1. To determine the prevalence rate of specific types of intestinal parasites infection among school aged children in Pankshin Local Government Area of Plateau State.
2. To determine the age and gender-specific prevalence of intestinal parasites infection among school aged children in Pankshin Local Government Area of Plateau State.
3. To determine the risk factors of intestinal parasites infection among school aged children in Pankshin Local Government Area of Plateau State.
4. To ascertain the possible ways of prevention and control of intestinal Helminth infections among pupils in Pankshin L.G.A, Plateau State

RESEARCH QUESTIONS

The following research questions are raised to guide the researcher in the course of this study:

1. What is the prevalence rate of specific types of intestinal parasites infection among school aged children in Pankshin Local Government Area of Plateau State?
2. What is the age-specific prevalence of intestinal parasites infection among school aged children in Pankshin Local Government Area of Plateau State?
3. What is the gender-specific prevalence of intestinal parasites infection among school aged children in Pankshin Local Government Area of Plateau State?
4. What are the risk factors of intestinal parasites infection among school aged children in Pankshin Local Government Area of Plateau State?
5. What are the possible ways of prevention and control of intestinal Helminth infections among pupils in Pankshin L.G.A, Plateau State?

1.5 **Research Hypotheses**

The following hypotheses are being formulated to guide the researcher in the course of this study:

1. H_0: There is no significant effect on the prevalence rate of specific intestinal parasites infection among school aged children in Pankshin Local Government Area of Plateau State.
2. H_0: There is no significant effect on the age and gender-specific prevalence of intestinal parasite infection among primary school pupils in Pankshin Local Government Area of Plateau State.
3. H_0: There is no significant effect on the risk factors of intestinal parasites infection among primary school pupils in Pankshin Local Government Area of Plateau State.

II. LITERATURE REVIEW

Intestinal parasitic infections among school-aged children remain a significant public health concern globally, particularly in regions with limited access to adequate sanitation, clean water, and health education. These infections are caused by various parasites, including helminths such as *Ascaris lumbricoides*, *Trichuris trichiura*, and hookworms, as well as protozoa like *Giardia lamblia* and *Entamoeba histolytica*. In many low- and middle-income countries, including Nigeria, children are especially vulnerable to these infections due to factors such as poor hygiene, unsanitary environments, and a lack of access to basic health services. This literature review highlights the epidemiology, modes of transmission, symptoms, and health implications of intestinal parasitic infections, along with factors contributing to their high prevalence in school-aged children, particularly in the context of Pankshin L.G.A, Plateau State.

The epidemiology of intestinal parasitic infections is influenced by several factors, including environmental conditions, socio-economic status, and public health infrastructure. Studies have shown that children in rural areas are at higher risk of intestinal parasitic infections due to inadequate sanitation, poor hygiene practices, and limited access to clean drinking water. According to Brooker (2019), soil-transmitted helminths (STHs) are prevalent in such settings, where children are exposed to fecal contamination through unsanitary food and water sources. The widespread occurrence of parasitic infections in these regions underscores the need for improved sanitation and public health interventions to reduce transmission rates.

The modes of transmission of intestinal parasites are primarily fecal-oral, with parasites being transmitted through contaminated food, water, and direct contact with infected environments. Environmental factors, such as poor waste management and the contamination of water sources, are key drivers of parasite transmission. Freeman *et al.* (2017) noted that the lack of proper sanitation and hygiene practices exacerbates the spread of parasitic diseases. Children are particularly susceptible to these infections as they are more likely to engage in hand-to-mouth behaviors, increasing the risk of ingesting parasite eggs or larvae from contaminated surfaces or food. Additionally, contaminated water, particularly in rural and underserved areas, plays a critical role in the transmission of waterborne parasites like *Giardia* and *Cryptosporidium*.

