INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X
Impact Factor: 6.078

(Volume 8, Issue 3 - V8I3-1368)
Available online at: https://www.ijariit.com

Prevalence of Intestinal Helminths and Associated Factors among the Inhabitants of Selected Villages, around Usmanu Danfodiyo University Sokoto, North-Western Nigeria

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ABSTRACT

A cross-sectional study was carried out from October 2021 – March 2022 to assess the prevalence of intestinal helminth infections and associated factors among the inhabitants of selected villages around Usman Danfodiyo University Sokoto, North-Western Nigeria. A structured questionnaire was used to gather data on the demographic and risk factors associated with the intestinal helminth infections, stool samples were collected and examined for helminth eggs using the formalin-ether concentration technique. The overall prevalence of intestinal helminth infection in the study area was Ascaris hembricoides (35.0%) strongyloide stercoraluis (9.0%), Trichuris trichivra (7.5%), schristosoma mansoni (3.5%) and Heokwom (3.0%). Out of the 200 subjects examined for infection, 119 (59.5%) were found to be positive. The prevalence of helminthic infection in relation to sex was recorded with males having comparatively more infections (52.3%) than females (37.8%). However, there was strong negative correlation between helminth infection and sex Υ = - 0.50. Weak negative correlation was also found between age and prevalence of intestinal helminths Υ = - 0.15. Bush defaecation showed highest infections of Asaris infection than water closet and pit latrine. However, there was no significant association between prevalence and toilet facilities (P>0.05). The study demonstrates significant burden of intestinal helminth infections in this part of Nigeria and highlight the need for intervention measures.

Keywords: *Intestinal Helminths, Inhabitants, Prevalence, Open Defecation*.

1. INTRODUCTION

Intestinal helminth infections are endemic throughout the world. They affect an estimated more than 1.5 million persons and cause clinical attention in approximately 450 million (WHO, 2013). The most common intestinal helminth infection of human throughout Nigeria are A. lumbricoides, T. trichwra, Hookworm, S. Stercoralis, schistosoma minsini (Timothy et al, 2013). Those infections are transmitted by poor hand hygiene, ingestion of soil contaminated egg, poorly washed vegetables, eating unwashed fruit and poorly cooked infected meat (Arara, 2010). Another transmitting mechanism include skin penetration by swimming in cercarial infected water and walking bare footed over feacally contaminated soil (Babatunde et al 2013).

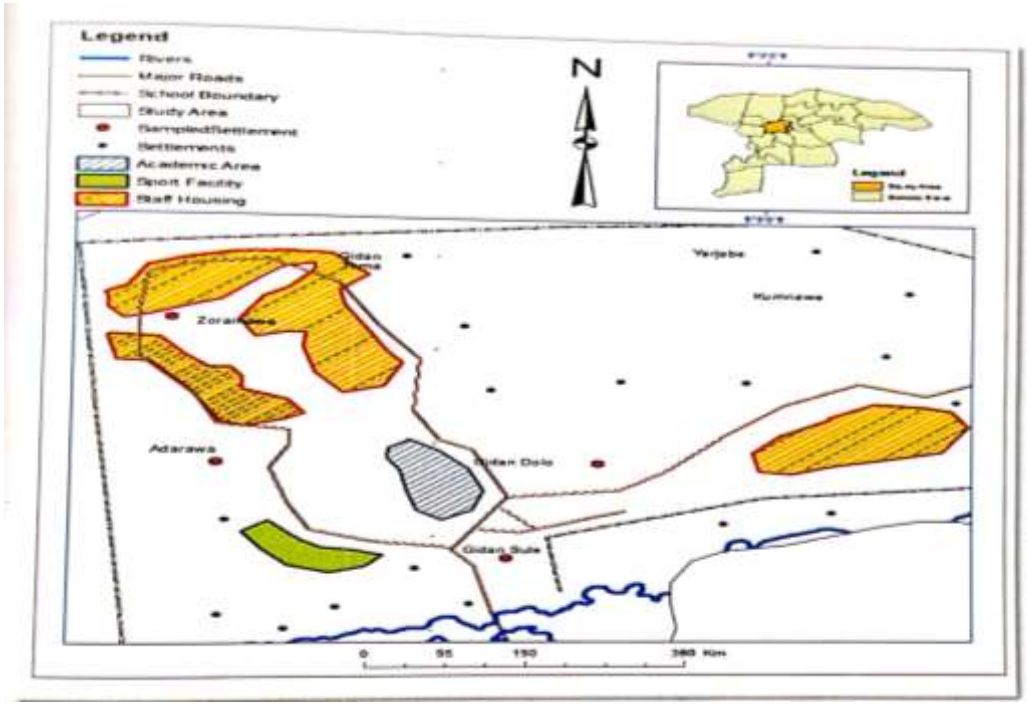
Infestation by intestinal helminths is a major public health problem causes stunting in growth, iron deficiency, anaemia, rectal dysentery (Crompton and Nesheim, 2002). Symptoms such as intense skin invasion, which may produce "ground itch" pruritic vesicular lesions followed by lung reactions, cough, tracheal irritation, Nauseas, vomiting, dyspepsia are clinical features of *Anaybstoma duodenale* and *Necator americnus* larva migrant (Zannick et al, 1990). In Nigeria, rural areas have been found to be very suitable for the transmission of these parasite because of ignorance and poor environmental hygiene (Thomas et al, 2014). The main reason for their persistent presence everywhere is as a result of less priorities given to public health programmes because the effect of helminth infections are not measured in terms of mortality figures (Hotez et al, 2007). Though several studies on intestinal helminth infection have been conducted in different parts of Nigeria (Kabiru 2000, Amuta et al, 2010, Amacchi et al, 2014). The prevalence of intestinal helminth infection in the rural area has not yet properly documented. This study will help local community inhabitants to improve on their environmental sanitation and to health centre of Dundaye district of Wamakko local government area to design mass de-worming programme periodically. Therefore, the present study was performed to assess the prevalence of

