



Original Article

One Health Bulletin



Intestinal parasitic infections and risk factors among school-aged children in selected schools in Nigeria

Shikmwa Ayuba Dawurung¹, Garba James Damen¹, Ayuba Bulus Dawurung^{2✉}

¹Medical Laboratory Science, Faculty of Health Sciences and Technology of University of Jos, Plateau State, Nigeria

²Department of Clinical Laboratory, Institute of Human Virology, Abuja, Nigeria

ABSTRACT

Objective: To determine the prevalence of intestinal parasitic infections and associated risk factors among selected school children in Du District, Jos South LGA, Plateau State, Nigeria.

Methods: A cross-sectional study was carried out on 185 healthy children aged 5–15 years, and a multistage sampling technique was used. Formal-ether concentration/direct wet mount methods were used to identify the parasites. A pre-tested, structured questionnaire was used to gather data on environmental, personal hygiene, and sociodemographic parameters. *Chi-square* test and descriptive statistics were employed for the analysis.

Results: A total of 185 students were included and 25 (13.5%) of them had intestinal parasitic infections. The most common parasites were *Ascaris lumbricoides* (28.0%), *Taenia* spp. (24.0%), and *Entamoeba histolytica/dispar* complex (20.0%). Higher infection rates were observed among children practicing open defecation (up to 18.7%) and those using unsafe drinking water sources (wells 12.9%; streams 12.4%).

Conclusions: The results highlight the critical need for comprehensive control efforts, including better health education, a clean water supply, and sanitation.

KEYWORDS: Intestinal; Risk factors; Parasitic infections; School-aged children; Jos South; Plateau State

1. Introduction

Intestinal parasitic infections (IPIs) remain a major public health challenge in sub-Saharan Africa, where they play a major role in illness and death, particularly among vulnerable groups like school-aged children[1]. These infections are frequently linked

to poverty, limited access to clean drinking water, inadequate sanitation, and poor hygiene practices[2]. Children are especially at risk due to their inquisitive nature, frequent contact with contaminated surroundings, and underdeveloped immune systems. The long-term effects of IPIs in children can lead to malnutrition, slowed cognitive development, reduced physical growth, and lower school attendance and performance, thus perpetuating a cycle of poverty and health issues[3].

Nigeria, a tropical nation with a predominantly rural population and often inadequate sanitation infrastructure, is highly endemic to various intestinal IPIs[4]. Prior studies conducted in different regions

Significance

This study offers current epidemiological data on intestinal parasitic infections in Plateau State, Nigeria, a region with scarce records. By identifying intestinal parasites and linking them to open defecation and unsafe water sources, the findings give a vital guide for local health authorities. This study highlights the urgent need for targeted health education, better sanitation infrastructure, and promotion of clean water initiatives to improve child health.

✉To whom correspondence may be addressed. E-mail: adawurung@ihvnigeria.org

This is an open access article distributed under the terms of the Creative Commons Attribution-Non-Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

For reprints contact: reprints@medknow.com

©2026 One Health Bulletin Produced by Wolters Kluwer- Medknow.

How to cite this article: Dawurung SA, Damen GJ, Dawurung AB. Intestinal parasitic infections and risk factors among school-aged children in selected schools in Nigeria. One Health Bull 2026; 6(4): 190–196. doi: 10.4103/ohbl.ohbl_115_25

Article history: Received 20 December 2025
Accepted 24 April 2026

Revision 6 March 2026
Available online 5 June 2026

of the country have reported varying prevalence rates influenced by a range of geographical, environmental, and socioeconomic factors[5]. In southeastern Nigeria, intestinal parasitism is common among preschool and school children. The intestinal parasites identified in stool specimens included hookworm (12.7%), *Strongyloides stercoralis* (3.3%), *Ascaris lumbricoides* (20.7%), *Taenia* spp. (2.7%), *Trichuris trichiura* (1.7%), and *Entamoeba histolytica* (4.0%). The prevalence of intestinal parasites was 49.7%[6]. The high prevalence of soil-transmitted helminths among pupils in both rural and urban areas observed in North-Central Nigeria, with at least one type of soil-transmitted helminth comprising 18.3% and 15.3% prevalence in rural and urban communities, respectively, indicating endemicity of these parasites in the region[7]. In Plateau State, there is recorded evidence of gastrointestinal parasites in cattle, which signals the presence of intestinal parasites in the state[8]. Gaining a comprehensive understanding of the current epidemiological landscape and identifying specific risk factors in the targeted population is essential for the development of effective control strategies. This study focuses on primary school children in selected public and private primary/nursery schools within Plateau State, an area where detailed and recent epidemiological data on IPIs and their associated risk factors in the study are scarce. The objective of this research was to ascertain the prevalence of IPIs among primary school children in Du District, Jos South LGA of Plateau State, Nigeria, as well as to identify the demographic, environmental, and behavioural factors linked to these infections.