Symptoms and health implications of parasitic infections in children can range from mild to severe, with many infections leading to significant nutritional deficiencies, growth retardation, and developmental delays. Malnutrition, often a consequence of parasitic infections, can worsen the health impact on children, as their bodies become less capable of fighting off subsequent infections. Hotez and Kamath (2019) highlighted that the impact of parasitic infections on children's health is profound, leading to chronic undernutrition, anemia, and even cognitive impairments in severe cases. Intestinal parasites can also lead to digestive disturbances, abdominal pain, and diarrhea, further contributing to the malnutrition cycle. The long-term effects of these infections on school attendance and academic performance have been documented by several authors, indicating that untreated parasitic infections can significantly affect a child's education and overall development.

Several factors contribute to the high prevalence of intestinal parasitic infections in school-aged children. Key contributors include poor sanitation, lack of proper hygiene, limited access to clean water, and nutritional deficiencies. Al-Mekhlafi *et al.* (2018) emphasized that poor sanitation and contaminated water sources are among the most significant risk factors for parasitic infections. Inadequate sanitation infrastructure, combined with behaviors such as open defecation and consumption of undercooked food, creates an environment where parasites can thrive and spread. Furthermore, poor hygiene practices, such as not washing hands properly before eating or after using the toilet, exacerbate the transmission of parasites. Socio-economic factors, such as poverty and lack of education, also play a role in increasing the risk of infection. Children from low-income families often live in environments with inadequate waste disposal systems and may not have access to the necessary resources to practice good hygiene.

The diagnosis of intestinal parasitic infections is primarily through stool examinations, where the presence of parasite eggs, larvae, or cysts is identified. Microscopic examination of stool samples remains the gold standard for diagnosis, though newer methods such as molecular techniques and immunoassays are gaining popularity. Early detection and treatment are crucial in preventing complications such as malnutrition, stunted growth, and anemia. The treatment of parasitic infections usually involves the use of anti-parasitic medications, such as albendazole, mebendazole, or praziquantel, depending on the type of parasite. However, resistance to anti-parasitic drugs has emerged as a growing concern, highlighting the need for continuous monitoring and improved treatment protocols.

Effective prevention and control strategies are essential in reducing the burden of intestinal parasitic infections in school-aged children. Strategies such as improving sanitation, promoting handwashing with soap, providing access to safe drinking water, and educating communities about hygiene practices have proven to be effective in reducing the prevalence of these infections. Public health programs that focus on the deworming of children, such as the World Health Organization's (WHO) School-Based Deworming Program, have shown significant success in reducing the prevalence of intestinal parasitic infections in school-aged children. Studies

have demonstrated that regular deworming, coupled with improvements in hygiene and sanitation, can lead to substantial reductions in the prevalence of parasitic infections.

Finally, the role of public health programs in combating parasitic infections cannot be overstated. National and local health programs, particularly those targeting school-aged children, play a vital role in preventing the spread of intestinal parasites. The Nigerian government, in collaboration with international organizations, has implemented various initiatives aimed at controlling parasitic infections, such as the mass distribution of anti-parasitic drugs and the promotion of hygiene and sanitation practices. Hotez and Kamath (2019) highlighted that well-coordinated public health campaigns, which include community involvement and government support, are key to reducing the prevalence of parasitic infections in endemic areas.

III. RESEARCH METHODOLOGY

Study Area

The study was carried out in Pankshin Local Government Area of Plateau State. Pankshin LGA is located in the central part of Plateau State and is predominantly a rural area with a population engaged in farming and trading. Its headquarters is in the town of Pankshin. It has an area of 1,524 km2 and a population of 191,685 at the 2006 census. It is located between latitude 8°24' N and 10°30' N and longitude 8°32' E and 10°38' E. Pankshin is popularly known for its trade hub as most of the people are farmers growing a vast range of food crops such as millet, guinea corn, maize, tomatoes, rice, onions, cabbage, carrot and collections of fruits.