intestinal helminth infection and associated factor mong the inhabitants of some selected village around Usman Danfodiyo University Sokoto.

2. MATERIALS AND METHODS

2.1 Study Area

The study was carried out in Dundaye district of Wamakko local government area of Sokoto State. The study area comprises four villages, these are Gidan Dolo, Gidian Sule, Adiwawa and Zurumawa all located around Usmanu Danfodiya University Sokoto main campus. The Usmanu Danfodiyo University Sokoto main campus is located between longitude 5^0 10^1 East to 5^0 16^1 East, and longitude 13^0 10^1 North to 13^0 40^1 North. The main campus is situated twelve kilometres (12km) away to the northwest of Sokoto town in Dundaye district of the Wamakko local government area of Sokoto State, Nigeria. The inhabitants are mainly subsistent farmers and traders.



2.2 Sample Size Calculation

The sample size was calculated using single population proportion formula by taking the highest sample giving from both prevalence and associated factors. We used the previous prevalence from a study done in Kaduna (Thomas et al 2017) i.e 15.75% with 5% margin of error and 95% confidence interval the final sample size was 204.

2.3 Selection of Sampled Villages

Four villagers surrounding Usmanu Danfodiyo University Sokoto main campus were used for this study villages in the study area are smaller in size and population, less than sixty households were identified in each of the villages sampled from the total villages around Usmanu Danfodiyo University Sokoto, four villages were selected randomly two near the river and two for from the river. The villages selected for this study were Gidan Dolo, Gidan Sule, Zurumawa and Adarawa Table of random numbers was used for the random sampling.

2.4 Questionnaires

A structured questionnaire was administered to each of the selected participants to obtain information on their social-demographic characteristics and to evaluate their knowledge, attitude and practices toward their faecal disposition method and choice of treatment.

2.5 Faecal Sample Collection

Participants were provided with labelled wide-mouthed sample bottles and were instructed on how to obtain their faecal sample without contamination. The bottles were collected the following morning and the faecal samples were immediately preserved with 10% formalin and taken to the laboratory for analysis.

The sample bottles were given to the respondents in all the four villages selected. At Adarawa, only (40 males and 10 females) returned their bottle, Gidan Dolo (38 males and 12 female) returned their bottles Gidan Sule (39 males and 11 females) returned their bottles and Zurumawa (38 males and 12 females) returned their bottles).

2.6 Laboratory Analysis

Formal – Ether concentration method was employed in the defection and estimation of helminth ova in the faecal samples as described in Oyeyipo et al, (2013), Ojurongbe et al, (2014). An approximately 2g of stool was placed in a bottle containing 10ml of 10% formalin and mixed with applicator stick. The suspension was filtered through two layers of gauze into graduated centrifuge tube. Approximately 3ml of either solution was measured and added into the tube and centrifuged for 2 min at 2000 rpm. The

supernatant was discorded and the residence were transferred to microscope slides and examine for the presence of helminths ova with a microscope set at 10x and 40x objectives.

2.7 Data Analysis

Data from questionnaire and laboratory analysis were collated and analysed for simple descriptive statistics, differences in the prevalence of infection between sex and age were determined using logistic regression to analyse the degree of association and was expressed as odd ration. X^2 test from contingency tables was also used to prevalence of infection and toilet facilities.