2. Methods

2.1. Study area and population.

This cross-sectional study was carried out in three primary schools located in Du District, Jos South, Plateau State, Nigeria. The study encompassed a population of 185 healthy primary school children aged 5 to 15 years.

2.2. Sampling technique

For this investigation, a multistage sampling technique was used. Due to the lack of recent epidemiological data in the area, Du District was first chosen on purpose. Three elementary schools: Latya, Kwang, and B. Academy, were then chosen to reflect a variety of public and private learning environments. Lastly, 185 students who satisfied the inclusion requirements were recruited during the study period and received a signed parental agreement.

2.3. Sample collection and examination

The sample size ($n=185$) was determined using the formula put forward by Lwanga and Lemeshow[9], based on an expected prevalence (P) of 10.9% from a previous study.

$$n = [Z^2 \times P \times (1-P)] / d^2$$

Where n means sample size, Z refers to Z-score corresponding to the chosen confidence level (for 95%, $Z \approx 1.96$), P is expected prevalence (10.9%)[10] and d means margin of error.

This represents the minimum number of samples to be collected, which is 149. Each child received a clean, labeled, wide-mouthed, and leak-proof container along with instructions on how to collect the samples. The samples were transported to the Department of Medical Laboratory Science and Technology, University of Jos, for analysis within a few hours after collection. Macroscopic examination was done to assess the color, consistency, and presence of adult worms. For microscopic examination, both direct wet mount and formal-ether concentration techniques were utilized to identify ova, cysts, and larvae of intestinal parasites[11]. The reagents were commercially prepared. In the direct wet mount procedure, a small amount of stool was mixed with a drop of normal saline and iodine solution on different slides, covered with a coverslip, and inspected under $100\times$ and $400\times$ magnification. For the formal-ether concentration method, about 1 g of stool was emulsified in 10 mL of 10% formol saline, sieved and centrifuged, and the resulting sediment was examined microscopically.

2.4. Data collection

A pre-tested structured questionnaire was distributed to the parents or guardians of the children involved in the study to gather data on socio-demographic details such as age, sex, and the educational level of the parents. Additionally, the survey explored environmental factors, including the type of toilet facilities available at home and school, the source of drinking water, and how long the same water source has been used. It also assessed personal hygiene practices, such as methods of treating drinking water, handwashing routines, the frequency of purchasing food from restaurants or open markets, and how food is consumed. Furthermore, information regarding the keeping of domestic animals in the household was gathered.

2.5. Data analysis

The data gathered were entered into Microsoft Excel and analyzed with IBM SPSS Statistics version 26. Descriptive statistics, such as frequencies and percentages, were employed to summarize the demographic characteristics and the prevalence of various parasites. The *Chi-square* (χ^2) test was utilized to evaluate the relationship between the prevalence of intestinal parasites and different demographic, environmental, and hygiene-related factors. A P -value below 0.05 ($P<0.05$) was regarded as statistically significant.

2.6. Ethical consideration

Ethical approval for the study was obtained from the Plateau State Ministry of Health, State Specialist Hospital, with approval number: NHREC/09/23/2010b, and in accordance with the Helsinki Declaration 2013. Approval was also obtained from school authorities, and written informed consent and assent were secured from the parents/ guardians and the children, respectively.

3. Results

3.1. Demographic distribution

The study comprised 185 participants in total. Although there was a slightly higher percentage of females ($n=101$, 54.6%) than males ($n=84$, 45.4%), the sex distribution was otherwise balanced. With 48.6% ($n=90$) of the total population, the ≤ 5 -year age group was the largest demographic. The 6–10-year age group came in second with 39.5% ($n=73$). With just 11.9% ($n=22$) of the participants, the 11–15-age group was the least represented.

