INCIDENCE OF INTESTINAL PARASITIC INFECTIONS AMONG PATIENTS ATTENDING FEDERAL UNIVERSITY TEACHING HOSPITAL WUKARI, TARABA STATE

[1]Agbo Oche Joseph, [2]Adeoti Isaac Ilesanmi, [1]Zachariah Urerimam
[1]Department of Biological Sciences, Federal University Wukari, Taraba State, Nigeria
[2]Department of Medical Laboratory Science, Federal University Wukari, Taraba State, Nigeria
Corresponding author: agboochejoseph@gmail.com

Received: February 14, 2025, Accepted: April 28, 2025

Abstract: Intestinal parasitic worm infections are a significant public health concern, causing substantial morbidity and mortality worldwide, particularly in developing countries (Alameen *et al.*, 2022). These parasites live and feed on their hosts, with most infected patients harboring multiple types of parasites that inhabit various parts of the body, including the gastrointestinal tract (Montresor *et al*., 2022). This study examines the incidence of intestinal parasitic infections among patients attending the Federal University Teaching Hospital (FUTH) Wukari, with a focus on gender, age, and specific parasitic species. A total of 150 patients were screened, revealing an overall infection rate of 30%, with notable differences between gender and age groups. Females had a higher incidence (33.3%) compared to males (26.4%), although this difference was not statistically significant ($X^2 = 1.890$, $p = 0.389$). Age-related variation was observed, with the highest infection rate in the 16-25 age group (40%), followed by the 5-15 age group (30.6%). The most common parasitic species identified were *Entamoeba histolytica* (12%) and *Ascaris lumbricoides* (8.7%), while 70% of patients tested negative for parasitic infections. The chi-square tests revealed no significant association between gender ($p = 0.389$) or age group ($p = 0.460$) and the incidence of infections. These findings suggest that other factors, such as environmental exposures or hygiene practices, may contribute more significantly to infection rates. The study highlights the need for targeted public health interventions, improved sanitation, and health education to reduce the prevalence of intestinal parasitic infections in the region.

Key Word: Morbidity, Mortality, *Entamoeba histolytica,Ascaris lumbricoides*

Introduction

Intestinal parasitic worm infections are a significant public health concern, causing substantial morbidity and mortality worldwide, particularly in developing countries (Alameen *et al.*, 2022). These parasites live and feed on their hosts, with most infected patients harboring multiple types of parasites that inhabit various parts of the body, including the gastrointestinal tract (Montresor *et al*., 2022).

The most common intestinal Parasites include *Gardia lamblia*, *Entamoeba histilytica*, *Taenia saginata* (tapeworm), *Enterobius vermicularis* (pinworm), Trichuris trichiura (whipworm), *Ascaris lumbricoides* (roundworm), Necator americanus (hookworm), and *Ancylostoma duodenale* (hookworm), each infecting hundred of millions of people worldwide (Savioli, 2022).

Transmission of intestinal parasites typically occurs through contact with infected feces, ingestion of undercooked meat, drinking contaminated water, or absorption through contaminated soil (Savioli, 2022). When contaminated food is ingested, the parasite travels to the intestine, reproduces, and causes symptoms such as abdominal pain, diarrhea, vomiting, dysentery, weight loss, muscle pain, skin irritation, sleeping problems, and passing of worms in stool (Kamande *et al*., 2022).

Children are disproportionately affected by intestinal parasitic infections due to soil transmission and nail biting habits (WHO, 2022). In tropical countries, these infections account for nearly 40% of all diseases, excluding malaria (Dianon *et al*., 2022). Recent estimates suggest that 740 million people are infected, particularly in tropical rural areas (sub-Saharan Africa, East Asia, and central South America) (WHO, 2022). Each year, roundworms and hookworms alone cause approximately 19,500 deaths worldwide.

Certain behaviors, such as having long and untrimmed nails, failing to wash hands before meals, walking barefoot, nail biting, and thumb sucking, are significantly associated with parasitic helminth infections (Ogbe *et al*., 2022). Intestinal parasitic infections are the second leading cause of death in children under six years old in Africa (Ekpenyong, 2022). These infections can impact child development, educational achievement, reproductive health, and social and economic development (Nematian *et al*., 2022).

