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Incidence Of *Ascaris lumbricoides* Among School Aged Children (3–18) In Izzi Local Government Area, Ebonyi State, South East Nigeria.

Nwankwo, Joseph I.*[1]., Ukpai, Grace E.[2] And Iriele Kingsley I[1].
*[*1] Applied Microbiology and Brewing Department, Faculty of Applied Natural Sciences, Enugu State University of Science and Technology, PMB 01660, Enugu Nigeria.*
[2] Applied Microbiology Department, Ebonyi State University, Abakiliki.

Abstract: *A survey of the round worm, Ascaris lumbricoides was conducted among children aged 3 – 18 years in communities within Izzi local government area in Ebonyi state, Nigeria. The purpose of the study was to determine the incidence of the round worm among the children in the local government. A total of 300 faecal samples collected from the communities in the area were examined using the sodium chloride concentration method, out of which 15 (5.0%) were infected with the parasite. A total of 161 males and 139 females were sampled. The incidence among females (5.8%) was higher than males (4.3%). Age group 16 – 19 years had the highest percentage infection (11.1%). Those that mostly defecate in the bush had a higher incidence (5.1%). The incidence for those that mostly eat raw vegetables and fruit was higher (5.8%) than for those that do not. Worm expulsion was directly related to infection with an incidence of 14.8%. Incidence for those that passed out blood-stained stool was higher (9.3%). Results obtained implicated those that obtain their drinking water from ponds to be the most infected (6.7%). Using T-test and ANOVA to analyse the various parameters, the result obtained indicates that ascariasis is insignificant in the area which could be attributed to a mass treatment and awareness campaign by the government in recent time. Moreover, it is envisaged that improvement in personal hygiene and sanitation augmentation with the appropriate anthelmintics will prevent re-infection and infection from other intestinal nematodes.*

Keywords: *Ascaris lumbricoides, Izzi local government, Ebonyi state and Incidence.*

I. Introduction

A number of parasites whose predilection sites are in the small intestine are implicated directly or indirectly with anaemias (Soulsby, 1976). Intestinal worm disease has gone a long way to increasing the incidence of infantile death and emaciation. This could be attributed to individual's personal hygiene, occupational status, socio-economic and cultural factors as well as the sanitary conditions of the environment.

Among the helminths parasites that affect man are *Ascaris lumbricoides*, hookworm (*Necator americanus* and *Ancylostoma doudenale*), *Tricuris trichiura*, *Strangloides stercoralis*, *Teania* species etc. And they causer different infections and diseases to man with a variety of symptoms ranging from anaemia, diarrhoea, vomiting, digestive disorders and abdominal discomfort (Duerden *et al*., 1987).

Ascaris lumbricoides is one of the most prevalent of all human parasites on the world today. It measures about 20 – 40cm in length and 5 – 6mm in diameter. It is worldwide in distribution affecting about twenty-five percent of the world's population and is particularly common in areas of inadequate sanitation and where untreated human faeces are used as fertilizers (night soil). It is spread by faecal pollution of the soil. Infection with this round worm that invades the human digestive tracts is by ingesting infected eggs in contaminated food or from hand that have become faecally contaminated (Cheesbrough, 1987). Manifestations of ascariasis vary and include constitutional symptoms, particularly pulmonary and gastro-intestinal complaints. Complications include pneumonitis, intestinal obstruction and damage to vital organs (Bratton and Nesse, 1993). The infection is diagnosed by finding the eggs in the faeces or as in Loeffler's syndrome; larvae may also be seen in Sputum (Roderick et al; 1997). Treatment with anthelmintic agents is usually effective in mild cases, but at epidemic level or in hyper endemic areas; repeated mass chemotherapy and maintenance of good hygiene and attendant sanitation is necessary.

