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Survey of Intestinal Helminthes in an Open Defecation in Ringim, Jigawa-Nigeria

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Abstract: **The study aimed to survey the Intestinal Helminthes in an open defecation in Ringim town, Ringim Local Government Area, Jigawa State. A total of 300 samples were examined out of which 20 (6.67%) were positive with presence of helminthes eggs, and 280 (93.33%) were negative. The parasites found are: Ascaris lumbricoides with 11 (3.67%), Hookworm had 6 (2.0%) while Taenia species, Hymenolepis nana and Fasciola hepatica had 1 (0.33%) each. The positive ones were found in all the samples sites collected. River side and Railway area has 3 (10.0%) each, and Main Road had 5 (16.67%), Majiyawa and Unity Secondary School had 2 (6.67%) each and Motor Park, Gen. Hospital Ringim, Almajirawa, Sabon Gari Primary School and Gwaram (fond) had 1 (3.33%) each.**

Keywords: **Helminthes, Prevalence, Defecation, Ringim.**

1. INTRODUCTION

Helminthes are invertebrates characterized by elongated, flat or round bodies and they develop through egg, larval (juvenile) and adult stages. Knowledge of the different stages in relation to their growth and development is forms the basis for understanding epidemiology and pathogenesis of helminthes diseases, as well as for the diagnosis and treatment of patients harboring these parasites [1]. Intestinal helminthes are distributed worldwide particularly in tropical and sub-tropical areas of the world. More than one billion of the world population including at least 400 million school children are chronically infected with *Ascaris lumbricoides Trichuris trichiura* and *hook worms* [2]. The prevalence of infection and degree of factors predisposing to infection vary from one region to another [3]. Prevalence of intestinal helminthes in developing regions ranges between 50-80% in Children [4]. The epidemiology of human intestinal helminthes is well studied in urban and semi urban society. Indeed hospital records have become an increasingly popular method of determining the prevalence of intestinal helminthes in recent times [5],[6]. Reports from (WHO, 2007) indicates that there are about 1000 million cases of *Ascaris lumbricoides*, 900 million for hookworms and 500 million for *Trichuris trichiura* worldwide. A survey was carried out for stool examination in a community wide of 1,240 people in America, Brazil, revealed that over half the population had multiple intestinal helminthes [7]. Majority of Nigerian children from low socioeconomic class have been found to be anemic, stunted with retarded growth and underweight due to malnutrition caused mainly by intestinal helminthes [8]. Disease symptoms do not manifest unless the host is heavily infected, there is usually a history of severe diarrhoea results from contributing effect of environmental deficiencies suffered during childhood in the form of inadequate feeding, ill health, overcrowding and poor life style [9]. The study aimed to carry out a survey of intestinal helminthes in open defecation in Ringim town, Ringim Local Government Area, Jigawa State, Nigeria.

2. MATERIALS AND METHODS

Study Area; Ringim town is the Headquarter of Ringim Local Government Area, Jigawa State, North west of Nigeria, approximately located on latitude 12^0 9" N and longitude $9^0$10" E [10]. The town enjoys a tropical climate characterized by two main seasons, the rainy season mostly from May to September with the mean annual rainfall of about 600mm and dry season from November to April. The area has maximum temperature of about 38^0c between April and July. The town has the mean annual rainfall of about 600mm [10].

Ringim town lies within Sudan's Savannah. The area is characterized by grasses, shrubs, and scattered medium height trees, which is at Eastern part of Kano metropolis about 78km. Majority of the inhabitants are Hausa/Fulani with the population of 192024 (Census; 2006). They are of diverse occupation ranging from beggars to elite processionals. They have tap water, hand pumps, hand dug wells and river Hadejia as their sources of water supply. Some of the inhabitants have the habit of open defecation especially Almajirai (beggars), primary school children defecate beside their school compounds, while student of Unity Secondary School go to nearby farms. The chosen sample sites are Kogi (River side) Almajirawa, Majiyawa, Unity Secondary School, Hayin Dogo (beside railway tracks), Motor park, Gwaram (beside a pond close to the town) Gidan gona, General Hospital Ringim, Bayan Abattoir Ringim, Hayin Kwalta (beside main road).

Sample Size Determination; the minimum sample size was determined using this formula by WHO (1989)

$$N = \frac{z^2 pq}{L^2}$$

Where n =number of samples.

Z = standard normal deviate at 95% at confidence levels (standard value 1.96%) p = estimated prevalence of variable interest (from the past study) q = 1 – p = (1 – 0.0143 = 0.9857)

L = allowable error of 5% (0.05)

$$N = \frac{(1.96)^2 \times 0.0143 \times 0.9857}{(0.05)^2}$$

$$\frac{3.846 \times 0.0143 \times 0.9857}{0.0025} = 21.66$$

Sample Collection; Thirty (30) samples were collected from each of the area mentioned above into transparent clean dry, wide mouthed and leak proof containers. The faecal samples were preserved with 10% formal saline if delay was anticipated prior to microscopic examination [10].

Laboratory Analysis; It was carried out using standard procedures described in Cheesebrough (2005) [11]

Faecal sample were examined with unaided eye, colour, consistency (formed or unformed) and constituents (Presence of adult worms, segment, blood or mucus) were noted.

Wet Preparation; The faecal samples were mixed and picked with an applicator stick. They were emulsified in a drop of normal saline on a clean, dried, grease free slide. The preparation was covered with cover slip carefully excluding air bubbles. It was examined using microscope with x 10 objectives and confirming with x 40 objectives. Parasites were identified using the descriptions of Cheesebrough (2005).