The population's average age was 6.16 ± 3.44 years with the mean age of females slightly higher (6.32 ± 3.42 years) than that of males (5.98 ± 3.39 years), as shown in Table 1.

3.2. Sex prevalence

Of the 185 schoolchildren, the 11–15 age group had the highest prevalence of intestinal parasites (18.2%), followed by the 6–10 age group (13.7%) and the ≤ 5 age group (12.2%). According to the sex

distribution, Table 2 shows that females had a higher infection rate (15.2%) than males (11.3%).

3.3. Parasitic distribution in the study area

Of the 185 children examined, 25 (13.5%) were positive for intestinal parasites. The prevalence of IPIs was highest among children in LEA Primary School Latya (15.1%), as shown in Figure 1. *Ascaris lumbricoides* (28.0%), *Taenia* spp. (24.0%), and *Entamoeba histolytica/dispar* complex (20.0%) were the most detected parasites. Additionally, cysts of hookworm and *Hymenolepis nana* were found to be 12.0% and 8.0%, respectively, as shown in Figure 2.

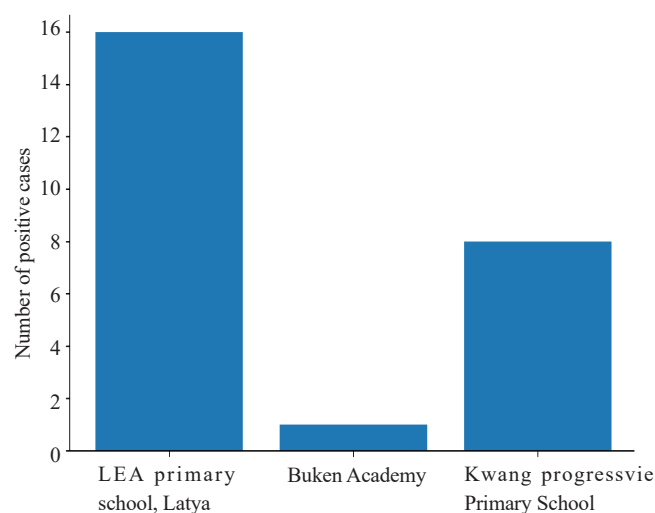


Figure 1. Prevalence of intestinal parasites by schools.

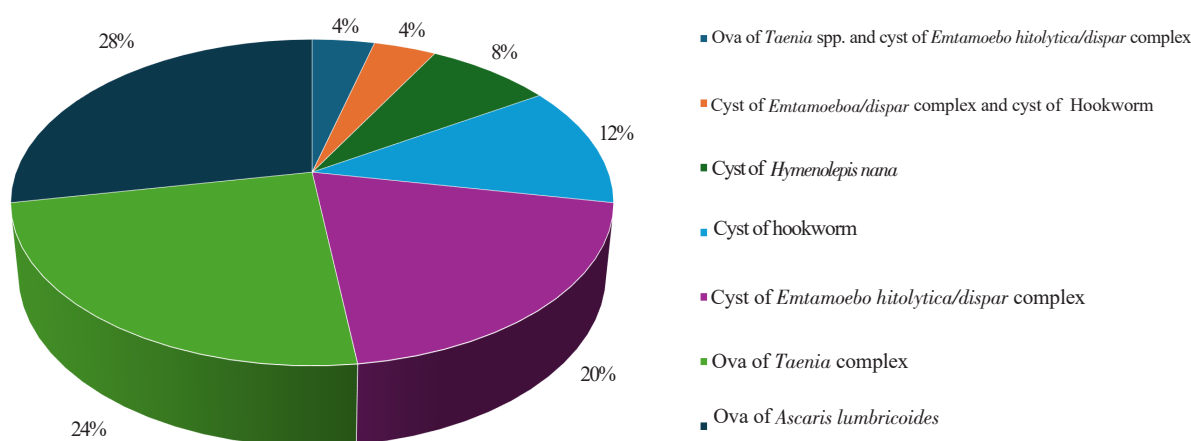


Figure 2. Types of intestinal parasites identified.

3.4. Relationship with age groups and sex

The age range of 11-15 years old (18.2%) and females (15.2%) had the highest prevalence. *Chi-square* analysis, however, showed no statistically significant association between infection and either sex ($P = 0.432$) or age ($P = 0.763$)(Table 2).