Hence, this study will be part of a comprehensive parasitological investigation of five rural communities in Izzi Local Government Area in Ebonyi State, Nigeria, to observe the percentage incidence of *ascaris* burden in the communities. This study will therefore examine in detail the incidence and possible fact that influence the effective eggs of *ascaris* in the communities and an at7tempt to provide a qualitative method based on influencing parameter data for predicting the incidence and also possible prevention and control/therapy measures preferred. For the purpose of this work, a general review of previous study on *ascaris* other parasitic infections will be discussed.

This research will look at *Ascaris lumbricoides* which is the chief parasite in children and was chosen because children mostly exhibit a care-free attitude to hygiene than the young adults. The following objectives have been laid down for studies,

a. To investigate the incidence of *ascaris* in the communities.
b. To determine the incidence of *ascaris* among age and sex of thee children
c. To determine how socio-cultural factors: feeding habit, defaecation behaviours, personal and communal hygiene with attendant sanitary condition of the environment which ensures continuous re-exposure to infective agents affect the spread of ascariasis.
d. To relate the infection with malnutrition of the people.
e. To investigate the relationship between *ascaris* and other parasitic infections with regards to morbidity
f. To determine how economic factors; occupational, mainly affect the infection and of other endemic parasites.
g. To effect public health campaign.
h. Finally, to determine how these intestinal worm diseases can be prevented/controlled.

The choice of a rural community is because the parasite is endemic in areas with high level of poverty and poor sanitary conditions, lack of amenities and to a lesser extent the behavioural pattern of the people.

Nigeria is one of the tropical disease areas in the world and it is necessary to scr6een people of different localities. So as to present correct information vital for the national control programme and epidemiological findings. In same vein, Nigeria aims at good health for all by the year 2000, it becomes wise to emphasize the importance of improved public and private hygiene as one of the effective control measures of intestinal parasites.

The purpose of this work is to present a clear picture of problems of intestinal parasites (*ascaris*) especially among the primary school children in Izzi local government area, Ebonyi state, Nigeria.

II. Materials And Methods

Description of Study Area

The study area (Izzi) is one of the largest local government areas in Ebonyi state and it is located on $6^{o}33'$ North of equator and $8^{o}15'$ east of equator. The topography is rugged with vegetation which is mostly of the guinea savannah. The mean annual rainfall ranges from 180 to 200cm with a relative humidity of 65 to 75%, the average temperature is $21 \pm 6^{o}C$.

The local government comprises five communities namely Igbeagu, Ezainyimagu, Mgbalukwu, Ndieze and Agbaja with a total population of one hundred and sixty-six thousand, two hundred and thirty-nine (166, 239) according to the 1991 census (NEST, 1991). The local government headquarters is located at Iboko.

The major occupation of the populace is farming and their major crop (cash crop) is rice. However, over half of the population that make up the entire local government practice commercial farming and over 75% engage in subsistence farming. The populace obtain their drinking water mostly from wells and bore-hole rarely from ponds. The communities have a large expanse of rich agricultural land and as such farming has been an age-long practice and t7he use of fertilizers for the improvement of agricultural yield is a common practice.

The Population Sample Size

The population sample from which three hundred sample sizes was chosen at random comprised of one thousand five hundred pupils within the age of 3 – 18 years. Three hundred pupils were therefore selected from each community to make up the one thousand five hundred from which sixty from each three hundred was chosen at random. There was no special criterion under which the selection of the sample size was made but it was not uncommon to see some children with features like anaemia and other predisposing tendencies of ill health. Most of the pupils within the age of bracket 3 – 18 years are mostly school children who walk bare-footed to schools and most times to farm and at homes. The poor level of hygiene and sanitation was evident in these communities which is typical of a rural settlement.

The sample size comprises of one hundred and sixty one males and one hundred and thirty nine females.

Collection of Samples

Three hundred questionnaires ((Appendix C) were shared to the sample population along with labelled specimen bottles. To fill the questionnaires, the children were guided by their parents and the information/questions supplied confirmed through oral interviews. The faecal specimen were collected in the morning hours (within 8-11am) and conveyed to the laboratory for examination. Samples collected daily were examined five hours after collection. The samples were drawn from school children between ages of 3 – 18 years of age. The samples were collected in April 1999.