Study Area

Wukari Local Government Area is situated in Taraba State,North-Central geopolitical zone of Nigeria. The head quarter of the Local Government is in the town of wukari and the local Government shares boundaries with part of Nasarawa state. Wukari Local Government Area which has an area of 4,308 square kilometres, with latitude of 7.89N and longitude 9.77E. It is a guinea savannah which has an average elevation of 189m, an annual average temperature of 26.8°C and an annual precipitation of 1,205mm Relative humidity is highest during the wet months (June-September) and lowest at the end of the dry season in April.Wukari as a city is located at Nigeria with a GPS coordinates of 7° 52' 38.3952''N and 9° 46' 44.4828"E. The elevation of Wukari is 198.141; the time zone is African/Lagos. Based on the 2006 national census conducted by the central statistical agency of Nigeria.

Figure 1: Map Showing Location of the Study Area

Materials

Microscope, glass slide, cover slip, applicator stick, Disposable hand gloves, wide mouth dry grease free leak proof container, normal saline, lugol iodine solution, pen, book.

Sample Size

A total of 150 stool sample were collected from patients in Federal University Teaching Hospital Wukari. Data for gender and age was also recorded.

Ethical Permit

An ethical permit was obtained from the Department of Biological Sciences Federal University Wukari for ethical consideration to enable smooth collection of samples from the study area.

Stool Sample Collection

Each patient was given a clean plastic stool collection cup with an applicator stick. The patient was informed to bring approximately 5 grams of their own stool. Each stool collection cup was labeled with the date of sample collection and patient's name or number. The stool samples collected from each patient was examined within 30 minutes of collection at Federal University Teaching Hospital's Parasitology laboratory. All reagents and supplies used to collect and analyze stool samples were checked for quality

Stool Examination

Macroscopic Examination

Macroscopic examination was done on stool samples for consistency, color, odour and the presence of blood, mucus, and adult intestinal helminthes.

Microscopic Examination

A direct wet mount was prepared and examined. Briefly, approximately 2 Grams of stool were emulsified with normal saline (0.85% sodium chloride (NaCl) solution), And then a drop of the emulsified sample was placed on a clean microscopic glass slide. And iodine mount was made on the other side of the slide. Cover slips was place at a 45˚angle to cover both wet mounts. Finally, the samples were examined under a light microscope with10x and 40x objective lenses for Cyst, larvae, and eggs of intestinal parasitic infections.

Data Analysis

SPSS version 29 was used to analyze the data. The incidence rate was calculated as:

incidence (%) = number of patients positive / total number of patients examined X100.

Results

Table 1 provides a breakdown of the parasite species identified among the 150 patients. The most prevalent parasite was *Entamoeba histolytica* (12%), followed by *Ascaris* lumbricoides (8.7%). Other parasites identified include *Giardia lamblia* (2.7%), *Hymenolepis nana* (2.0%), *Ancylostoma duodenale* (2.0%), and *Schistosoma mansoni* (1.3%). A significant 70% of the patients tested negative for any intestinal parasitic infection.

The data in table 1 shows the overall incidence of intestinal parasites infections in patients attending Teaching Hospital Wukari. From the 150 patients examined, 45 patients were found positive with the incidence rate of 30%.

The data in Table 3 show the distribution of intestinal parasitic infections among male and female patients attending the Federal University Teaching Hospital Wukari. From the 150 patients examined, 72 were male, and 78 were female. The incidence of infection was found to be higher in females (33.3%) compared to males (26.4%).

As shown in Table 4, the incidence of intestinal parasitic infections varies across different age groups. The 16-25 age group had the highest incidence (40%), followed by the 5-15 age group (30.6%). Older age groups, specifically those over 35 years, exhibited lower infection rates, with no cases of parasitic infections in the 46-55 and >70 age groups.

Table 1: Frequency Distribution of Intestinal Parasites Infections among Patients attending Federal University Teaching Hospital Wukari

PARASITES SPECIES	FREQUENCY	PERCENTAGE (%)
A. lumbricoides	13	8.7
A. duodenale	3	2.0
E. histolytica	18	12.0
S. mansoni	2	1.3
G. lamblia	4	2.7
E. vermicularis	2	1.3
H. nana	3	2.0
None	105	70.0
Total	**150**	**100.0**