3.5. Relationship with environmental sanitation (type of toilet facility)

The prevalence of intestinal parasites across demographic categories is displayed in Table 2. The incidence of children using water systems was 11.9%, whereas that of children engaging in open defecation at home was 18.7%. The kind of toilet facilities did not significantly associate with infection status, despite the observed trend.

3.6. Relationship with source of drinking water

The prevalence of parasites in tap, well, and stream water sources is displayed in Table 2. It's significant to note that the prevalence of illness was 0% for those using tap water, but it was almost the same for those using well water (12.9%) and stream water (12.4%). At $P=0.489$, the difference was not statistically significant.

3.7. Relationship with personal hygiene practices

Table 2 presents the relationship of IPIs with several hygiene practices. Pupils who always purchased food from open markets (20.7%), did not wash their hands after using the restroom (15.8%), and did not treat their water before drinking (14.5%) had higher prevalence rates. None of these trends met the statistical significance criterion, even though they imply that poorer hygiene raises risk.

3.8. Relationship with domestic animal rearing

Parasite prevalence was somewhat greater in students whose parents did not raise animals (14.0%) than in those who did (12.8%). Pigs (13.8%) and chickens (13.3%) were the most common animal types as described in Table 2. The connection was not statistically significant ($P=0.814$).

3.9. Household water source and collection habits

According to Table 3, most households get their water primarily from streams (52.4%) and wells (44.3%). Adult women are largely responsible for collecting water (58.4%), with female children coming in second (26.5%).

Furthermore, most participants (83.3%) have been drinking from their respective water sources for at least one year or longer.

Table 1. Participants' demographic data.

Age group	Male	Female	Total
≤5	43(53.8)	47(46.5)	90(48.6)
6-10	32(40)	41(40.6)	73(39.5)
11-15	9(11.3)	13(12.9)	22(11.9)
Total	84(45.4)	101(54.6)	185(100)
Mean age±SD	5.98±3.39	6.32±3.42	6.16±3.44

SD: Standard deviation. Data were expressed as $n(\%)$.

Table 2. Relationship between the Prevalence of intestinal parasites and age groups/sex of pupils in Jos South LGA.

Variables	Presence of intestinal parasite		χ^2	P
	Yes	No		
Age groups				
≤5	11(12.2)	79(87.8)	0.541	0.763
6-10	10(13.7)	63(86.3)		
11-15	4(18.2)	18(81.8)		
Sex				
Male	9(11.3)	71(88.8)	0.432	0.432
Female	16(15.2)	89(84.8)		
Toilet facility				
At home				
Pit	1(3.8)	25(96.2)	3.969	0.137
Water system	10(11.9)	74(88.1)		
Open defecation	14(18.7)	61(81.3)		
In school				
Pit	14(14.9)	80(85.1)	0.427	0.808
Water system	10(11.8)	75(88.2)		
Open defecation	1(16.7)	5(83.3)		
Source of drinking water				
Tap	0(0.0)	6(100.0)	1.430	0.489
Well	13(12.9)	69(84.1)		
Stream	12(12.4)	85(87.6)		
Personal hygiene				
Treat water before drinking				
Yes	1(5.0)	19(95.0)	1.391	0.238
No	24(14.5)	141(85.5)		
Wash hands after using toilet				
Yes	6(9.2)	59(90.8)	1.573	0.210
No	19(15.8)	101(84.2)		
Buy food from restaurant/open market				
Yes	22(15.9)	116(84.1)	2.741	0.098
No	3(6.4)	44(93.6)		
Frequency of buying food from restaurant/open market				
Always	6(20.7)	23(79.3)	0.852	0.356
Rarely	15(13.8)	94(86.2)		
Mode of eating food				
Hand	8(15.7)	43(84.3)	0.284	0.594
Spoon	17(12.7)	117(87.3)		
Parents rear domestic animals				
Yes	10(12.8)	68(87.2)	0.055	0.814
No	15(14.0)	92(86.0)		
Type of domestic animals reared				
Cow	0(0.0)	2(100.0)	0.343	0.952
Goat/sheep	2(11.8)	15(88.2)		
Chickens	4(13.3)	26(86.7)		
Pig	4(13.8)	25(86.2)		

χ^2 : *Chi-square* test. Data were expressed as $n(\%)$.

Table 3. Distribution of drinking water source, water fetching person, and duration of drinking water source use among surveyed households.

