BURDEN OF INTESTINAL HELMINTHS AMONG PATIENTS ATTENDING GENERAL HOSPITAL WUDIL IN KANO STATE NORTH WESTERN NIGERIA

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Abstract
Background: Infection with parasitic helminths is often recognized as one of the most important public health problems in tropical Africa.
Aim: This study is aimed at determining the prevalence of intestinal helminths among rural and semi urban communities (with no treated pipe borne water) attending Wudil General Hospital, Kano, Nigeria.
Methods: Stool samples were collected from patients and processed using formol ether concentration technique.
Results: Out of the 200 stool samples examined, the overall intestinal helminthes prevalence was 138(69.0%). Of these *Ancylostoma duodenale* had the prevalence rate of 38(19.0%), *Strongyloides stercoralis* 22(11.0%), *Ascaris lumbricoides* 28(14.0%), *Schistosoma mansoni* 26(13.0%), and *Trichuris trichiura* 24(12.0%). On the basis of gender, males had the highest infestation of 84(60.9%) compared to females 54(39.1%). Infection across age groups revealed that age group of 10-19 had the highest prevalence of helminths 45(32.6%) followed by 20-29 with 33(23.9%) while the least was in the age group of 50-59 with 11(8.0%). Patients that had no toilet facilities (that use open space) were the most infected 123(89.1%), while patients that use closed water system in the semi urban communities had the minimum infection rate of 3(2.2%).
Conclusion: The study indicated very high occurrence of intestinal helminthiasis among the study population which stress the need for government efforts to promote and/ or sustain proper sanitation and good water supply.
Key words: Prevalence, Intestinal, Helminths, Rural, Nigeria.

Introduction

Helminthiasis is caused by a group of worms called the helminths (Greek: helminthos, helminth means worms). That classically belongs to the phylum nemathehelminths (the round worms) and phylum platyhelminths (the flat worms) which are divided into the flukes (which are flat leaf-like) and the tape worms (which are tape-like) in appearance (Anderson *et al*., 2007). Helminths have been discovered in the cause of examination to have a relatively complex life cycle with one or more intermediate hosts and flame cells as the functional unit for excretory system, these add to the other factors used in differentiating them with other intestinal parasites and to some extent a contributing factor for classifying them as a group (Nancy *et al*., 2002). Among the phylum platyhelminths the class trematodes which are the flukes, plays a vital role in various cases of helminthiasis. They are dorsoventrally flattened, unsegmented and leaf like, they also possesses alimentary canal (Marthew *et al*., 2002). Appearance of cestodes in many cases of helminthiasis in their endemic areas is attributed to several advantages they possessed on their bodies.

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Such as, the tegument which covers the body and is absorptive and the scolexis regarded as the hold fast organ found on the anterior portion of the parasite is normally provided with four suckers (Albert *et al*., 1999) According to Henry (2001), one of the easiest ways helminthiasis due to cestodes is diagnosed is through the identification of the proglotid or the segment (which are metameric repetition of the reproductive organs of the organism) in the stool (by macroscopy). While other helminths like *Schistosoma mansoni* and *Hook-worms* are trematodes and nematodes respectively, their diagnosis relied heavily on the ova/eggs detection in stool specimen (Panendez *et al*., 2007). The flukes of medical significance include almost all the digenetic flukes, which require snail as the first intermediate host. They are responsible for a significant fraction of helminthic cases in many areas around the world especially where fresh water snails are found in abundance (Matsashi *et al*., 2005). Some helminths that cause helminthiasis are serious pathogens which inflict great damage to the host and great economic loss, leading to serious consequences to the affected population and the nation at large (Lesta *et al*., 2001).

All intestinal nematodes have separate sexes and they lay eggs which can be found in faeces, which is why helminthiasis due to most nematode are easily diagnosed through faecal examination and most of them are intestinal parasites meaning that the adult are found in the intestine where they mate, female lay eggs that are in most cases passed out with faeces (Antonio *et al*., 2007). *Hook-worm* and Strongyloides larva needs no broken skin in order to get into their host, because they have the ability to actively penetrate unbroken skin (especially the sole of the feet), the larva then circulate in the body through the blood to heart and lungs(heart to lung migration) before reaching the intestine (Tallkoff *et al*., 1999). When stool specimen does not reveal the presence of ova/eggs microscopically, does not exclude infection with helminths, because segments could have been found by macroscopy which indicates cestodes infection while the microscopy could also reveal larva which could be of *Strongyloides stacoralis* (Stephen *et al*., 2006). Although several reports exist in Nigeria on the morbidity and mortality of most intestinal helminthes parasites (Ogbe and Odudu 1990; Dada *et al*., 1993), the much needed baseline data on the level of endemicity of human intestinal helminthiasis especially on the rural sectors are not easily recorded and do not exist, (Ukoli, 1990). Indeed most reports in Nigeria have been based on parasitological examinations of hospital patients of urban dwellers (Kogi *et al*., 1999; Abdullahi and Abdulazeez 2000) and only seldom did study involve semi urban and rural communities (Luka *et al*., 2000) where poor sanitation, domestic hygiene, general ignorance of the diseases enhances the problem.