3. RESULTS

3.1 Prevalence of intestinal helminth infections among the study subjects of 204 invited subjects, only 200 participated in the study and were included in the present analysis. The most common intestinal helminth parasites defected in the subject sampled were Ascaris *lumbricoides* 35.0%, *strongycoides stercoralis* (9.0%), *Trichuris trichiors* (7.5%), *schistosoma mansoni* (3.5%) and Hookworm (3.0%). It is clear that, Adarawa, Gidan Dolo, Gidan Sule and Zurumawa had the percentage prevalence of 62.0%, 58.0%, 60.0% and 54.0% respectively. This shows that the prevalence of intestinal helminth infections is high in Adarawa village than the other communities studied (Table).

3.2 Prevalence of Intestinal Helminth Infection and Sex

The overall gender prevalence of helminthiasis among the communities were presented in Table 2. Helminth Infection were predominantly higher (52.3%) in males than females (37.8%). There was a strong negative correlation between helminth infection and gender (Υ = - 0.50).

3.3 Prevalence of Helminthiasis by age in relation to the age of the inhabitants studied in Table 3, the highest prevalence rate of (69.0%) was observed in the age group 05 – 15 years while the lowest prevalence rate of (53.8%) was found in the age group > 36 years. There was weak negative correlation between prevalence and age (Υ = - 0.15).

3.4 Prevalence of Intestinal Helminth Infections by toilets facilities. Bush defecation showed highest infections of Ascaris infection (40%) while pit latrine was linked mostly to *Trichuris trichiura*. Bush defecation showed the highest infections in three of the intestinal helminths identified in the study area. Water closet showed zero prevalence for most of the observed helminth except *schistosoma mansoni* and *Trichura trichivris* that appeared once in both cases. However, there was no significant association between prevalence and toilet facilities (p>0.05).

Table 1: Prevalence of intestinal helminth infection among the study subject (n=200)

Villages Sampled	Number Examined	Number infection/ Prevalence of helminthes (%)					% Prevalence
		Ascaris Lumbricoides	**Hookworm**	***Schistosoma mansoni***	***Strongyloides Stercoralis***	**Trichris Truchiura**	
Adarawa	50	20(40.0)	2.(4.0)	0(0.0)	4(8.0)	5(10.0)	31(62.0)
Gidan Dolo	50	17(34.0)	2(8.0)	1(2.0)	5(10.0)	4(8.0)	29(58.0)
Gidan Sule	50	15(30.0)	2.(4.0)	6(12.0)	3(6.0)	4(8.0)	30(60.0)
Zurumawa	50	18(35.5)	1(3.2)	0(0.0)	6(6.5)	2(3.2)	27(54.0)
Total	**200**	**70(35.0)**	**7(3.5)**	**7(3.5)**	**18(9.0)**	**15(7.5)**	**119(59.5)**

Table 2: Prevalence of Intestinal helminth infection in relation to sex (n=200)

		Male Prevalence		Female prevalence	
Village Examined	Number Examined	Number Examined	No. infected (%)	Number Examined	No. infected (%)
Adamawa	50	40	22 (55.0)	10	5(50.0)
G/Dolo	50	38	19 (50.0)	12	5 (41.7)
G/Sule	50	39	23 (59.0)	11	3 (27.2)
Zurumawa	50	38	17 (44.7)	12	4 (33.3)
Total	200	**155**	**81 (52.3)**	**45**	**17 (37.8)**

Correlation values: Υ = - 0.15

Table 3: Prevalence of intestinal helminth infection in relation to age group (n=200)

Age Group	**Number Examined**	**Number infection/ Prevalence of helminthes (%)**					**% Prevalence**
		Ascaris Lumbricoides	**Hookworm**	***Schistosoma mansoni***	***Strongyloides Stercoralis***	**Trichris Truchiura**	
5-15	46	15(32.6)	4.(8.7)	3(6.5)	7(15.2)	3(6.5)	32(69.6)
16-25	96	32(33.3)	5(5.2)	4(4.2)	5(5.2)	9(9.4)	55(57.3)
26-35	45	15(33.3)	2.(4.4)	0(0.0)	5(11.1)	3(6.7)	25(55.6)
36 above	13	5(38.5)	0(0.0)	0(0.0)	0(0.0)	2(15.4)	7(53.8)
Total	**200**	**67(33.5)**	**11(5.5)**	**7(3.5)**	**18(9.0)**	**17(8.5)**	**119(59.5)**

Correlation Values: Υ =0.15

Table 4: Prevalence of intestinal helminth infection by tilet facilities (n=200)