Variables	households
Main source	
Tap	6(3.2)
Well	82(44.3)
Stream	97(52.4)
Who usually goes to fetch your drinking water	
Adult woman	108(58.4)
Adult man	3(1.6)
Female child	49(26.5)
Anybody	25(13.5)
How long have you been drinking from the source	
1-14 weeks	24(13.0)
2-6 months	7(3.8)
1-2 years	93(50.3)
>5 years	61(33.0)

Data were expressed as *n*(%).

4. Discussion

The observed prevalence of 13.5% of IPIs in this study is lower than that reported by Edogiawerle *et al.*[12] (18.7%) in Edo State, Onyeka *et al.*[13] (62.8%) in Pankshin, Plateau State, Obeta *et al.*[14] (24.0%) in Jos, Plateau State, and Gbonhinbor *et al.*[4] who reported a prevalence of 23.95% in Bayelsa State. This variation can be linked to the disparities between urban and rural environments, as well as the timing of community deworming programs. The observed prevalence underscores the continued public health importance of IPIs in these communities, despite potential ongoing control efforts. *Ascaris lumbricoides* was the most frequently identified parasite (28.0%), followed by *Taenia* spp. (24.0%) and *Entamoeba histolytica*/dispar complex (20.0%). The dominance of *Ascaris lumbricoides* is consistent with its global distribution, which often thrives in areas with poor sanitation and contaminated soil, owing to fecal-oral transmission[15]. The presence of *Taenia* spp. suggests potential exposure to undercooked meat or poor livestock management, which could lead to neurocysticercosis or taeniasis. This highlights the need for community education on food preparation practices and meat inspection[16]. The presence of the *Entamoeba histolytica*/dispar complex, a protozoan associated with dysentery, further indicates challenges in water and food hygiene[17]. Co-infections, although infrequent in this study, can intensify morbidity and complicate treatment, emphasizing the need for comprehensive diagnostic and treatment approaches.

Demographic factors such as age and sex did not show a statistically significant association with the prevalence of IPIs in this study. While females had a slightly higher prevalence (15.2%)

than males (11.3%), and the 11-15 years age group had the highest prevalence (18.2%). These differences were not statistically significant, which might suggest that exposure to risk factors is relatively uniform across these demographic subgroups within the study population. However, some studies have reported age-related variations, with older children having higher rates due to increased outdoor activities and exposure[18].

Environmental sanitation plays a critical role in the prevalence rates of intestinal parasites observed. The practice of open defecation, both at home (18.7%) and in school (16.7%), correlated with the highest incidence of IPIs. This aligns with various studies that establish a connection between open defecation and heightened transmission of fecal-oral pathogens[19]. In contrast, access to enhanced sanitation facilities, such as pit latrines, was linked to a lower prevalence rate of 3.8% at home, emphasizing the importance of effective waste management. The stark contrast in prevalence among users of tap water (0.0%) compared to those using well water (12.9%) and stream water (12.4%) strongly suggests that unsafe drinking water sources pose a considerable risk for IPIs. This highlights the urgent necessity for providing safe, treated drinking water in these areas[20].

Personal hygiene practices, although not individually significant statistically, exhibited trends that align with recognized risk factors. A lower treatment rate of drinking water (14.5%) and a higher rate of not washing hands after using the toilet (15.8%) were associated with increased infection rates compared to those who did. Additionally, frequent eating from open markets correlated with a higher prevalence of infections. These results highlight the need for ongoing health education focused on proper hygiene practices, including handwashing with soap and water and safe food handling[21].

The connection between raising domestic animals and the prevalence of IPIs was complex. Overall, contact with domestic animals was linked to a slightly lower prevalence rate (12.8%) compared to no contact (14.0%). However, raising pigs was associated with the highest prevalence (13.8%), while cow rearing was linked to the lowest prevalence (0%). This indicates that interactions between animals and humans, along with management practices, may affect transmission rates. Pigs are recognized carriers of certain parasites, such as *Taenia solium*, which can lead to significant human infections like cysticercosis[22]. This highlights the need for further exploration of specific zoonotic transmission pathways and underscores the importance of veterinary public health measures.

Furthermore, the observation that households where adult women are responsible for fetching water (58.4%) and those relying on

stream water (52.4%) displayed the highest prevalence. This indicates a gender-related risk factor and points to the cumulative exposure associated with water collection.