Materials and Methods

Study Area

The study was carried out in Wudil Local Government Area of Kano State. Wudil is situated in the Eastern part of Kano in northwestern Nigeria, and has an estimated population of about 1.2 million people across the local government area, the majority of the indigenes are farmers, and others fishermen drivers, traders and tailors.

Study Population

The study population was made up of 200 individuals of varying sexes, aged between 1-59 years, who reported to Wudil General Hospital. The bio-data of the patients was sought orally and with a questionnaire which included age, sex, occupation education status and the type of toilet facility.

Samples were collected in universal bottles and the samples were stored at $4^{o}C$ immediately after preserving it with 10% formol saline.

Sample Collection and Parasitological Technique

The patients were given clean, dried, well labeled specimen bottles for the collection of their faecal samples Collected samples were examined with unaided eyes noting the colour, consistency (formed or unformed/watery) and constituent (present of adult worms, segments blood or mucous) of the stool samples.

A small amount of the sample was picked using applicator stick, placed on a drop of normal saline and emulsified. The preparation was covered with cover slip carefully excluding air bubbles. It was examined using 10x Objective confirmed with the 40x Objective (Cheesbrough, 2006). Subsequent upon that, 10 ml of 10% formol saline was used to 1g of faeces and emulspied using applicator stick. Guaze filter was used to filter the stool through funnel. 3 ml of ether was used against 7ml of the stool filtrate and mixed for 1 minute. The content was centrifuged for 1 minute at 1500 rpm. The fatty plug (debris) was loosen, using applicator stick and the supernatant quickly poured by inverting the tube. The tube was placed on a rack to allow the fluid on the tube side to drain back into the deposit. The deposit was mixed well and a drop transferred onto glass slide for viewing using 10x and 40x objective (formol-ether concentration technique) as per standard method as described by World Health Oganization (1995).

Statistical Analysis

The data obtained in this study were statistically analyzed. Chi square was used to test for association between the variables, using Excel Microsoft (2010), with the help of Duncan Multiple Range Test (DMRT) to separate the means.

Results

Out of the 200 stool samples examined, 138(69.0%) were positive for different helminthic worms. Of these *Ancylostoma duodenale* had the highest prevalence rate of 38(19.0%). Others were *Ascaris lumbricoides* 28(14.0%), *Schistosoma mansoni* 26(13.0%) and *Trichuris trichuira* 24(12.0%) (Table 1). Macroscopic examination of the stool sample revealed that 97(48.5%), 50(25.0%) and 53(26.5%) were brown, green and yellow respectively. Helminthes ova were detected in 66(47.83%), 34(24.64%) and 38(27.54%) of the brown green and yellow faeces respectively while 95(47.5%) and 105(52.5%) of the faecal samples were formed and semi formed respectively. Helminths ova were detected in 66(47.8%) and 72(52.2%) of the formed and unformed faecal samples respectively. Blood and mucous were contained in 18(9.0%) and 11(5.5%) of the samples respectively while 171(85.5%) of the sample had no constituents. The highest number of helminthic ova were detected in 111(55.5%) of the faecal samples that had no constituents, while 17(8.5%) and 10(5.0%) of the bloody and mucoid samples had helminths ova respectively (Table 2). The prevalence of intestinal helminthes according to sex showed that 84(60.9%) males and 54(39.1%) females were infected. Infection across age group revealed that the age group of 10-19 has the highest infection of 45(32.61%) followed by 20-29 with 33(23.91%) while the least was in the age group of 50-59with 11(7.97%) patients infected. Distribution by occupation also showed that artisans has the highest prevalent rate followed by farmers with 49(35.50%) and 39(28.26%) respectively while civil servants and business class had 25(18.12%) each. When considering the prevalence in relation to educational status, those with primary level of education had the highest prevalence rate of 48(34.78%) as shown in (Table 3).

Based on the residential settings, those patients from the rural community were mostly infected with 72(52.17%) while the semi urban area has 66(47.83%) as seen in Table 4. In relation to toilet facilities, those patients that had no toilet (that uses open space) were the most infected with the helminths 123(89.13%), those using pit latrine had 12(8.69%) of the infections while patients that use closed water system had the minimum infection rate of 3(2.2) as indicated in (Table 5).

