

## Prevalence of Human Intestinal Parasitic Nematode Among Out-Patients Attending Wudil General Hospital, Kano State, Nigeria

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### ABSTRACT

A prospective study was carried out to determine the prevalence of human intestinal parasitic nematodes among out-patients attending Wudil General Hospital, Wudil Local Government Area of Kano State, Nigeria. A total of 56 stool samples were randomly collected from the outpatients; processed and examined (macroscopic and microscopic) by formal ether sedimentation techniques. The prevalence of human intestinal parasitic nematode among the patient in the study area was 46.4%. The Males had the highest (48.98%) infection rate, while females had the least (28.6%) prevalence rate, however, this is not statistically significant ( $p>0.05$ ). The 36-40years age groups had the highest prevalence of 75%, while 21-25years age groups had the least prevalence rate of 25%, the difference in prevalence among the ages was found to be statistically not significant ( $p>0.05$ ). *Strongyloides stercoralis* had the highest prevalence of 30.36% while *Trichuris trichiura* had the least prevalence rate of 3.57%, the differences among the species of human intestinal parasitic nematode was found to be statistically not significant ( $p>0.05$ ). The control of human intestinal parasitic nematode should be done by adopting drug treatment for those already infected similar to the national immunization program, improve standard sanitation and health services in Wudil L.G.A, particularly the rural area.

**Keywords:** *Ascaris*, Nematode, Parasite infection & *Strongyloides*.

### INTRODUCTION

Nematodes (roundworms) make up a large assemblage of the relatively simple structure with a widespread distribution, their cylindrical and nonsegmented body distinguished them easily from other helminths. They occur in fresh water, sea, and soil, and are among the most susceptible parasites of plants and animals. Most of the free-living nematodes are microscopic, as many of the parasitic species invading body fluids such as the blood or lymph channels of their hosts. Those species which live in the intestine are generally larger, while some in tissue habitats (e.g the kidney) grow to relatively enormous lengths<sup>1</sup>, thus nematode could either be parasitic or a free-living<sup>2</sup>.

Nematodes exhibit a wide range of feeding habits. Many feed entirely on the microorganisms present in decaying vegetable matter other live on the outsides of plants and suck their juice. In vertebrates, they may parasitize the eye, mouth, tongue, alimentary canal, liver, lungs or body cavity, often causing destructive and revolting diseases and producing untold hardship<sup>1</sup>. The life cycles range from the very simple to the extremely complicated. Most nematodes are dioecious, producing eggs with tough resistant coverings. Some species are monoecious while in some dioecious species the males are rare or as yet unknown. The monoecious species may be either parthenogenesis or self-fertilizing hermaphrodites. The majority of nematodes

are oviparous, but some are ovoviviparous. The successful development of nematode eggs outside the host is largely dependent on environmental conditions, particularly whether they hatch in water, soil or within an animal host, must undergo a series of four ecdyses (molts) before reaching maturity<sup>1</sup>, the environmental condition could either be from biotic or abiotic factors<sup>3</sup>.

The human intestinal parasitic nematode causes the following problems to the human being Hookworm cause several abdominal pain, diarrhea, indigestion, loss of appetite nausea and vomiting, dysentery, constipation, and anemia while the chronic are abdominal pain kwashiorkor, and hypoproteinemia in addition to that, it is also leading to the micronutrient deficiency<sup>4</sup> as well as even effecting the early liner growth of children<sup>5</sup>, thus deworming is recommended to maintaining the body nutrient content<sup>6</sup>. *Ascaris lumbricoides* the adult worm leading to blockage of intestinal lumen, absorption of the intestinal content, destruction of intestinal mucosa and peritonitis (rectal prolapsed), while larval migration breaks lungs capillaries causing hemorrhage, however, it can also act as protective factor to those suffering with asthma<sup>7</sup>.

*Trichuris trichiura* Their heavy infection cause bloody diarrhea and rectal prolapsed is possible in severe cases. *Strongyloides stercoralis* they cause dermatitis, swelling, itching at the site where the skin has been penetrated, while heavy infection cause abdominal pain and dysentery.

*Enterobius vermicularis* They cause intensive itching leading to bacterial infection, while rarely worms will invade the female genital track causing complications. Therefore, those are the commonly devastating parasite in human<sup>2</sup>.

The human intestinal parasitic nematode that is responsible for causing diseases and destruction of the human life which lead to the incapacitation, such as ulceration of the intestine which could lead to an internal bleeding that leading to the dead of many people. Therefore, there is a need to find out the prevalence rate in both sexes and ages among patient attending Wudil general hospital, Wudil L.G.A, Kano State. The present work has been taken up to determine the prevalence of Human Intestinal parasitic nematode among Outpatients attending Wudil General Hospital, Kano state, Nigeria with the following objectives i) to determine the prevalence rate among sexes (i.e. between males and females); ii) to find out the prevalence rate among different age groups; iii) to find out which species of intestinal parasitic nematode is more prevalent.