The differences in prevalence rates among the schools show that LEA Primary School has a rate of 15.1%, K. Primary School has 14.3%, and B. Academy has a lower rate of 4.3%. These variations may be attributed to local environmental conditions, socio-economic factors, or specific hygiene practices at each school that could affect the transmission of parasites. The notably lower prevalence at B. Academy calls for further investigation to uncover protective factors/best practices that might be applied to other schools.

5. Conclusions

IPIs pose a significant public health challenge for primary school children in Plateau State, Nigeria, with *Ascaris lumbricoides*, *Taenia* spp., and the *Entamoeba histolytica/dispar* complex identified as the most common parasites. Although demographic factors did not show a significant connection, environmental factors, including open defecation and the use of unsafe drinking water sources like streams and wells, were closely associated with higher infection rates. While personal hygiene practices did not have statistically significant correlations, patterns suggested an increased risk. The differences in prevalence among various schools indicate the impact of localized environmental and potentially socioeconomic factors. Based on the findings of this study, the following recommendations are suggested to control and prevent IPIs among school pupils in the study areas.

To stop intestinal parasites, communities need to create easily accessible latrine facilities and implement regulations against open defecation. Governments and non-governmental organizations should supply treated water sources while educating families on methods for boiling and chlorinating water. School campaigns must focus on promoting handwashing with soap and the safe preparation of food, including thoroughly cooking meat. Regular mass deworming initiatives should be introduced for all children of school age to lessen the current worm burden. Lastly, families engaged in pig farming need specialized training on managing animal waste and maintaining hygiene to reduce risks related to livestock.

The microscopy methods utilized in this research were unable to distinguish between specific pathogenic and non-pathogenic species, which might result in an underestimation of the actual prevalence of protozoa. The cross-sectional design and limited sample size might restrict the generalizability of the findings and hinder the establishment of clear causal relationships. Furthermore,

the application of *Chi*-square tests does not allow for the control of confounding factors, indicating that future studies should use logistic regression to provide a more comprehensive analysis of infection predictors.

Conflict of interest statement

The authors declare that there are no conflicts of interest.

Acknowledgements

The authors thank the parents and school authorities for their support. We appreciate the University of Jos Medical Laboratory Science Department for using the laboratory for analysis. We also appreciate Mr. Philip Jalo for the use of the statistical tool.

Funding

The study received no extramural funding.

Data availability statement

The data supporting the findings of this study are available from the corresponding author upon request.

Authors' contributions

Dawurung SA conceptualized the study together with Damen GJ. All authors were involved in the study design. Dawurung SA, Dawurung AB, and Damen GJ defined the intellectual content of the study. Dawurung SA and Dawurung AB conducted the literature search, prepared the manuscript, and performed data analysis as well as clinical studies and data acquisition. Dawurung AB designed the tables and figures. Dawurung SA and Dawurung AB carried out the statistical analysis. Dawurung AB and Damen GJ were responsible for manuscript editing and review. Dawurung AB served as the guarantor of the study. All authors read and approved the final manuscript.

References

- [1] Ahmed M. Intestinal parasitic infections in 2023. *Gastroenterol Res* 2023; **16**(3):127.
- [2] Pandian SRK, Panneerselvam T, Pavada P, Govindaraj S, Ravishankar V, Palanisamy P, et al. Nano-based approach for the treatment of neglected tropical diseases. *Front Nanotechnol* 2021; **3**: 665274.
- [3] Bisetegn H, Debash H, Ebrahim H, Erkihun Y, Tilahun M, Feleke DG. Prevalence and determinant factors of intestinal parasitic infections and