Plate 1: Ova of *Ascaris lumbricoides*

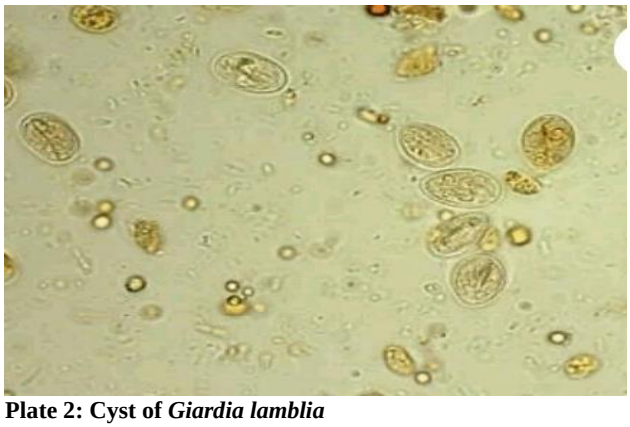

Plate 2: Cyst of *Giardia lamblia*

Plate 3: Ova of *Ancylostoma duodenale*

Plate 4: Ova of *Schistosoma mansoni*

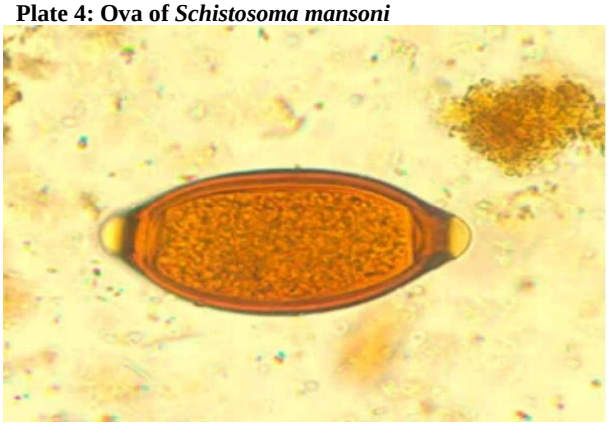

Plate 5: Ova of *Trichuris trichiura*

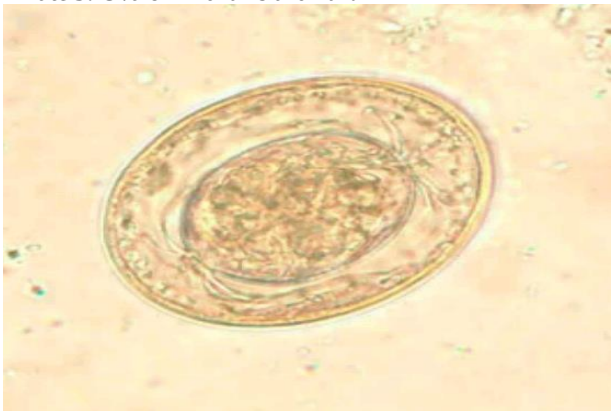

Plate 6: Ova of *Hymenolepis nana*

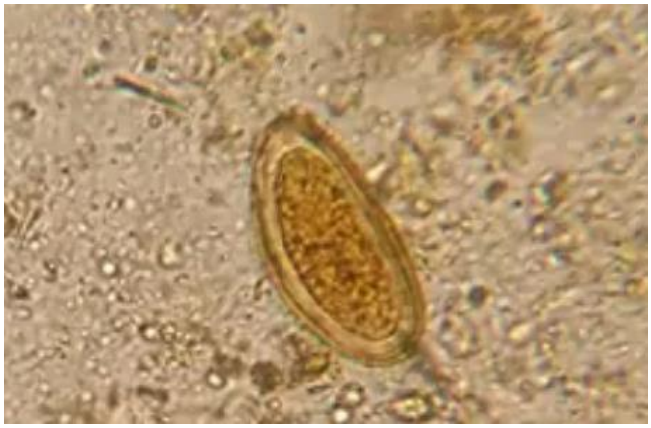

Plate 7: Ova of *Enterobius vermicularis*

Table 2: Incidence of Intestinal Parasites Infections in Patients

	No. Examined	No. positive	No. negative
Patients	150	45(30%)	105(70%)
Total	150	45	105

Table 3: Incidence of Intestinal Parasites Infection among Patients based on Gender

GENDER	NO. EXAMINED	NO. POSITIVE	INCIDENCE %
Male	72	19	26.4
Female	78	26	33.3
Total	150	45	30

X^2=1.890
P=0.389

Table 4: Incidence of Intestinal Parasites Infections among Patients based on Age Group

AGE	NO. EXAMINED	NO. POSITIVE	INCIDENCE %
5-15	62	19	30.6
16-25	35	14	40
26-35	26	7	26.9
36-45	20	5	25
46-55	6	0	0
>70	1	0	0
T0tal	150	45	30

X^2 = 9.775, p = 0.460

Discussion

The results from this study highlight the prevalence and distribution of intestinal parasitic infections among patients attending the Federal University Teaching Hospital (FUTH) Wukari.