Parasitological Method

For parasitological examination, concentration method for faecal parasites as described by Cheesbrough, 1987 was used.

Saturated sodium chloride was the major chemical used. A test tube was filled to about one quarter with the sodium chloride solution and an estimated 1.0 gram of faeces was added to the tube using a rod or stick and emulsified in the solution. The tube was filled with the solution and mixed very well and allows to stand in a vertical rack. The solution in the tube was topped (filled) to the brim using a pipette. A clean (grease-free) cover glass was carefully placed on top of the tube and the set up was left undisturbed for twenty minutes after which the cover glass was carefully lifted from the tube by a straight upward pull and placed face-down on a clean glass slide. The entire preparation was examined microscopically using the x10 objective lens. This procedure was carried out for all the three hundred faecal samples and the concentration method augmented with the direct smear observation technique.

III. Results

A total of three hundred people were examined. This comprised 161 males and 139 females. Eighteen of the individuals belong to 16 – 19 years age group, fifty-nine from age group 12 – 15 years. One hundred and twenty-eight from 8 – 11 years group, while ninety-four was from 4 – 7 years age group and one from 1 – 3 years age group. A total of 60 samples came from each of the five communities making a total of three hundred samples for the local government. The total infection prevalence was 15 (5%) as shown in Table I.

Table 1: Total incidence for *Ascaris lumbricoides.*

Age Interval	Total Number Sampled	Number Infected	Percentage Infected	Number Not Infected	Percentage Not Infected
1 – 3	1	-	0	1	100
4 – 7	94	4	4.3	90	95.7
8 – 11	128	7	5.5	121	94.5
12 – 15	59	2	3.4	57	96.6
16 – 19	18	2	11.0	16	88.9
TOTAL	**300**	**15**	**5.0**	**285**	**95.0**

Table 1 showed that age group 16 – 19 years has the highest percentage incidence (11.1%) followed by age group 8 – 11 years (5.5%), then 4 – 7 years (4.3%) and 12 – 15 years (3.4%). There was no reported incidence for age group 1 – 3 years; besides only one person was sampled from the age group.

The highest incidence was recorded among the children from Ezainyimagu (10.0%) followed by Ndieze (6.7%), Agbaja (5.0%) and Igbeagu (3.3%). However, none was recorded for Mgbalukwu as shown in Table 2.

Table 2: Incidence by Communities

	Communities	Number Sampled	Number Infected	Percentage Infected
1	Igbeagu	60	2	3.3
2	Ezeinyimagu	60	6	10.0
3	Mgbalukwu	60	-	0.0
4	Ndieze	60	4	6.7
5	Agbaja	60	3	5.0
	TOTAL	**300**	**15**	**5.0**

As shown in Table 3, females had a higher percentage incidence (5.8%) compared to males (4.3%).

Table 3: Incidence by sex of pupils

Age Interval	Total Number Sampled	Male	Female	Number Of Male Infected	Number Of Female Infected	Percentage Of Male Infected	Peercentage Of Female Infected	Total Percentage Infected
1 – 3	1	1	-	-	-	0.0	0.0	0.0
4 – 7	94	38	56	2	2	5.3	3.6	4.3
8 – 11	128	77	51	4	3	5.2	5.6	5.5
12 – 15	59	35	24	1	1	2.9	4.2	3.4
16 – 19	18	10	8	-	2	0.0	25.0	11.1
TOTAL	**300**	**161**	**139**	**7**	**8**	**4.3**	**5.8**	**5.0**

Table 4 shows that pupils within the age group 16 – 19 years has the highest infection incidence (11.1%) followed by those within the age group 8 – 11 years (5.5%), then 4 – 7 years (4.3%) and 12 – 15 years (3.4%). None was recorded for age group 1 – 3 years.