Toilet Facilities	Number Examined	Number infection/ Prevalence of helminthes (%)					% Prevalence
		Ascaris Lumbricoides	Hookworm	*Schistosoma mansoni*	*Strongyloides Stercoralis*	Trichris Truchiura	
Pit latrine	77	23 (29.9)	5 (6.5)	1 (1.3)	5 (6.5)	7 (9.1)	41 (53.2)
Water	9	0 (0.0)	0 (0.0)	1 (11.1)	0 (0.0)	1 (11.1)	2 (22.2)
closet	114	46 (40.0)	6 (5.3)	5 (4.4)	11 (9.6)	8 (7.0)	76 (66.7)
Open bush	**200**	**69 (34.5)**	**11 (5.5)**	**7 (3.5)**	**16 (8.0)**	**16 (8.0)**	**119 (59.5)**
Total							

Note: X^2 =8.869, DF=4, P=0.692, p-value >0.05

4. DISCUSSION

The study revealed a high prevalence (59.5%) among the inhabitants of the communities sampled. This overall prevalence may not be unconnected with the poor socio-economic status of the inhabitants which was reported by Montressor et al, (2000) that high prevalence of helminthic infection is closely correlated with poverty, poor personal and environmental higune a combination of factors abounds in the sampled population.

This overall prevalence rate has been similarly investigated by Umeh et al, (2015) when they reported a prevalence rate of (45.71%) of intestinal helminth parasite among nursery and primary pupils in Uga, Anambra State. A number of authors undertook similar studies in Akwa Ibom State, Nigeria also reported a high prevalence rate, notable among which were the work of Usip and Mathew (2015) in which an overall prevalence of 61.1% was recorded. These findings were in contrast with the report of (Shehu et al, 2013) when he reported a low prevalence rate of (25.33%) of intestinal helminth infections among school children in Maru local government Area (L.G.A) Zamfara State, Nigeria. These difference could be attributed to seasonal differences, number of samples obtained, age brackets examined and other geographical factors in the studies area.

The common intestinal helminth parasites isolated in this study were Ascaris himbricoides, Hookworm, Trichuris trichiora, strongyloides mansoni- Ascaris lumbrioides is the most encountered parasites. The high prevalence of Ascaris lumbricoides infection is consistent with the report of (Auta et al, 2013) and (Ojurungbe et al, 2014). Though there was strong negative correlation between prevalence and gender (Υ= -50), percentage prevalence between males and females showed that males were more infected compared to their female counterpart which corresponded with the report of Amalchi et al, (2014), Ashcroft (2014), Bethany et al, (2000) and Babtunde et al, (2013). The high prevalence among males could be involvement of males in activities such as farming, fishing and swimming.

The strong negative correlation with sex (Υ= -0.50) could be attributed to the fact that there are other major factors than gender that play significant role in the infection. This is contrary to the report of Megitsu et al, in Southwest Ethiopia which they reported that females were more infected than males. Similarly, Anosike et al, (2016) recorded higher infection rate of (39.3%) in females than males (34.5%). The merk negative correlation between infection and age (Υ= - 0.15) could be probably because as the age increaser, the children become ore conscims of their surrounding and tend to exhibit more hygienic behaviour in their day to day routine as they are growing older. Though, Timothy et al, (2013) reported strong negative correlation between infection and age among primary school in Gwagwada, Kaduna, North Western Nigeria.

The result of this study indicate that there was relatively lower prevalence of infection recorded among the inhabitants that used pit latrine (53.2%) compare to those that used open field (66.7%) was not surprising since it was known that the use of pit latrine protect against intestinal helminth, if it is provided with adequate water supply to ensure personal cleanliness and cleanliness of the latrine. But where the provision of the latrine is not accompanied with adequate supply of water, the chances of faecal contamination become higher (Tshikuka et al, 1995).

5. CONCLUSION

Ascaris Lumbricoides has very high prevalence among inhabitants of the studied communities. The prevalence of the parasites was observed to be decreasing as age increases. Infection of intestinal helminths is determined by the source of toilet facilities. There is also equal chances of infection among gender when they are exposed to the same activities that may predispose them to infections. The severity of the infection with intestinal helminths may be more than what this study revealed. Hence, there is need for further study to be carried out throughout the local government area, especially among the inhabitants of the rural areas.

Behavioural change is needed for proper use of toilet and sanitation facilities. Mass deworming campaign should be carried out especially in the rural communities. This will help to reduce the cases of high prevalence of intestinal helminths infection.

6. CONFLICT OF INTEREST STATEMENT

We declare that we have no conflict of interest.

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