Formol Ether Concentration Technique; One (1g) of faecal collected was emulsified in 7ml of 10% formal saline. The suspension was then strained in a beaker through a fine sieve. The filtrate was transferred into a centrifuge tube, 3ml of either was added and shake vigorously. The mixture was spun at 2500rpm for 2 minutes. Four layers were seen within the tube. The three upper layers were discarded. The bottom of the tube was tapped and a drop of the sediment was placed on a clean, slide and covered with cover slip. This was examined under x 10 confirming with x 40 objectives and ova, larvae, and cyst, seen and recorded.

Eggs were counted in accordance with the method described by Stoll's (Stoll's Method).

Statistical Analysis; Data analysis was carried out using SPSS (Statistical Package for Social Sciences) version 15. A P value of ≤ 0.05 was regarded as significant

3. RESULTS

Table 1.0: General prevalence of intestinal helminthes in faeces

	NE	NI	Prevalence (%)
A. lumbricoides		**11**	**3.67**
Hookworm		**6**	**2.0**
T. species		**1**	**0.33**
H. nana		**1**	**0.33**
F. hepatica		**1**	**0.33**
Total	**300**	**20**	**6.67**

KEY NE = Number Examined, NI= Number infected

Table 2.0: The prevalence of helminthes by site of collection

Area	N E	NI	Prevalence (%)	X^2	df	P value
River side	30	3	(10.0)	8.571	9	0.478
Main Road Side	30	5	(16.67)			
Majiyawa	30	2	(6.67)			
Unity Sec, Sch.	30	2	(6.67)			
Gwaram	30	1	(3.33)			
Almajirawa.	30	1	(3.33)			
Motor Park	30	1	(3.33)			
S/ Gari.	30	1	(3.33)			
Rail Way Side	30	3	(10.0)			
Gen. Hosp. Ringim	30	1	(3.33)			
Total	**300**	20				

Keys NE = Number Examined NI= Number infected X^2= Chi square**,** df=degree of freedom

Table 3.0; Incident of Helminthes Eggs by Macroscopy

Colour	N E	NI	Prevalence (%)	X^2	Df	P Value
Brown	277	16	(5.78)	**8**.550	2	0.014
Green	17	4	(23.53)			
Yellow	6	0	(0)			
Consistency						
Formed	249	15	(6.02)	1.898	2	0.387
Semi – formed	46	4	(8.7)			
Watery	5	1	(20.0)			

Keys; NE = Number Examined NI= Number infected X^2= Chi square**,** df=degree of freedom

Table 4.0; Incident of helminthes Eggs by Nature of Stool

Nature of Stool	N E	NI	Prevalence	X^2	Df	P value
Fresh	82	15	(18.29)	24.513	1	0.000
Not Fresh	218	5	(2.29)			
Total	**300**	**20**	**(6.67)**			

4. DISCUSSION

In this study, faecal samples in which helminthes eggs were seen in a direct wet preparation and formal either concentration techniques were regarded as positive. A prevalence rate of 20 (6.67%) was recorded from open defecation passed in Ringim Town. This is in contrast to the high prevalence rate of 54.9% of school children in the urban government school, 63.5% in the rural government school and 28.4% in urban private schools in a survey conducted by Expo *et al.*, (2008) [11] in Ikenne, Ogun state Nigeria. This could be attributed to the fact that the work was carried out on school children. The parasite detected were ***Ascaris lumbricoides, Hookworms, F. hepatica, H. nana and Taenia Species***. Several epidemiological studies have been carried out in rural and urban areas of Nigeria on the prevalent and intensity of intestinal helminthes reveals that ***Ascaris lumricoides, Trichuris trichiura, and Hookworm*** are the most common by (Asaolu *et al.*, in 1992) [12]. The highest prevalence of Asacris lumbricoides 11(3.67%) and Hookworms (2.0%) could be due to level of personnel and environmental hygiene, social habits and occupation. Large proportions of the people in the study area are farmers and Almajirai (Beggars) who had the habits of open defecation due to lack of toilets facilities in their houses. With regard to the color of the stool specimens; brown, green, yellow had frequency in ascending order. The preponderance of the helminthes in Brown Coloured stool may be due to the fact that most of the samples examined were brownish. The highest prevalence of helminthes eggs from main road side 5 (16.67%), river side and Railway had 3 (10%) each, Unity Secondary school Ringim and Majiyawa with prevalence of 2 (6.67%) each. Similar observation was made by (Kogi *et al.*, 1991) [5]. Students from unity secondary school Ringim, have the habit of open defecation despite availability of toilets facilities in the school while Majiyawa is a small village close to Ringim town without toilet facilities. ***Taeniasis*** could have been acquired from consumption of improperly cooked meat of (Beef)

in the form of a locally roasted delicacy called (Suya). This improperly cooked meat is usually eaten by many people in the study area. While ***H. nana*** might have been acquired by ingestion of eggs in foods, drinks, or through contaminated hands as most people of the study area do not wash their hands regularly before and after eating foods. Furthermore, and the place where they are selling the food is close to the area where people are defecating openly. Occurrence of ***Fasciola hepatia,*** in the study areas may be due to the availability of the snail intermediate host results from river Hadejia passing through the study area. Many people of the study area dry the fish and consumed without cooking. The low Eggs count could be attributed to asymptomatic infection though significant.

5. CONCLUSION

In conclusion, a prevalence rate of 20 (6.67%) was recorded from open defecation passed in Ringim Town. This possesses a public health concerned, and indicates a potential risk of the infection being transmitted to the people of Ringim town.

6. RECOMMENDATION

It is recommended that government should take serious measures towards reducing the prevalence rate of helminthes in the study area by constructing more public toilets, regular deworming of school children and Almajirai (beggars). There is also need for health education to the public on the need to avoid open defecation.

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