TABLE 4: Incidence by age groups

Age Interval	Total Number Sampled	Total Number Infected	Percentage Infected
1 – 3	1	0	0.0
4 – 7	94	4	4.3
8 – 11	128	7	5.5
12 – 15	59	2	3.4
16 – 19	18	2	11.1
TOTAL	**300**	**15**	**5.0**

Results from Table 5 indicates that of the three sources of drinking water for the communities, that is, well, bore-hole and pond, those that mostly obtain their drinking water from pond recorded the highest percentage incidence (6.7%) followed by those that obtain their drinking water from well (5.4%) and then bore-hole (4.3%). However the age group 8 – 11 years was the only group implicated (11.1%) for those that drink from the pond. While the order of incidence of those that obtain their drinking water from well was 10.0%, 6.5%, 5.9% and 3.7% for age groups 16 – 19, 12 – 15, 4 – 7, and 8 – 11 years respectively. Furthermore, the percentage incidence for those that obtain their drinking water from bore-hole was 4.3%, 6.2% and 2.5% for age group 16 – 19, 8 – 11 and 4 – 7 years respectively.

Table 5: Incidence of infections as it relates to source of drinking water.

Age Interval	Well			Bore Hole			Pond		
	Number	Number Infected	Percentage Infected	Number	Number Infected	Percentage Infected	Number	Number Infected	Percentage Infected
1 – 3	1	-	0.0	-	-	0.0	-	-	0.0
4 - 7	51	3	5.9	40	1	2.5	3	-	0.0
8 – 11	54	2	3.7	65	4	6.2	9	1	11.1
12 – 15	31	2	6.5	26	-	0.0	2	-	0.0
16 – 19	10	1	10.0	7	1	14.3	1	-	0.0
TOTAL	**147**	**8**	**5.4**	**138**	**6**	**4.3**	**15**	**1**	**6.7**

As shown in Table 6, those that use toilets occasionally and are infected was 6.3% while those that use toilet everyday and are infected was 3.9%. Also, infection rate was higher in pupils within the age group of 16 – 19 years followed by the age group 8 – 11 years and 4 – 7 years for those that use toilets everyday; representing 14.3%, 4.5% and 2.6% infection respectively. However, none was reported for age 1 – 3 and 12 – 15 years. For those that use toilets occasionally or rather that defecate in the bush frequently, the percentage infection was 9.8%, 6.8%, 6.1% and 5.4% for age interval 16 – 19, 8 – 11, 12 – 15 and 4 – 7 years respectively. Besides, none was recorded for age group 1 – 3 years.

Table 6: The use of toilets as it relates to infection

Age Interval	Number Sampled	Every Day	Number Infected	Percentage Infected	Occasionally	Number Infected	Percentage Infected
1 – 3	1	-	-	0.0	-	-	0.0
4 – 7	94	38	1	2.6	56	3	5.4
8 – 11	128	84	4	4.5	44	3	6.8
12 – 15	59	26	-	0.0	33	2	6.1
16 – 19	18	7	1	14.3	11	1	9.1
TOTAL	**300**	**155**	**6**	**3.9**	**144**	**9**	**6.3**

Results indicated in Table 7 shows that those that eat raw vegetables and fruits are implicated and they have a higher percentage of infection (5.8%) compared to those that do not take such foods (3.0%). Also those that fall within the age group 16 – 19 years recorded a higher percentage (7.1%) incidence followed by those within the ages 8 – 11 years (6.0%), 4 – 7 years (5.7%) and 12 – 15 years (4.1%) for those that eat raw vegetables and fruits. While the infection was observed only in age groups 16 19 years (25.0%) and 8 – 11 years (3.6%) for those that do not eat raw vegetables and fruits.

