

Full Length Research Paper

Prevalence of intestinal helminths among undergraduate students of Obafemi Awolowo University Ile Ife, Southwestern, Nigeria

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A cross section study of the prevalence and knowledge of intestinal helminths was investigated among the newly admitted undergraduate students of Obafemi Awolowo University, Ile Ife, Osun State, Nigeria between April and June 2016. Faecal samples from 767 subjects comprising 406 males and 361 females were collected and processed using modified kato-katz method. Eggs of four helminths, *Ascaris lumbricoides*, *Trichuris trichiura*, hookworms and *Taenia* spp. were observed with prevalence of 22.03, 7.30, 5.08 and 1.43% respectively. 240 (31.3%) of the subjects harboured at least one parasitic infection and the prevalence of infection was higher among the male (31.52%) than the female (31.02%) although the difference in the rates between the two sexes was not statistically significant ($P>0.05$). The trend in the infection rate was observed to be both age and sex dependent. The lowest age group (16-20 years) recorded the lowest prevalence (26.88%) and the prevalence of infection increased with increase in age till it peaked at 26-30 years (42.85%) and dropped at the age 31-35 years (33.33%). The results of the questionnaire revealed that majority of students that were infected with the helminths have poor knowledge about causes, transmission, prevention and treatment of intestinal helminths which make it difficult to avoid exposure to the parasite.

Key words: Intestinal helminths, prevalence, *Ascaris lumbricoides*, University students, Nigeria.

INTRODUCTION

Intestinal helminths especially *Ascaris lumbricoides*, *Trichuris trichiura* and hookworms (*Ancylostoma deodenale* and *Necator americanus*) has been reportedly rank among the commonest and most persistent human intestinal helminths in both male and

female of all age groups globally (Mbuh et al., 2011). About 2 billion people have been reported to be infected with intestinal helminths globally, majority been children from the developing countries especially in sub-Saharan Africa of which ascariasis account for approximately 1.6

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billion while trichuriasis and hookworm infection account for about 800 million (de Silva et al., 2003). High prevalence of intestinal helminths reported in developing countries are due to some peculiar factors which include poverty, overcrowding, lack of sanitation (Ojurongbe, 2013), poor nutrition, (WHO, 2002), impoverished health services, poor environmental and personal hygiene (Naish et al., 2004). Morbidities associated with these helminths infections include malnutrition, impaired intellectual performance (Ojurongbe et al., 2014), anaemia, dysentery and abdominal complication (Salawu and Ughele, 2015). Studies on these pathogens in many developing countries had shown that children (≤ 18 years) are mostly vulnerable and approximately 90% of these children are either in elementary or secondary schools (Salawu and Ughele, 2015). A child is defined as an individual under the age of 18 years (UNCRC, 1990; Salawu and Ughele, 2015). Consequently, mostly newly admitted students in tertiary institution in Nigeria fall under this category with the mindset of the general public that they are matured enough to take good care of themselves hygienically (Ojurongbe et al., 2010). However, studies have shown that environments, location, school attended, feeding and behavioral habits, and upbringing are among the factors predisposing these children to intestinal helminthiasis. Also, numerous studies on intestinal helminthiasis have been carried out over the years in different parts of the country mostly among rural dweller (Akinseye et al., 2017) and school-age children in elementary schools (Aniwada et al., 2016; Adefioye et al., 2013; Ojurongbe et al., 2014; Salawu and Ughele, 2015) with little studies on tertiary students (Ojurongbe et al., 2010; Dada and Ekundayo, 2015; Isibor et al., 2013; Afolabi et al., 2016). However, information about the newly admitted students who are the one bridging the gap between the secondary and the tertiary students on the prevalence and knowledge of intestinal helminthiasis is yet to be documented especially in Obafemi Awolowo University Ile Ife, hence this study.

MATERIALS AND METHODS

The study was carried out at Obafemi Awolowo University Ile Ife, Nigeria. The population of the subjects consisted mainly newly admitted undergraduate students. The purpose of the study was explained to the subjects and documented consents were obtained from all participants. The participants were assured of confidentiality. The survey was carried out generally among the students irrespective of their faculty or department.

Consent and ethical issues

Ethical clearance for the study was issued by the ethical committee of the Obafemi Awolowo University Health Centre, Ile Ife, where the questionnaire administration and sample collection took place.

Questionnaire administration

A well-structured and pre-tested questionnaire was administered to collect socio-demographic information on each student and their responses were recorded by ticking the appropriate boxes provided. The socio-demographic information contained in the questionnaire include students' bio-data, other important information on transmission, control and knowledge about soil transmitted helminths.

Collection of stool samples

All participating students were supplied with a clean pre-labelled, wide-mouthed screwed capped plastic universal bottle, a sheet of paper and a wooden spatula each. The students were instructed to pass their faeces on the sheet of paper provided and to use the wooden spatula to transfer about 5 g of early morning faeces to the bottle and ensured the bottle was tightly screwed. The samples were taken to the Parasitology Laboratory, Department of Zoology, Obafemi Awolowo University where they were fixed immediately by adding adequate 10% formalin and mixed thoroughly with a wooden applicator stick and examined for helminth ova by a simple thick smear technique using a 41.7mg Kato-Katz technique (WHO, 1994).