## MATERIALS AND METHODS

### Sample collection

A total of 56 people ranging from 1 to 40years were randomly selected for the study. Males were 48(85%) while females were 8(14%). Then a labeled clean stool container were distributed to each of the patients that have come with the request form from the consulting doctor of the Wudil general hospital to the hospital's laboratory unit, then the container with the sample were retrieved the next day or after some minute and taken to the laboratory for examination of eggs and parasite. In a situation where samples could not be examined immediately, 10% of formol saline was added to each sample as a preservative. An about 1 gram of stool sample was emulsified into a tube containing 4ml of 10% of formol water using applicator stick. Then 3-4ml of 10% of formol water was added again, and the bottle was covered and mixed well by shaking. After the emulsified sample was sieved using a strainer, then the sieved suspension was collected into a beaker. The suspension was transferred into a conical (centrifuge). Diethyl ether (3-4 ml) was added and covered the tube using a stopper and mixed for one minute, then, the stopper was loosely covered because a considerable pressure was built up inside the tube. Then after was centrifuged immediately at 3000rpm for 1 minute. So, the diethyl ether, sample debris, and formal water were discarded. The sediment remained in the tube and returned to an upright position for the remaining fluid from the side of the tube to drain to the bottom. Then the sediment was transferred to a glass slide, and cover with a covered with a cover slip. Then after, the glass slide was placed onto an electronic binocular microscope, examined the preparation microscopically using 10 x objective lens and 40 x objective lens for examination small cysts and eggs to confirm their morphology<sup>8</sup>.

### Statistical analysis

The result was subjected to chi-square analysis to determine if significance relationship existed between age,

gender, and among the parasite (human intestinal parasitic nematodes).

## RESULTS

### Prevalence in relation to sex

Out of the 56 stool, sample examined, 26(46.4%) were observed to be infected, while 30(53.6%) were uninfected (Table 1). The prevalence of human intestinal parasitic nematode shows that males had the highest (48.98%) rate of infection, while the females had the least (28.6%) rate of infection (Table 1). There are no significant differences in the prevalence of human intestinal parasitic nematode among the sexes ( $p>0.05$ ,  $\chi^2=1.024$ ,  $df=1$ ).

### Prevalence in relation to age

Table 2 shows the prevalence of human intestinal parasitic nematode in relation to age, the result shows that 36-40years age groups had the highest 3(75%) rate of infection, while 21-25years age groups had the least prevalence rate (25%). The differences between the prevalence of human intestinal parasitic nematode among the age group were found to be statistically not significant ( $p>0.05$ ,  $\chi=8.71$ ,  $df=7$ ).

### Prevalence with regard to species

The prevalence of human intestinal parasitic nematode with regard to species shows that *Strongyloides stercoralis* had the highest prevalence rate 30.39%, while *Trichuris trichiura* had the least(3.57%) prevalence rate (table 3). The differences between the prevalence of human intestinal parasitic nematode among species were found to statistically be not significant ( $p>0.05$ ,  $\chi^2=5.178$ ,  $df=4$ ).

## DISCUSSION

However, the present study clearly confirmed that there is 46.6% prevalence rate for the disease in the study area. The result of this study markedly differed from the work done by others which show the highest prevalence rate of 43.4%<sup>9</sup>, 50%<sup>10</sup>, 62.3%<sup>11</sup>, 80.9%<sup>12</sup>, 66.7%<sup>13</sup> and 79.8%<sup>14</sup> respectively. Whereas, in some cases, the rate was absolutely lower than that of the present study which shows the prevalence rate of 31.8%<sup>15</sup>, 38.6%<sup>16</sup>, 3.73%<sup>17</sup> and 36.0%<sup>18</sup>, respectively. Therefore, prior to the present study, the result was found to be considered as moderate. This may be due to the lack of standard sanitation, indiscriminate defecation, lack of food hygiene and minimal health care services as well as personal hygiene itself<sup>1</sup> and in addition to that, some environmental factors and other sanitary factors could also be a causative agent<sup>19</sup>. The higher prevalence of human intestinal parasitic nematode observed from male (49%) in the present study confirm the finding of Mordir and Davoud who observed 60%<sup>13</sup> and 3.38%<sup>17</sup> infection rate in male respectively. Whereas another study was also similarly observed male having the higher rate (40%) compare to female (28.6%) even though the number of female participants was extremely doubled the number of male attending the screening<sup>18</sup>. This could be attributable to the fact that males engage in outdoor activities than females thereby exposing them self to the infected soil especially in farm and playing in the open oval infested ground on barefoot, other reasons could be as a result of eating unhygienic food. In contrast

Table 1: Prevalence of human intestinal parasitic nematode in relation to sex in the study area.