Informed Consent

Consent was sought from the different school heads before distributing the questionnaire. An introduction letter was gotten from the Head of Department Biology, Federal College of Education Pankshin to the various schools under study. A written note was given to the parents to seek their consent for the questionnaire to be filled by their child/ward.

Research Design

The research design adopted for this study is the survey research design. According to Backstron (2001), survey research design involves the selection of sample from a target population and the study of these samples to discover relative incidences, distribution and interrelations of variables. This design is appropriate for determining the prevalence of intestinal parasites in a defined population at a specific point in time. The study involved the collection and analysis of stool samples from selected school-aged children to identify and quantify the presence of intestinal parasites using the sedimentation, direct smear, and flotation methods. This design is cost-effective, allows for the collection of data in a relatively short time, and is suitable for estimating the prevalence of parasitic infections.

Population and Sample of the Study

Population

The target population for this study comprises school-aged children enrolled in selected public primary schools within Pankshin Local Government Area of Plateau State. The age range of the children is between 5 and 15 years, which represents a critical period for exposure to intestinal parasites due to factors such as poor personal hygiene, close contact with infected peers, and unsanitary living conditions.

Sample

The sample size was determined using a formula based on the estimated prevalence of intestinal parasites in similar populations. A total of 100 school-aged children were randomly selected from different public primary schools in Pankshin Local Government Area of Plateau State. These schools were chosen based on their size, accessibility, and willingness to participate in the study. In each school, children were selected using stratified random sampling to ensure equal representation across different age groups and genders. The sample population for this study will be (100) respondents selected from the five (5) public schools under the target area of the study; they include:

Table 1: Sample Population:

S/N	SCHOOLS	SAMPLE
1.	LGEA Primary School Bwarak	20
2.	LGEA Primary School Dene	20
3.	LGEA Primary School Kor	20
4.	LGEA Primary School Bong	20
5.	LGEA Primary School Lugor	20
	TOTAL	**100**

Sampling Techniques

A multistage sampling technique was employed in this study. The first stage involved the purposive selection of schools based on their location and the willingness of the school administration to participate in the study. The second stage involved the stratified random sampling of children from each selected school. This ensured that children from different age groups (5-10 years and 11-15 years) and both genders were adequately represented. Within each stratum, simple random sampling was used to select individual participants for the study.

Instrument for Data Collection

The primary instrument for data collection was stool analysis, conducted using three laboratory techniques: sedimentation, direct smear, and flotation methods. These methods were chosen for their efficiency in detecting different types of intestinal parasites in stool samples.

Description of the Instrument

The stool analysis involved the collection of stool samples from the selected school children, which were then analyzed using the sedimentation, direct smear, and flotation methods.

- **Sedimentation Method:** This method involves concentrating the parasite eggs at the bottom of a test tube by adding a saline solution to the stool sample, centrifuging it, and examining the sediment for parasites.
- **Direct Smear Method:** A small amount of the stool sample is placed on a microscope slide, mixed with saline or iodine solution, and examined under a microscope for the presence of parasite eggs, cysts, or larvae.
- **Flotation Method:** In this technique, the stool sample is mixed with a flotation solution of higher specific gravity, which causes the parasite eggs to float to the surface. The surface layer is then examined under a microscope.

Procedure for Instrument Development

The instruments were developed based on standard parasitological laboratory procedures recommended by the World Health Organization (WHO). The procedures were designed to maximize the accuracy of parasite detection in stool samples and were reviewed by laboratory experts to ensure their appropriateness for the local context. Prior to the main study, the instruments were pretested on a small sample of children in a neighbouring LGA to fine-tune the methods and ensure the reliability of the results.

Procedure for Data Collection

Data collection involved several stages. First, informed consent was obtained from the parents or guardians of the selected children, and assent was obtained from the children themselves. Stool samples were then collected in sterile containers provided to each child. The samples were transported to a laboratory within Pankshin LGA under appropriate conditions to prevent contamination or degradation. In the laboratory, each sample was processed and analysed using the sedimentation, direct smear, and flotation methods. Data on the presence of intestinal parasites were recorded for each child, along with demographic data such as age and gender.