Statistical analysis

All statistical analyses were performed using SPSS for windows version 21.0. Differences in prevalence of each parasite infection among subgroup were determined by chi-square. Statistical difference was assigned at $P \leq 0.05$.

RESULTS

A total of 767 students comprising 406 (52.93%) males and 361 (47.06%) females were screened for intestinal helminths infection in this study. The eggs of intestinal helminths observed in the faecal samples were those of *Ascaris lumbricoides*, hookworms, *Trichuris trichiura*, and *Taenia* spp. with the overall prevalences of 22.03, 7.30, 5.08 and 1.43% respectively.

The population and STH's infected distribution of participating students within different faculties in Obafemi Awolowo University, Ile Ife is shown in Table 1. The prevalence of each intestinal helminth egg observed in the analyzed faecal sample infection among students is shown in Table 2 while Table 3 shows the age-gender distribution of intestinal helminths among the students in the study area.

In total, 240 (31.29%) students harboured at least one parasitic infection (Table 1). Prevalence of intestinal helminths was recorded in all the faculties with varying prevalence but higher prevalence were recorded among students in non-science based faculties (Social sciences, 40.29%) while lower prevalences were recorded among students with science based faculties (H/sciences 21.74%).

Table 1. Population and STH's distribution of participating students within different faculties of Obafemi Awolowo University, Ile Ife.

S/N	Faculty	Number Examined	Number infected	%infection
1	Administration	105	31	29.52
2	Agriculture	55	17	30.91
3	Art	209	64	30.62
4	Health Science	46	10	21.74
5	Education	44	16	36.36
6	Environmental design and management	79	26	32.91
7	Law	39	11	28.21
8	Science	65	17	26.15
9	Social Sciences	67	27	40.29
10	Technology	58	21	36.21
Total		767	240	31.29

Table 2. Prevalence of soil-transmitted helminths among students examined within different faculties of Obafemi Awolowo University Ile Ife.

S/N	Faculty	Number examined	% +ve for helminth eggs			
			<i>A. lumbricoides</i>	Hookworms	<i>T. trichiura</i>	<i>Taenia spp.</i>
			<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
1	Admin	105	20(19.05)	6(5.72)	8(7.62)	0(0.00)
2	Agric	55	14 (25.45)	3(5.45)	2(3.64)	1(1.82)
3	Art	209	43 (20.57)	16 (7.65)	10(4.78)	4(1.91)
4	H/science	46	10 (21.74)	0(0.00)	0(0.00)	0(0.00)
5	Education	44	11(25.00)	4(9.09)	1(2.27)	2(4.45)
6	EDM	79	18(22.78)	7(8.86)	2(2.53)	2(2.53)
7	Law	39	9 (23.07)	2(5.13)	1(2.56)	0(0.00)
8	Science	65	12 (18.46)	6 (9.23)	6(9.23)	0(0.00)
8	Social Science	67	18(26.86)	8 (11.94)	5(7.46)	1(1.49)
10	Tech	58	14 (24.14)	4(6.89)	4(6.89)	1(1.72)
Total		767	169(22.03)	56(7.30)	39(5.08)	11 (1.43)
p value		p<0.05	p<0.05	p<0.05	p<0.05	p<0.05

Table 3. Prevalence of soil transmitted helminths (STH) with respect to age group and sex of students in the study area.

Age (years)	Sex					
	Male		Female		Total	
	N E	No (%) infected	N E	No(%) infected	N.E	No (%)infected
16-20	185	44(23.78)	239	70(29.28)	424	114(26.88)
21-25	173	67(38.72)	109	34(31.19)	282	101(35.81)
26-30	38	15(39.47)	11	6(54.54)	49	21 (42.85)
31-35	10	2(50.00)	2	2 (100.00)	12	4 (33.33)
Total	406	128(31.52)	361	112(31.02)	767	240(31.29)

NE=Number examined.

Table 4. Knowledge about the causes, transmission, prevention and treatment of STHs among the students in the study area.

Variable	Category	Response (%) N=767	Number infected (%) N=240
Heard about intestinal helminths	Yes	152(19.82)	41(17.08)
	No	615(80.18)	111(46.25)
Causes of intestinal helminths	Bacterial	66(8.60)	21(8.75)
	Virus	17(2.22)	5(2.83)
	Through sexual intercourse	13(1.69)	4(1.66)
	Through parasitic helminths	32(4.17)	8(3.33)
	No idea	639(83.02)	202(84.16)
Transmission	Through faecal-oral route	33(4.30)	9(3.75)
	Through injection	20(2.60)	6(2.50)
	Sexual intercourse	25(3.25)	6(2.50)
	Parasitic helminths	37(4.82)	13(5.42)
	No idea	652(85.01)	206(85.83)
Prevention	Adequate disposal of human waste	27(3.52)	8(3.33)
	Boiling of drinking water	12(1.56)	4(1.66)
	Proper washing of cloth	8(1.04)	6(2.50)
	Good Personal hygiene	75(9.77)	14(5.83)
	Avoidance of stool	48(6.25)	17(7.08)
	No idea	597(77.83)	191(79.58)
Treatment	Chemotherapy	24(3.13)	11(4.58)
	Vaccination	78(10.16)	16(6.66)
	No cure	15(1.95)	4(1.66)
	No idea	650(84.74)	209(87.08)