- undernutrition among primary school children in north-central Ethiopia: A school-based cross-sectional study. *J Parasitol Res* 2023; **2023**(1): 2256910.
- [4] Gbonhinbor J, Abah AE, Awi-Waadu G. Prevalence of intestinal parasitic infection and associated risk factors among primary school-aged children (5-15 years) in Southern Nigeria. *Int J Infect* 2022; **9**(3): e123721.
- [5] Okeke OA, Ezirike AC, Udeh NP, Nwadike CC, Imakwu CA, Nnatuanya IO, et al. Incidence of intestinal parasites among school-aged children: A case study of Nnambia, Ahiazu Mbaise Local Government Area of Imo State, Nigeria. *South Asian J Parasitol* 2023; **6**(1): 34-43.
- [6] Maduagwu QC, Sangari JS, Toma MA, Lawrence WB, Wuyep C, Yiltok. The occurrence of intestinal parasites among children within south eastern Nigeria (A case study of Abia, Imo and Ebonyi States). *Int J Sci Res Technol* 2025; **7**(9): 216-224.
- [7] Nyamngee A, Sanda IM, Mariam K. Prevalence of soil-transmitted helminths among asymptomatic school children in selected rural and urban communities in North-Central Nigeria. *J Anat Sci* 2025; **16**(1): 246-256.
- [8] Kopteer EP, Ogwurike BA, Akpa LE, Karau S, Emmanuel DN, Kumshin AJ. Prevalence of gastrointestinal helminth parasites of cattle in Kugiya Market, Bukuru, Jos South LGA, Plateau State, Nigeria. *World J Adv Res Rev* 2024; **22**(3): 871-884.
- [9] Lwanga SK, Lemeshow S. *Sample size determination in health studies*. Geneva: World Health Organization; **1991**, p. 1.
- [10] Khalid SM, Nura JS, Sambo MA, Incidence of intestinal parasites among school-aged children in Nasarawa State. *Bayero J Biomed Sci* 2022; **7**(1): 64-73.
- [11] Agarwal K, Mishra S, Singh P, Sharma R, Rukadikar AR, Hada V, et al. Evaluation of different concentration techniques for microscopic diagnosis of protozoa and helminths in stool samples of children. *J Fam Med Prim Care* 2025; **14**(2): 693-698.
- [12] Edogiawerie D, Turay AA, Okpala HO. Prevalence of intestinal helminths among Primary School children in Ihumudumu community, Ekpoma, Edo, Nigeria. *Int J Community Res* 2016; **5**(1): 12-21.
- [13] Onyeka CC, Antip TM. Prevalence of intestinal parasites among school aged children in primary schools in Pankshin LGA of Plateau State. *J Med Dent Sci Res* 2025; **12**(2): 83-93.
- [14] Obeta MU, Ejnaka OR, Jwanse RI, Lote-Nwaru IE, Ibrahim AS. Prevalence and distribution of soil-transmitted helminths among children attending township orimary School, Jos, Plateau State, Nigeria. *Lond J Med Health Res* 2019; **19**(1): 55-61.
- [15] Ali SA, Niaz S, Aguilar-Marcelino L, Ali W, Ali M, Khan A, et al. Prevalence of *Ascaris lumbricoides* in contaminated faecal samples of children residing in urban areas of Lahore, Pakistan. *Sci Rep* 2020; **10**(1): 21815.
- [16] Centers for Disease Control and Prevention. *Taeniasis*. 2024. [Online] Available from: <https://www.cdc.gov/parasites/taeniasis/index.html>. [Accessed on 28 November 2025].
- [17] Atabati H, Kassiri H, Shamloo E, Akbari M, Atamaleki A, Sahlabadi F, et al. The association between the lack of safe drinking water and sanitation facilities with intestinal *Entamoeba* spp infection risk: A systematic review and meta-analysis. *PLoS One* 2020; **15**(11): e0237102.
- [18] Tegen D, Damtie D. Prevalence and risk factors associated with intestinal parasitic infection among primary school children in Dera district, northwest Ethiopia. *Can J Infect Dis Med Microbiol* 2021; **2021**(1): 5517564.
- [19] Oniya MO, Jegede OJ. Prevalence of soil-transmitted helminthiasis among primary school pupils in Ipogun, Ondo State, Nigeria. *J Parasitol Vector Biol* 2021; **13**(1): 35-40.
- [20] World Health Organization, United Nations Children's Fund. *State of the world's drinking water: An urgent call to action to accelerate progress on ensuring safe drinking water for all*. Geneva: World Health Organization; **2022**.
- [21] Ejemot-Nwadiaro RI, Ehiri JE, Arikpo I, Meremikwu MM, Critchley JA. *Cochrane Database Syst Rev* 2015; **2015**(9): CD004265.
- [22] Kabululu ML, Johansen MV, Lightowlers M, Trevisan C, Braae UC, Ngowi HA. Aggregation of *Taenia solium* cysticerci in pigs: Implications for transmission and control. *Parasite Epidemiol Control* 2023; **22**: e00307.

Publisher's note

The Publisher of the *Journal* remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Edited by Liang TC, Qi Y