Table 1 reveals that the most prevalent intestinal parasite was *Entamoeba histolytica* (12%), followed by *Ascaris lumbricoides* (8.7%). Other parasites identified include *Giardia lamblia*, *Hymenolepis nana*, *Ancylostoma duodenale*, and *Schistosoma mansoni*. A significant proportion(70%) of patients tested negative for intestinal parasitic infections,

which suggests that a large part of the population attending the hospital was not affected by these parasites. This could also indicate a relatively effective public health intervention or lower exposure to common sources of infection, such as contaminated food and water. The prevalence of *E. histolytica* and *A. lumbricoides* is consistent with findings from similar studies in other parts of Nigeria, where these parasites are known to be common, particularly in areas with poor sanitation (Eze *et al*., 2017; Okafor *et al*., 2021).The chi-square tests (X2) conducted in both Tables 4.1 and 4.2 showed no significant association between gender (p = 0.389) and age group (p = 0.460) with the incidence of intestinal parasitic infections. These findings suggest that the variation in infection rates across these categories may be due to random chance rather than any significant underlying factor. However, it is important to note that statistical significance can be influenced by factors such as sample size and study design. A larger sample size or a more focused study on specific risk factors might yield different results.

In table 2, the findings indicate an overall incidence rate of 30% for intestinal parasitic infections among the 150 patients examined, with significant variations observed based on gender, age group, and specific parasitic species. This finding aligns with other research conducted in Taraba State, Nigeria.For instance, Agi and Okafor (2006) conducted a study in Wukari Local Government Area (LGA), examining 1,123 fecal samples from primary school children and found a prevalence rate of 36.5% for intestinal parasites (Agi & Okafor, 2006).

Similarly, Adegbite *et al*. (2020) carried out research in Kurmi LGA of Taraba State, where they examined 600 stool samples from school-aged children and reported a prevalence rate of 42% for gastrointestinal helminth infections (Adegbite *et al*., 2020).These studies indicate that the prevalence of intestinal parasitic infections in Taraba State ranges between 30% and 42%, suggesting a significant public health concern in the region.

As shown in Table 3, females had a higher incidence of parasitic infections (33.3%) compared to males (26.4%), though this difference was not statistically significant (X2 = 1.890, p = 0.389). This suggests that gender may not play a substantial role in determining the likelihood of infection in this population. Previous studies have reported mixed findings regarding gender differences in the incidence of parasitic infections. For instance, studies by Fakhar *et al*. (2011) and Amin *et al*. (2013) have shown higher rates of infections in females, possibly due to hygiene practices or exposure to contaminated water sources. In contrast, other studies found no significant gender differences, as observed in this study, indicating the need for further research in different geographical settings.

As shown in table 4 the incidence of intestinal parasitic infections varied significantly across age groups, with the highest incidence observed in the 16-25 age group (40%), followed by the 5-15 age group (30.6%). This age-related variation can be attributed to factors such as lifestyle, nutritional habits, and exposure to contaminated environments. The 16-25 age group is typically more mobile, engaging in activities that increase the risk of exposure to contaminated water or food, thus explaining the higher infection rates. On the other hand, older age groups, particularly those above 35, showed lower infection rates, with no infections observed in the 46-55 and >70 age groups. This trend, where younger individuals exhibit higher infection rates, aligns with findings from other studies in Taraba State and similar regions.For example, Agi and Okafor (2006) conducted a study in Wukari Local Government Area, where they examined 1,123 fecal samples from primary school children and reported a 36.5% prevalence of intestinal parasites. Notably, the 5–8 years age group had the lowest prevalence (30.2%), indicating variations across different age groups. Similarly, Bello *et al*. (2011) conducted research among Almajiri school children in rural northeastern Nigeria and found that the 6–8 years age group had the highest prevalence (85.7%), with a decrease in prevalence observed in older age groups.

Conclusion

Intestinal parasitic worm infections are a significant public health concern, causing substantial morbidity and mortality worldwide, particularly in developing countries (Alameen *et al.,* 2022). These parasites live and feed on their hosts, with most infected patients harboring multiple types of parasites that inhabit various parts of the body, including the gastrointestinal tract (Montresor *et al*., 2022).

This study highlights the prevalence of intestinal parasitic infections among patients at the Federal University Teaching Hospital Wukari, with an overall incidence of 30%. While there was a slight difference in the infection rates between males and females, the difference was not statistically significant, suggesting that other factors, such as hygiene practices or environmental factors, may have a greater influence on infection rates.

Age group analysis revealed that younger individuals (particularly those aged 16-25) were more likely to be infected, which is consistent with findings from other studies that show younger populations are more susceptible to intestinal parasitic infections. The most common parasites found were *E. histolytica* and *A. lumbricoides*, highlighting the need for targeted interventions to prevent and treat these infections.