Table 7: Relationship between those that eat raw vegetables and fruits and the rate of infection

Age Interval	Number	Number Infected	Percentage Infected	Number	Number Infected	Percentage Infected
	←	**E**	→	←	**F**	→
1 – 3	-	-	0.0	1	-	0.0
4 – 7	70	4	5.7	24	-	0.0
8 – 11	100	6	6.0	28	1	3.6
12 – 15	49	2	4.1	10	-	0.0
16 – 19	14	1	7.1	4	1	25.0
TOTAL	**233**	**13**	**5.8**	**67**	**2**	**3.0**

E: Data for those that eat raw vegetables and fruits.
F: Data for those that do not eat raw vegetables and fruits.

As shown in Table 8, infection increase with age for those that had expelled worms recently. For age groups 4 – 7, 8 – 11, 12 – 15 and 16 – 19 years, percentage infection was 7.1%, 14.3%, 15.4% and 33.3% respectively. Besides, infection was recorded only for age groups 4 – 7 (3.8%) and 8 – 11 years (3.7%) for those that did not expel worms recently.

Table 8: Worm expulsion as it relates to infection

AGE INTERVAL	NUMBER	NUMBER INFECTED	PERCENTAGE INFECTED	NUMBER	NUMBER INFECTED	PERCENTAGE INFECTED
	J			**K**		
1 – 3	-	-	0.0	1	-	0.0
4 – 7	14	1	7.1	80	3	3.8
8 – 11	21	3	14.3	107	4	3.7
12 – 15	13	2	15.4	45	-	0.0
16 – 19	6	2	33.3	12	-	0.0
TOTAL	**54**	**8**	**14.8**	**246**	**7**	**2.8**

J: Data for those that admitted to have expelled worm recently
K: Data for those that do not expel worm recently

Result shown in Table 9 indicated that infection rate was higher (9.3%) for those that admitted to have passed out blood-stained stool recently than those that did not (4.1%). However, age group 16 – 19 years recorded the highest percentage incidence (25.0%) followed by age group 8 – 11 years (12.5%) and 12 – 15 years (8.3%) for those that passed out blood-stained stool recently. While the percentage incidence for those that did not pass out blood-stained stool was 7.1%, 5.1%, 3.8% and 2.1% for age groups 16 – 19, 4 – 7. 8 – 11, 12 – 15 years respectively.

Table 9: Blood-stained stool as it relates to infection

AGE INTERVAL	NUMBER	NUMBER INFECTED	PERCENTAGE INFECTED	NUMBER	NUMBER INFECTED	PERCENTAGE INFECTED
	Q			**R**		
1 – 3	-	-	0.0	1	-	0.0
4 – 7	14	-	10.0	80	4	5.1
8 – 11	24	3	12.5	104	4	3.8
12 – 15	12	1	8.3	47	1	2.1
16 – 19	4	1	25.0	14	1	7.1
TOTAL	**54**	**5**	**9.3**	**246**	**10**	**4.1**

Q: Data for those that excreted blood-stained stool recently.
R: Data for those that do not excrete blood-stained stool recently.

As shown in Table 10, those within the age group 16 – 19 years recorded the highest incidence (11.1%) followed by those within the age group 12 – 15 years (8.0%), 8 – 11 years (4.4%) and then 4 – 7 years (2.6%) for those that treat their drinking water. While the percentage infection for those that do not treat their water represents 11.1%, 5.9% and 5.4% for age groups 16 – 19, 8 – 11, 4 – 7 years respectively.

Table 10: Distribution of infection as it relates to water treatment

AGE INTERVAL	NUMBER	NUMBER INFECTED	PERCENTAGE INFECTED	NUMBER	NUMBER INFECTED	PERCENTAGE INFECTED
	P			**S**		
1 – 3	-	-	0.0	1	-	0.0
4 – 7	38	1	2.6	56	3	5.4
8 – 11	45	2	4.4	8.3	5	5.9
12 – 15	25	2	8.0	34	-	0.0
16 – 19	9	1	11.1	9	1	11.1
TOTAL	**118**	**6**	**5.1**	**182**	**9**	**4.9**

P: Data for those that treat their drinking water.
S: Data for those that do not treat their drinking water.