Table 1: Prevalence of intestinal helminths infection among the study group

Parasite species	**Number Positive**	**Prevalence (%)**
Ancylostoma duodenle	38	19.0
Ascaris lumbricoides	28	14.0
Schistosoma mansoni	26	13.0
Strongyloides stacoralis	22	11.0
Trichuris trichiura	24	12.0
Total	138	69

Table 2: Prevalence of intestinal helminthiasis by stool macroscopy

Parameter	**NE**	**NI(N=138)**	**Prev. (%)**	**X^2**	**Df**	**P – Value**
Colour						
Brown	97	66	47.8	0.245	2	0.885
Green	50	34	24.6			
Yellow	53	38	27.5			
Total	200	138	100			
Consistency						
Formed	95	66	47.8	0.019	1	0.890
Semi formed	105	72	52.2			
Watery	Nil	Nil	Nil			
Total	200	138	100			
Constituents						
Blood	18	17	12.3	2.830	2	0.243
Mucous	11	10	7.3	4.35		
No constituents seen	171	111	80.4			
Total	200	138	100			

KEY: NE = Number examined; NI = Number Infected

Table 3: Distribution of intestinal helminthiasis by demographic and socioeconomic factors

Parameters	**NE**	**NI(N=138)**	**PREV (%)**	**X^2**	**DF**	**P – Value**
Gender						
Male	120	84	60.9	0.140	1	0.708
Female	80	54	39.1			
Age group						
1-9	28	21	15.2	3.454	5	0.630
10-19	64	45	32.6			
20-29	46	33	32.9			
30-39	29	16	11.6			
40-49	18	12	8.7			
50-59	15	11	8.0			
Occupation						
Farmer	56	39	28.3	3.801	3	0.284
Civil servant	30	25	18.1			
Business	39	25	18.1			
Artisans	75	49	35.5			
Education status						
None	51	32	23.2	1.373	3	0.736
Primary school	67	48	34.8			
Secondary School	37	26	18.8			
Tertiary Institution	45	32	23.2			

Key: NE = Number examined; NI = Number Infected

Table 4: Prevalence of intestinal helminthiasis by residential area

Parameter	**NE**	**NI**	**Prev. (%)**	**X^2**	**Df**	**P – Value**
Residential Area						
Semi urban	86	66	47.8	4.230	1	0.040
Rural	114	72	52.2			
Total	200	138	100			

Key: NE = Number examined; NI = Number Infected

Table5: Prevalence of intestinal helminthiasis by availability of toilet facility

Toilet facility	NE	NI	Prev (%)	X^2	Df	P – Value
Open space	181	123	89.1	2.110	2	0.348
Pit latrine	14	12	8.7			
Closed water system	5	3	2.2			
Total	200	138	100			

Key: NE = Number examined; NI = Number Infected

Discussion

The result obtained in this study revealed a prevalence rate of 69.0% of the observed helminthes in the study area. Similar helminths were also reported by Kumurya and Adamu, (2007), but with prevalence rate of 32% among HIV infected people in Kano, Nigeria.

The parasites detected were *Hookworm, Ascaris lumbricoides, Schistosoma mansoni, Strongyloides stercoralis and Trichuris trichiura.* These helminthes were also reported in other parts of the country with *Ascaris lumbricoides,* Hookworm and *Trichuris trichura* being the commonest (Ndifon, 1991; Luka *et al*., 2000; Abdullahi and Abdullazeez, 2000). In this work, prevalence of Hookworm was the highest among the identified helminthes (19.0%). This is in agreement with other reported work Abdullahi and Abdulazeez, (2000), who also reported hookworm with the highest prevalence 21% among the other helminthes encountered. This showed that Hookworm infection is higher in the studied region. When considering helminthes infections with respect to sex, the males were more frequently infected, which is similar to observation by Ndifon (1991). However the reason for this might be connected with the fact that members of this group (males) form the larger proportion of business men and artisans who had the highest prevalence in this study area. By occupation, business group has the highest prevalence rate this may not be unconnected with other behavioral factors (Chan *et al.*, 1994). In this study rural dwellers appear to have the highest infection rate. This is similar to the findings of Samuel, (2004) in Maiduguri. This may be attributable to other determinant factors such as environment apart from the chances. In relation to toilet facilities, people using the open space had the highest prevalence, while those using close water system had the least prevalence rate. These could be due to the fact that infection of these parasites is through active penetration of unbroken skin. Consequently the faeces in open places could contaminate nearby household and school environments with eggs from geohelminths, and this might have resulted to the high number from this present study. The high prevalence rate of infection obtained in this study is similar to the findings of Leykun (2001) in a study in Ethiopia among School children.

Conclusion

The study showed an overall prevalence rate of intestinal helminths of 69.0% which poses a serious public health concern that requires urgent attention. It is therefore recommended that governments (state and local) should set policy-backed effort to help reduce the burden of helminthiasis in the study area. This could be achieved through health education campaigns and awareness among pupils, parents/guardians, teachers and food vendors especially in the rural areas. More facilities should be provided, such as toilet facilities, good drainage system, massive chemotherapy and provision of portable drinking water**.**

Conflict of Interest

I want declare that there is no conflict of interest regarding this work, in whatever way.

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Ethical Issues

Permission was obtained from the ethical committee of Wudil General Hospital before embarking on the research.

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