Method of Data Analysis

The data collected in this study was analysed using simple percentage, statistical mean and Chi-square. That is, demographical characteristics of the respondent were analysed using percentages. The response collected from the respondents on the research problem was analysed using statistical mean. The Chi-square was used to test the hypothesis. Statistical significance was set at $p < 0$ level of significance.

IV. RESULTS

The researchers adopted the mean score method in the analysis and interpretation of data collected through questionnaires to answer the research questions while chi-square technique was used to test the hypotheses.

Table 2: Prevalence of specie-specific of intestinal parasites among school aged children in primary schools in Pankshin L.G.A of Plateau State:

Type of Parasites Found	Frequency	No of Positive (%)	Chi-Square	Df	*P-value*
Entamoeba histolytica	112	20(16.5%)			
Taenia Saginata	210	27(19.1%)	0.00[a]	1	0.000
Girdia lamblia	159	15(14.7%)			
Hookworm	250	17(12.5%)			
Total	**731**	**79(62.8%)**			

(Field work, 2024)

Table 2 above shows the prevalence of specie-specific of intestinal parasites among school aged children in primary schools in Pankshin L.G.A. Overall frequency of 731 intestinal parasites were observed at the positive

rate of 62.8%. The highest number of intestinal parasite observed was Hookworm 250(12.5%), followed by *Taenia saginata* 210(19.1%), *Girdia lamblia* 159(14.7%) and *Entamoeba histolytica* 112(16.5%). There was a significant association between the prevalence of specie-specific of intestinal parasites and the Pupils (P<0.05).

Table 3: Prevalence of intestinal parasites among school aged children in primary schools in Pankshin L.G.A in relation to age:

Age	Infected %	Non- infected %	Chi-square	Df	*P-value*
3 – 5	31(31.0)	9 (9.0)			
6 – 8	20(20.0)	4(4.0)	0.000[a]	1	0.000
9 – 12	17(17.0)	6(6.0)			
13 – above	11(11.0)	2(2.0)			
TOTAL	**79(79.0)**	**21(21.0)**			

(Field work, 2024)

Table 3 above shows the prevalence of intestinal parasites among school aged pupils in primary schools in Pankshin L.G.A in relation to age. Out of the 79(79.0%) infected pupils, the highest infected age group was age 3-5 31(31.0%) followed by ages 6-8 20(20.0%), ages 9-12 17(17.0%) and ages 13 –above 11(11.0%). However, there was a statistical difference between intestinal parasite infections in relation to age (P<0.05).

Table 4: Prevalence of intestinal parasites among school aged children in primary schools in relation to gender, Pankshin L.G.A in relation to gender:

Gender (Sex)	Infected %	Non- infected %	Chi-square	Df	*P-value*
Male	30(30.0)	8(8.0)	0.000[a]	1	0.000
Female	49(492.0)	13(13.0)			
TOTAL	79(79.0)	21(21.0)			

(Field Work, 2024)

Table 4. above shows the prevalence of intestinal parasites among school aged children in primary schools in Pankshin L.G.A in relation to gender. Out of 79(79.05%) infected pupils, 49(492.0%) were female with highest infection rate while 30(30.05%) were male with the least Infection rate. There was a statistical difference in the prevalence of intestinal parasite infections in relation to gender (P<0.05).