IV. Discussion

This work does not correspond to previous work by Nwosu, (1981) who reported an incidence of 20.6% for *ascaris lumbricoides.* It also disagrees with the work by Udonsi *et al*: (1996) who reported a prevalence of 54.0%. There was also dissimilarity in the result obtained by Obiamiwe, (1977) who recorded 29.5% infection with ascariasis. However, it agrees with the result obtained by Yakubu and Bello, (1988) who reported a lower incidence of 2.8% for ascaaris lumbricoides using a sample size of five hundred and fourteen.

The reason for this low incidence could be attributed to a controlled treatment given to school children within the local government, four months before this research. Besides, this treatment was given at the onset of the dry season which might have ensured a break in transmission of the parasite thus agreeing with the condition described by Nwosu (1981) that if mass chemotherapy to be directed mainly at the subgroups at risk and timed from the onset of the dry season (which is unfavourable for worm transmission), then there would be a drastic reduction in worm prevalence with minimal cost.

Generally, the incidence within the communities sampled was collectively low. Besides, no incidence was recorded in one of the communities. However this contradicts the report by Nwosu, (1981) that most human helminth diseases in the tropics are confined to the rural villages where poor sanitation and domestic hygiene, as well as general ignorance of the disease enhance the problem. Some other researchers have reported high incidence of intestinal helminth in rural communities. However, it agrees with the report by Alakija, (1986) that the prevalence of several important parasites such as *A. lumbricoides*, Hookworm, *T. trichiura, S. stercoralis* and *E. histolytica* is lower in the rural communities than in the urban communities due to over-crowding in the cities.

Age and sex play a very significant role in the transmission of ascaris and other intestinal helminths. From this study, it was discovered that age group 16 – 19 years recorded the highest incidence. However, the results obtained does not agree with the report by Hobson (1975) who reported that infection decreases with increasing age groups may be affected. Also, it disagrees with the work by udonsi *et al;* (1996) who reported that peak prevalence for *ascaris lumbricoides* was among the less than or nine years age group. However, the result obtained for this survey can be related to the number of pupils sampled within the age groups.

Sex related incidence was higher in females than males and agrees with that reported by Kightlinger *et al;* (1995 and1998), that prevalence of intensity of ascariasis is significantly higher in girls and was thought to be influenced by gender-related behavioural and environmental factors that contributes to exposure. Furthermore, from the analysis age groups 4 – 7 years and 8 – 11 years has positive effect while other age groups have negative effect. Also effect of ascaris was positive on females but negative on males. The source of drinking water is related to infection. Infection rate of the that obtain their drinking water from well was consistent or observed for all the age groups sampled save for the 1 – 3 years age group; unlike those that obtain their drinking water from bore hole and ponds. Conversely, the percentage index was highest for those that obtain their drinking water from ponds even though it has a negative effect, from the analysis. This could be explained from the fact that only one age group 8 – 11 years was implicated, thus a lower percentage (5.0) of the 300 population sample (Table V) was implicated. Also bore hole as a source of drinking water has a positive effect on infection while well as a source of drinking water also has a positive effect. Considering the number that take untreated water and the positive effect of such parameters to the incidence of infection in the communities, it agrees with the report by Nwosu (1981) who emphasized that water for domestic use derived from rivulent and streams, artificial wells, ponds and rain water collected and stored constituent infection foci.

From the analysis, it was evident that the level of infection depends on both defecation habit and age of individual. Besides, occasional use of toilets indicates that on most occasions, the number implicated defecates in the bushes. However, this habit has a resultant effect on those that practice it because their level of hygiene is poor and is a predisposition for them to get infected or even infect others. Powuloski (1985) reported that indiscriminate defecation and urination are important factors in the transmission of intestinal helminth diseases while Davies (1984) also showed that prevalence of ascariasis reflect inadequate faecal disposal.