Generally, high prevalence of infection was recorded among male students (31.52%) than female students (31.02%) although with no significant difference ($p>0.05$). The trend in the prevalence values of the four observed parasites were both age and gender dependent. In all age groups within both sexes, increase in prevalence of infections was observed as the age increases (Table 3). Approximately, 27% of the younger age category (16-20 years) was found to be infected and the rate increased though the succeeding age groups reached the maximum of 42.85% among the older age group (26-30 years) but declined to 33.33% among the oldest 31-35 years. There was no significant difference in prevalence of infection within age group ($p>0.05$).

Considering the infection among the sexes within each age group, females had more infection rates than the males except at age group 21-25 years where otherwise.

Based on the questionnaire survey, all the students that took part in this study submitted their faecal samples and also completed the questionnaires. Table 4 shows that majority of the students lack knowledge about the causes,

transmission, prevention and treatment of intestinal helminthiasis. Based on the knowledge of intestinal helminths among the students, approximately 80% of the respondents have not heard about intestinal helminths before while about 83% have no idea about the causes of intestinal helminthiasis. About 85% of the respondents do not have an idea about the transmission while majority also do not know about the prevention and treatment of intestinal helminthiasis. Also, comparing the rate of infection among the respondents, the results of this study shows that the respondents that do not have any knowledge about causes, transmission, prevention and treatment of intestinal helminths are heavily infected (Table 4).

DISCUSSION

The occurrences of intestinal helminthiasis due to *A. lumbricoides*, hookworms and *Trichuris trichiura* have been reported in tertiary students by various authors from

various parts of the country and it has been observed that the prevalences and intensities of these infections ranges depend on the location and the methodology employed in the study (Nwaneri et al., 2013). In this study, the most prevalence among the intestinal helminths is *A. lumbricoides* (22.03%) followed by hookworms (7.30%) and *Trichuris trichiura* (5.08%); this result is consistent with the reports of some authors who reported that intestinal helminthiasis among school children in Nigeria is very common and caused due to the triad of roundworm, hookworms and whipworms (Taiwo and Agbolade, 2000; Asaolu et al., 2002; Adeoye et al., 2007; Salawu and Ugbele, 2015)

In this study, an overall prevalence of 31.49% was recorded among the newly admitted undergraduate students of Obafemi Awolowo University Ile Ife Nigeria. This results is in line with 20.6% reported from tertiary students in Ede Osun State (Ojurongbe et al., 2010), 40.5% prevalence reported among students in FUTA (North gate area) Akure, Ondo State (Dada and Aruwa, 2015) and 21.1% in Ilorin (Babatunde et al., 2003) but contradicts overall prevalence of 13.3% reported among students in FUTA Akure (Afolabi et al., 2016) and 11.1% in Benin city (Wagbastoma and Aisien, 2005). The high overall prevalence of infection recorded in this study shows that intestinal helminthiasis is not limited to children and rural dweller but also tertiary students in urban centers and the high prevalence recorded could be attributed to the poor sanitation and eating habit, poor personal and environmental hygiene practices among the students in their various hall of residence.

In this study, the trend of infection among the students were both age and gender dependent. Prevalence of infection increase as the age of student increases. Students in age group 16-30 years were mostly infected while the older age group 31 years above was least infected. This agree with the submission of both Adanyi et al. (2011) and Salawu and Ugbele (2015) who stated that as a child get older, the child tends to be more cautious and mindful of hygienic practices by minding what they eat and may not always get involved in playing in dirty environment, also they tend to spend more of their leisure time indoors.

A non-significantly high prevalence of infection was recorded among males compared to the females among the students studied. The results agrees with those of Ojurongbe et al. (2010); Aniwada et al. (2016) and Dada and Aruwa (2015) but contradicts the reports of Afolabi et al. (2016) and Adefioye et al. (2011) who reported otherwise. The prevalence of infection recorded among males might be due to the fact that male students are very playful and active outdoor, tend to less careful about what they eat than their female counterparts (Ojurongbe et al., 2010).

The result from the questionnaire shows clearly that majority of tertiary students have inadequate or poor

knowledge about intestinal helminthiasis and some other parasitic pathogens in their environment. Adequate knowledge about the causes, transmission, prevention and treatment will make it possible to avoid practices that might exposed them to infection. Also, it is imperative for government, stakeholder in health sector and healthcare provider to embark on awareness and sensitization program on the need for the newly admitted university students to know about soil transmitted infections and diseases.

In conclusion, there is a need for the control measures which include deworming programs couple with inclusion of compulsory health education courses for all tertiary students so as to bring about reduction in the prevalence and ensures adequate control by the authority concerned.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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