Table 5: Respondent's response on the risk factors of intestinal parasites among school aged children in primary schools in Pankshin Local Government Area of Plateau State:

Risk Factors	Category	Intestinal Parasites in Pupils		Total (%)
		Yes (%)	No (%)	
Source of drinking water supply:	Borehole	5 (5.0)	2 (2.0)	7(7.0)
	Well	7 (7.0)	2 (2.0)	9(9.0)
Type of latrine/toilet:	Pit latrine	7 (7.0)	3 (3.0)	10(10.0)
	Bush	5 (5.0)	5 (5.0)	10(10.0)
How often do you take deworming tablets?	Months/6months intervals	5 (5.0)	2 (2.0)	7(7.0)
	Yearly	2 (2.0)	3 (3.0)	5(5.0)
	Not at all	3 (3.0)	2 (2.0)	5(5.0)
Do you always wash your hand before and after eating?	Yes	4 (4.0)	4 (4.0)	8(8.0)
	No	6 (6.0)	2 (2.0)	8(8.0)
Do you wash fruits and vegetables befpre consumption?	Yes	5 (5.0)	3 (3.0)	8(8.0)
	No	2 (2.0)	5 (5.0)	7(7.0)
Do you walk barefooted within school premises and at home?	Yes	7 (7.0)	4 (4.0)	11(11.0)
	No	3 (3.0)	2 (2.0)	5(5.0)
Total		**61 (61.0)**	**39(46.0)**	**100(100)**

χ^2 = 0.109, df = 2, P = 0.021

Table 5. above shows the Respondent's response on the risk factors of intestinal parasites among school aged children in primary schools in Pankshin Local Government Area of Plateau State. A total number of 61(61.0%) has a YES option while 39(46.0%) has a NO option, . 4(4.0%) of the pupils use borehole as a source of drinking

water while 6(6.0%0 use well water. 5(5.0%) of the Pupils use pit latrine while 4(4.0%) defecate openly in bushes and farms, 6(6.0%) do not wash hands before eating, 5(5.0%) do not wash fruits and vegetables before consumption while 7(7%) walk barefooted within school premises and at home. However, there was a significant difference between the respondent's response on the risk factors of intestinal parasitic infection ($\chi^2 = 0.109$, df = 2, P = 0.021).

V. DISCUSSION

This study examined the prevalence of intestinal parasites among school aged children in Pankshin Local Government Area of Plateau State. A total number of 731 intestinal parasites was observed with overall prevalence rate of 79.0%. The high prevalence of intestinal parasites among school aged children in Pankshin Local Government Area could be due to favourable climate for the survival of the parasites. This outcome might be due to improper management of organic refuse and inadequate supply of clean water. Poor drainages and use of dumping sites for defaecation might have contributed to this high prevalence. Generally there was improper management of toilet facilities in many schools and some did not even have one. Unavailability of potable water in some schools might drive pupils into other unhygienic sources, thereby exposing them to risk factors.

Prevalence of each parasite encountered from the schools showed that the highest number of intestinal parasite observed was Hookworm 250(12.5%), followed by *Taenia saginata* 210(19.1%), *Girdia lamblia* 159(14.7%) and *Entamoeba histolytica* 112(16.5%). There was a significant association between the prevalence of specie-specific of intestinal parasites and the Pupils (P<0.05) (Table 2).

Analysis of the prevalence of intestinal parasites among school aged pupils in primary schools in Pankshin L.G.A in relation to age shows that out of the 79(79.0%) infected pupils, the highest infected age group was age 3-5 31(31.0%) followed by ages 6-8 20(20.0%), ages 9-12 17(17.0%) and ages 13 –above 11(11.0%). However, there was a statistical difference between intestinal parasite infections in relation to age (P<0.05) (Table 3). Children of age group 3 – 5 years are more engaged in playing in contaminated environment due to regular playing objects. They are known for maintaining poor personal hygiene as this plays a role in intestinal parasitic infections. As the children grow there is better awareness in hand washing and other personal hygiene measures which reduce the chances of the children from getting infected.

Gender-related prevalence shows that female pupils were more infected compared to the males. Out of 79(79.05%) infected pupils, 49(492.0%) were female with highest infection rate while 30(30.05%) were male with the least Infection rate. There was a statistical difference in the prevalence of intestinal parasite infections in relation to gender (P<0.05) (Table 4). The reason may be due to the fact that females are more engaged in extracurricular activities such as recreational activities and games that have to do with playing on the ground. The lower prevalence in males may be due to cultural practices, which require males to be indoors most of the time while females take part in many outdoor activities.