The result obtained indicates that ascaris had a positive effect for those that eat raw vegetables and fruits but negative for those that do not. Besides, using these parameters as a yard stick to determine the incidence of ascaris could be misleading because at one time or the other, everyone takes fruits or vegetables whether cooked or uncooked. Also, it is assumed that the most commonly infected fruits are those which are close to the ground (soil). But the tendency for those that claimed not to take raw vegetables or fruits to be infected indicates that other factors other than the consumption of raw vegetables or fruits operates to maintain infectivity. It could be said that infectivity is influenced mostly by socio-cultural factors such as feeding habits, defecation behaviours, personal and communal hygiene with attendant sanitary condition of the environment all of which culminate to ensure continuous re-exposure to infective agent which affects the spread of ascariasis.

From the analysis it was concluded that the infection of ascariasis depends on the expulsion of worms. This is an undisputable fact since morbidity is closely tied to the worm burden (Chan, 1997). But the point of conflict here lies in the fact that the incidence of infection increase with age for those that expel worms recently

(from age group 4 – 7, 8 – 11, 12 – 15, and 16 – 19 years respectively). This could be due to the number of pupils sampled within the age group.

Ascariasis is related negatively to blood-stained stools.. Surprisingly, the percentage incidence of ascaris for those that recently passed out blood-stained stool was higher than for those that did not (Table 9). From this result it could be explained that there was a predisposed infections which results to anaemia such as hookworm infection which might have occurred as mix infection with ascaris. It has been shown that *A. lumbricoides* interferes with the digestion and absorption of dietary protein (Woodruff, 1965) and thus can result to malnutrition of the host (Hanitrasoamampionona *et al;* 1998). Also, Sarojini (1993) reported that both ascaris and hookworm cause poor health and anaemia. Hookworm infestation is a more serious condition because the worm attaches itself to the intestinal wall and sucks blood. It produces a chemical that prevents blood from clotting. As a result, the wound bleeds even when the worm moves to another site. This causes great loss of blood.

With the result obtained and from the above assertion, it can be said that there exists a relationship between ascaris and hookworm with regards to morbidity. However, since a low incidence for ascaris was recorded from this work compared to the work by a colleague who recorded a high incidence for hookworm (43.0%) in the study area; hence it could be said that economic factors; occupational, mainly affect the infection of hookworm and any other endemic parasite that may be present in the area. Moreover, this is a reflection of the populace which is mainly agriculture and it is common to find people who walk bare-footed to farms or even market and school. This is further explained by the report by Davies (1984) who showed that the prevalence of ascaris reflect inadequate faecal disposal and that children have the greatest ascaris infection rate while agricultural workers are more prone to hookworm infection.

Infection rate or percentage incidence of infection was higher for those that take treated water compared to those that take untreated water (Table X). This could be attributed to the fact that water might not be a major source of infection for this infection in the area but could serve as a predisposing factor, since it has been reported that the incidence of infection is more pronounced during the rainy season. Also, it could depend on the number of people sampled.

Chowdhury and Tada, (1994) reported that the prevalence of human helminth zoonoses is a source both of despair and hope, despair because transmission so often is linked to cultural moves which are difficult to change; and hope because newer techniques employing the tools of molecular biology provide more accurate diagnosis and thus open the way to more effective treatment, i.e. the use of radiation in control of helminth infections, chemotherapy and genetic control of immunity to infection.

Besides, control and prevention should be aimed at children within school age and in a developing country like ours. Safe, effective and cheap drugs should be made available and applied regularly and at the appropriate time to prevent re-infection.

Above all, human ascaris infections can be prevented by adequate sanitation and modification in the behaviour of the populace, provision of toilet facilities in open spaces and market and schools and avoiding the use of faeces as manure for growing vegetables.

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