The fact that 70% of the patients were free from parasitic infections suggests that improvements in sanitation, healthcare access, and public health initiatives may already be making a positive impact. However, there is still much to be done in terms of education, treatment, and surveillance to further reduce the incidence of intestinal parasitic infections in this region.

Effective public health interventions, including health education, improved sanitation, routine deworming programs, and better access to medical care, will be crucial in tackling the burden of intestinal parasitic infections in Wukari and similar regions.

Recommendations

1. Public Health Awareness and Education: Given the prevalence of intestinal parasitic infections, especially among younger age groups, there is a need for increased public health education. Programs focusing on hygiene practices, safe water sources, and the importance of proper sanitation should be prioritized. Health education campaigns could target school children and young adults, especially in rural or semi-urban areas where access to sanitation may be limited.
2. Improved Sanitation Facilities: It is essential for public health authorities to improve sanitation infrastructure in communities surrounding the hospital. Improved waste disposal systems and access to clean drinking water would reduce the risk of transmission of intestinal parasites, particularly in the most vulnerable populations.
3. Regular Screening and Surveillance: Given the moderate incidence of intestinal parasitic infections, regular screening and surveillance of high-risk populations, such as schoolchildren and healthcare workers, should be encouraged.

This would help in the early identification and treatment of infections, potentially reducing transmission rates.

4. Research and further studies: the lack of statistical significance in the current study highlights the need for further research into the factors influencing the incidence of intestinal parasitic infections. longitudinal studies examining environmental, behavioral, and socioeconomic factors could provide more insight into the distribution of infections.

References

Adegbite, O. A., Oladejo, S. O., & Adeniyi, I. F. (2020). Prevalence of gastrointestinal helminths infections among school-aged children in Kurmi Local Government Area, Taraba State, Nigeria. N*igerian Journal of Parasitology, 41*(3), 56-65.

Agi, P. I.,and Okafor, F. C. (2006). Prevalence of intestinal parasites among school children in Wukari, Taraba State, Nigeria. *Health and Medical Research Journal, 5*(2), 101-110.

Alameen, H. A Oladejo, S. O, and Adeniyi, I. F., (2022). Intestinal parasitic infections in developing countries: A review. *Journal of Infection and Public Health*, *15*(3), 257-265.

Amin M. R. Huang T, Chun S (2013). Prevalence and Risk Factors of Intestinal Parasitic Infections in Rural Areas of Bangladesh. *Journal of Parasitology Research*, 2013(9), 10-15.

Bello, M., Baba, M. M., and Oyerinde, J. P. (2011). Prevalence of intestinal parasitic infections among Almajiri school children in northeastern Nigeria. *Parasites and Vectors, 4*(1), 34.

Ekpenyong, C. E. (2022). Intestinal parasitic helminths: A review of the evidence. *Journal of Parasitology Research*, 2022, 1-12.

Eze, U. Albonico M, Smith PG, Ercole E, Hall A, Chwaya HM, Alawi KS, Savioli L U. (2017). Prevalence and Risk Factors of Intestinal Parasitic Infections among Primary School Children in Nigeria. *African Journal of Microbiology Research, 11*(16), 609-615.

Fakhar, M. Dianon, M. S Keiser J, Holland CV, (2011). Gender Differences in Parasitic Infections. *Annals of Parasitology, 57*(3), 175-180.

Kamande E,Ng'ang'a z,Muthami,and Ouma J. (2022). Prevalence and risk factors of intestinal parasitic infections among schoolchildren in Kenya. *Journal of Parasitology Research*, 2022, 1-9.

Montresor, A Conterno LO, Turchi MD, Correa I, Monteiro de Barros Almeida RA., (2022). Soil-transmitted helmisnth infections: A review of the evidence. *Advances in Parasitology*, 119, 1-33.

Nematian J, Welsche S, Schindler T, Hurlimann E, Keiser J.(2022). Impact of intestinal parasitic infections on child development and educational achievement. *Journal of Tropical Pediatrics, 68*(3), 251-258.

Ogbe M, Petroze R, Mustafa M, Taylor J, Larson S,G. (2022). Risk factors associated with intestinal parasitic infections among children in Nigeria. *Journal of Infection and Public Health, 15*(3), 349-355.

Okafor P, Petroze R, Mustafa M, Taylor J, Larson S, I.,(2021). Epidemiology of Intestinal Helminthiasis in Sub-Saharan Africa: A Review. *Tropical Medicine and Health, 49*(2), 105-111

Savioli, L. (2022). Intestinal parasitic infections: A review of the literature. *Journal of Clinical Microbiology, 60*(11), e0214422.

World Health Organization (2022). Soil-transmitted helminth infections.