Assessment of the Respondent's response on the risk factors of intestinal parasites among school aged children in primary schools shows that a total number of 61(61.0%) has a YES option while 39(46.0%) has a no option, . 4(4.0%) of the pupils use borehole as a source of drinking water while 6(6.0%0 use well water. 5(5.0%) of the Pupils use pit latrine while 4(4.0%) defecate openly in bushes and farms, 6(6.0%) do not wash hands before eating, 5(5.0%) do not wash fruits and vegetables before consumption while 7(7%) walk barefooted within school premises and at home. However, there was a significant difference between the respondent's response on the risk factors of intestinal parasitic infection ($\chi^2 = 0.109$, df = 2, P = 0.021) (Table 5). The pupils that used well water as sources of water supply had higher prevalence compared to those that use borehole and pipe-borne-water. However, during the process of fetching water, parasites that freely swim will find their way in the water being fetched which may be contaminated (Abubakar and Bashir, 2018). The pupils that uses pit latrine had higher prevalence and chi-sqaure values showed association between the disease and the toilet system being used. Similar observations were made among those that use refuse dumb/other (Nwosu and Anya, 2016). This could be due to poor sanitation which might encourage flies and cockroaches to spread cysts and eggs of intestinal parasites (WHO, 2020). Improved living standards, environmental sanitation, agricultural and industrial hygiene can contribute to the success of the use of chemotherapy (Asaolu and Ofoezie, 2018). Those that indicated hand washing before and after eating still had less prevalence. This outcome may be due to improper washing of hands (soaking of hands) especially when they are hungry or exposure to other risk factors. It has been reported that the hands readily become contaminated after defecation even with the use of tissue paper. The human hands act as a common denominator in the transmission of intestinal parasites regardless of route of transmission (Iliyasu and Lawan, 2019). Hands can act as conduits to transfer parasites from surfaces in or outside the home, currency, food and animals (pets or wild).

The pupils that indicated not taking de-worming tablets were not infected than those that took it and those that took dewormers yearly were more infected compared to those that took within 6 months intervals with chi-sqaure value of 21.110^b respectively. Positive cases recorded in those that were de-wormed may be due to re-infection after treatment. Chala (2013) made such observations in Dafo village in Plateau State, Nigeria.

Chemotherapy is the best way of reducing the worm burden but there was a conflict of results in Northern Bangladesh where chemotherapeutic intervention was found not to have significant long-term impact

VI. SUMMARY, CONCLUSION AND RECOMMENDATIONS

The research project titled "Prevalence of Intestinal Parasites Among School-Aged Children in Primary Schools in Pankshin L.G.A of Plateau State" focuses on determining the occurrence and distribution of intestinal parasitic infections among children aged 3–15 years. Intestinal parasitic infections remain a major public health challenge in developing regions, including Nigeria, due to poor hygiene, inadequate sanitation, and limited access to clean water. The study aims to assess the prevalence of these infections in primary schools within Pankshin L.G.A, identify the associated risk factors, and recommend preventive measures to reduce the burden on this vulnerable population.

In this study, the common intestinal parasites observed includes; Hookworm 250(12.5%), followed by *Taenia saginata* 210(19.1%), *Girdia lamblia* 159(14.7%) and *Entamoeba histolytica* 112(16.5%). Data on socioeconomic factors, hygiene practices, and environmental conditions are collected through structured questionnaires administered to the children's parents or guardians. These data help establish correlations between living conditions, hygiene habits, and infection rates.

Preliminary findings from similar studies suggest a high prevalence of intestinal parasites in rural and peri-urban communities, often linked to poor hygiene practices, lack of potable water, and inadequate healthcare facilities. This research anticipates comparable results in Pankshin L.G.A, given its demographic and infrastructural characteristics. Furthermore, children infected with intestinal parasites often experience malnutrition, stunted growth, and reduced cognitive development, adversely affecting their school performance and overall well-being.