SEX	No. patient examined	No. patient with infection	Percentage of infection
Male	49	24	49
Female	7	2	29
Total	56	26	46

Table 2: Prevalence of human intestinal parasitic nematode in relation to age in the study area.

Age group (Year)	No. patient examined	No. patient with infection	Percentage of infection
1 – 5	15	4	27
6 – 10	11	6	55
11 – 15	10	5	50
16 – 20	10	7	70
21- 25	4	1	25
26 – 30	1	0	0
31 – 35	1	0	0
36 – 40	4	3	75
Total	56	26	46

Table 3: The prevalence of human intestinal parasitic nematode species in the study area.

Sex	No. patient examined	No. patient with infection	Percentage of infection
Male	49	Hookworm	12 24.4
		A. lumbricoides	10 10.4
		T. trichiura	01 02.4
		S. stercoralis	16 32.7
		E. vermicularis	05 10.2
		Hookworm	07 12.5
		A. lumbricoides	0.0 0.0
Female	07	T. trichiura	01 14.3
		S. stercoralis	01 14.3
		E. vermicularis	01 14.3
		Hookworm	12 21.4
		A. lumbricoides	11 20.0
		T. trichiura	02 03.6
		S. stercoralis	17 30.4
Both (Total)	56	E. vermicularis	06 10.9

to the finding of Owaku, shows a higher prevalence in females<sup>20</sup>. The report of this study clearly shows that there were differences in prevalence rate between various age groups, as the prevalence of infection revealed that 36-40 years age groups have the higher prevalence, this study seems to be similar to other studies reported that the most effective group were 6-10 years<sup>21</sup>, 17-19 years, 10-12 years<sup>22</sup>, 5-8years<sup>20</sup> and below 20years<sup>18</sup> of age,

respectively. In contrast, to some other findings, the age groups between 9 -11 years<sup>23</sup>, 12-14 years<sup>10</sup>, and 6-8 years<sup>12</sup> were found to be having the higher prevalence rate. The present study shows that, male children were found to be more infected than adult, and these age groups are the most active in terms of carrying out activities in and out of their neighborhood thereby exposing them self to the infected soil compared to the females of the same age group, either during their farming or a garden activities, this is similar to what observed in another study, that hookworm infection could easily spread among horticultural (the practice of cultivation and managing gardens) and plantation workers due to the use of night soil and human stool as manure, and in addition to that mostly are roaming around on barefoot<sup>24</sup>. However, it is important to note that most of the children attended school and played in an open oval infested ground on barefoot, therefore this practice could possibly expose them to the risk of soil-transmitted helminths infection<sup>24</sup>.

However, prior to the prevalence differences among the parasitic species in the study area, showed that *Strongyloides stercoralis* has the higher prevalence rate of 30.36% and is mostly found in males than in females. In contrast to the work done by Winsbery, Damen, and Owaka, found that *Trichuris trichiura*<sup>21</sup>, *Ascaris lumbricoides*<sup>12</sup>, and *Ascaris lumbricoides*(46%)<sup>25</sup>, respectively, having the higher prevalence rate among the entire intestinal parasitic nematode. This totally different from the work done by Sunniah<sup>26</sup>, that shows *Trichuris trichiura* (20.2%) having the higher rate followed by *Ascaris lumbricoides* (10.5%) and hookworm (6.7%), which is also similarly found by Asrat<sup>27</sup> as *A.lumbricoides* (48%) and hookworm (11.5%), well similarly also found *A.lumbricoides* (6.2%) and (6.8) much higher than *T.trichiura* (1.1%)<sup>28,29</sup>, but in another study the three species (*A.lumbricoides*, *T.trichura*, and *hookworm*) were cumulatively mention as having the higher rate out of the entire human intestinal nematodes species<sup>30</sup>. This is due to the fact that the study area was surrounded with river and people with habitual indiscriminate defecation, thus became more vulnerable to the parasites, because *S.stercoralis* is commonly found in humid tropical regions (dam and warm area), and the larvae are present in soil contaminated with human feces, although fifty-two *Strongyloides* species do not infect human (soil-dwellers nematode), but other species like *S.myopotami* and *S.procyonis* were found to be the zoonotic infection agent in an animal host<sup>25</sup>.

Therefore, this study shows a higher prevalence of human intestinal parasitic nematode in male among the sexes and lower age group in relation to ages, as well as among the entire species of parasites in which the *Strongyloides stercoralis* have the highest prevalence rate in the study area of Wudil Local Government Area. Based on the foregoing result control of human intestinal parasitic nematode infection should be done by giving a treatment to those already infected; national immunization program; improve standard sanitation processes such hygienic water management<sup>31</sup>; prevent indiscriminate defecation which

plays a major role<sup>32</sup>, as well as facilitating health services more especially the rural areas.

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