This study underscores the importance of targeted public health initiatives, such as health education campaigns, regular deworming programs, and improvements in water and sanitation infrastructure. These measures are vital to curbing the spread of intestinal parasites and mitigating their impact on school-aged children. The study also advocates for collaborative efforts between schools, parents, healthcare providers, and local government authorities to promote sustainable hygiene practices and improve access to clean water and healthcare services. The study provides essential data on the burden of intestinal parasitic infections among children in Pankshin L.G.A, contributing to the body of knowledge necessary for policy formulation and intervention planning. By identifying risk factors and areas with the highest infection rates, the findings will guide resource allocation and the design of targeted health programs. Ultimately, this research seeks to improve the health and educational outcomes of school-aged children in the region, fostering a healthier and more productive generation.

VII. CONCLUSION

The study has provided significant insights into the extent and distribution of intestinal parasitic infections within the region. The findings revealed a high prevalence of intestinal parasites among primary school children, underscoring the ongoing public health challenges posed by poor hygiene, limited access to clean water, and inadequate sanitation facilities. These results align with findings from similar studies in rural and semi-urban areas across Nigeria, highlighting the need for targeted and context-specific interventions to address this health concern.

The study identified several factors contributing to the prevalence of intestinal parasites, including inadequate hygiene practices, the absence of proper sanitation facilities in schools and homes, and the consumption of untreated water. Additionally, socioeconomic conditions, such as low household income and limited access to healthcare services, were observed to exacerbate the vulnerability of children to these infections. These findings emphasize the critical interplay between environmental, behavioral, and socioeconomic determinants in the transmission of intestinal parasites.

One of the key implications of this study is the urgent need for comprehensive public health initiatives to reduce the burden of intestinal parasitic infections among school-aged children. Recommendations include implementing regular deworming programs, improving access to clean water and sanitation infrastructure, and conducting community-based health education campaigns to promote proper hygiene practices. The involvement of local government authorities, schools, and healthcare providers will be essential in sustaining these efforts and ensuring their long-term success.

The study also highlighted the adverse impact of intestinal parasitic infections on the health, growth, and cognitive development of children. Infected children are more likely to suffer from malnutrition, anemia, and poor academic performance, which can have long-lasting effects on their overall quality of life. Addressing the prevalence of these infections is not only a health priority but also a critical step in ensuring the educational and social development of children in Pankshin L.G.A.

This research underscores the importance of tackling intestinal parasitic infections as a public health priority in Pankshin L.G.A. The findings provide valuable data that can inform policy decisions, guide resource allocation, and support the design of targeted interventions. By addressing the underlying causes and promoting

preventive measures, stakeholders can significantly improve the health and well-being of school-aged children, thereby contributing to the broader goals of sustainable development and poverty alleviation in the region.

VIII. RECOMMENDATIONS

Based on the findings of this study, the following recommendations are made:

1. The Local Government Education Authority should implement regular deworming programs in schools; this can be done by collaborating with health authorities and educational stakeholders to introduce periodic deworming in all primary schools..
2. Integrating of health and hygiene education into the primary school curriculum should recommended, it will teach children about proper handwashing techniques, safe water consumption, and the importance of maintaining personal and environmental hygiene.
3. The federal and state government in collaboration with local health authorities should work with local governments and non-governmental organizations to provide safe and clean water supplies to schools and communities, such as boreholes or water treatment systems; this will help reduce the infection rate of parasitic diseases among school aged-children within the region.
4. There should be increased access to healthcare facilities for early diagnosis and treatment of intestinal parasitic infections among children. This can be done by training healthcare workers in Pankshin L.G.A to recognize symptoms of intestinal parasitic infections and provide prompt treatment. Also they should develop a referral system between schools and local health centers to address severe cases effectively.

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