

Human Soil-Transmitted Helminthiasis among Adolescents in Ilara-Mokin Community, Ondo State, Nigeria; A Case Study of *Ascaris lumbricoides*, *Trichuris trichiura* and Hookworm

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Abstract: Helminth infections, such as *Ascaris lumbricoides*, hookworm, *Hymenolepis nana* and *Trichuris trichiura* are major public health concerns. Helminths are able to survive in their mammalian hosts for many years due to their ability to manipulate the immune response by secreting immunomodulatory products. This research work was carried out to know the prevalence of soil-transmitted helminthiasis (ascariasis, trichuriasis and hookworm) among adolescents in Ilara-Mokin Community of Ifedore Local Government Area of Ondo State. Students of Ilara-Mokin Community High School were recruited for this study having obtained their consents through their parents and teachers. Ethical approval was obtained from the appropriate ethical and research committee. Stool samples were collected from the pupils and immediately transported to the Laboratory of State Specialist Hospital, Akure where they were examined for the presence of ova/larva of the parasites using wet preparation and formal-ether concentration methods with the aid of binocular light microscope. Out of the 128 pupils recruited, 46 were males while 82 were females. The prevalence of soil-transmitted helminthiasis was 28.9% with ascariasis taking the lead 21.9% followed by hookworm 3.9% and trichuriasis has the least prevalence of 3.1%. The prevalence of soil-transmitted helminthiasis is considerably high among adolescents in Ilara-Mokin, therefore there is need for Government to introduce an integrated program that would see to the elimination of these infections.

Keywords: soil-transmitted helminthiasis, prevalence, adolescents, Ilara-Mokin, Ondo State.

1. INTRODUCTION

Helminths are worm-like organisms living in and feeding on living hosts, receiving nourishment and protection while disrupting their hosts' nutrient absorption, causing weakness and disease. They can live inside humans and other animals and those that live inside the digestive tract are called intestinal parasites. In their adult form, helminths cannot multiply in humans [1]. Helminths are able to survive in their mammalian hosts for many years due to their ability to manipulate the immune response by secreting immunomodulatory products. Helminth ova (or eggs) have a strong shell that protects the eggs against a range of environmental conditions [2].

Helminth infections, such as *Ascaris lumbricoides*, hookworm, *Hymenolepis nana* and *Trichuris trichiura* are major public health concerns because factors that predispose man to the infections are bound in the sub-region which includes poor environmental hygiene, poverty, unsafe water, malnutrition and ignorance [3, 4, 5]. It has been reported in the developing countries, more than 2 billion people might be infected with helminths [6], pre-school, school-aged children and pregnant women are at highest risk of morbidity after been infected with the infections [7].

More than 500 million people are infected with trichuriasis, ascariasis, or hookworm infections globally. These infections are classified among the seven of the most common neglected tropical infectious diseases that afflict the bottom billion because of their high prevalence and amenability to control. In Malaysia, numerous reports revealed that helminth infections among rural children are still widespread [8, 9, 10].

This research work was embarked upon to know the prevalence of helminth infections (Ascariasis, Trichuriasis and Hookworm) among the adolescents in Ilara-Mokin community because there's no documented report on these infections in the selected study area.

2. MATERIALS AND METHODS

Study Site and Subjects:

Ilara-Mokin is a small town located in Ifedore Local Government Area of Ondo State. It is about 10Km away from Akure which is the capital city of Ondo State. The people living in the Community are predominantly farmers, they live majorly on their farm produce, they depend on well, rain and stream water for their sources of drinking water. The children defecate in the surrounding bushes, the environment lack appropriate toilet facilities even though, the adults use pit latrines. Students of Ilara-Mokin Community High School were recruited for this study between April to July, 2011, having gotten their consents through their parents and teachers of the school. Ethical clearance was obtained from the appropriate ethical and research committee.

Methodology:

Stool samples were collected from all the subjects and immediately transported to the Laboratory of State Specialist Hospital, Akure where they were examined for the presence of the ova/larva of the parasites using wet preparation and formal-ether concentration methods with the aid of binocular light microscope.

3. RESULTS

The results of this research are shown in the tables below:

From the table 1 below, it is shown that out of the 128 subjects recruited for this study, 37(28.9%) were positive to soil-transmitted helminth (STH) infections with Ascariasis taking the highest prevalence of 28(21.9%) followed by trichuriasis 05(3.9%) while hookworm has the lowest prevalence with 04(3.1%). Only 01(0.8%) prevalence co-infection was found for ascariasis/hookworm while there is no co-infection for ascariasis/trichuriasis and trichuriasis/hookworm.

Table 1: prevalence of helminth infections among adolescents in Ilara-Mokin Community

Parasites	No. Examined	No. Positive	% Positive
<i>A.Lumbricoides</i>	128	28	21.9
Hookworm	128	05	3.9
<i>T.trichuira</i>	128	04	3.1
<i>A.Lumbricoides</i> / Hookworm	128	01	0.8
<i>A.Lumbricoides</i> / <i>T.trichuira</i>	128	-	-
<i>T.trichuira</i> / Hookworm	128	-	-
All infections (STH)	128	37	28.9

Out of the 128 subjects recruited for this study, 46 were males while 82 were female and all were within the age group 12-18years. Out of the 46 males, 12(26.1%) were positive to ascariasis, 03(6.5%) positive to hookworm and 02(4.3%) were positive to trichuriasis. Out of the 82 females, 16(19.5%) were positive to ascariasis, 02(2.4%) positive to hookworm and 02(2.4%) also positive to trichuriasis as shown in the table 2 below.

Table 2: prevalence of helminth infections among male and female adolescents in Ilara-Mokin Community

Gender	No. Exam.	<i>A.Lumbricoides</i>		Hookworm		<i>T.trichuira</i>	
		No. Pos	% Pos	No. Pos	% Pos	No. Pos	% Pos
Male	46	12	26.1	03	6.5	02	4.3
Female	82	16	19.5	02	2.4	02	2.4
Total	128	28	21.9	05	3.9	04	3.1

4. DISCUSSION

The commonest helminth infections are those caused by intestinal helminthes such as ascariasis, trichuriasis, and hookworm, followed by schistosomiasis. It has been reported that the people living in thousands of rural, impoverished villages throughout the tropical and subtropical regions are often chronically infected with several different species of parasitic worm; that is, they are polyparasitized [11, 12]. Reports have shown for reasons not well understood, compared with any other age group, school-aged children (including adolescents) and pre-school aged children tend to harbor the greatest numbers of intestinal worms and schistosomes and as a result experience growth stunting and diminished physical fitness as well as impaired memory and cognition [13]. And these adverse health consequences combine to impair childhood educational performance, reduce school attendance [14] and account for the observation that hookworm (and presumably other diseases caused by parasitic worms) reduces future wage-earning capacity [15].

The results of this study showed the prevalence of soil-transmitted helminthiasis (STH) among adolescents in Ilara-Mokin Community of Ifedore Local Government Area of Ondo State to be 28.9% with ascariasis having the highest prevalence of 21.9% followed by hookworm (3.9%) and trichuriasis has the least prevalence with 3.1%. According to the results of this study, it is shown that the prevalence of soil-transmitted helminthiasis is considerably high among the adolescents in the Community and the commonest of all the infections was ascariasis which is against the reports of [16] who reported 41.9% prevalence for STH and also reported hookworm to have the highest prevalence among the three helminth infections (ascariasis, trichuriasis and hookworm) reported in Moro Local Government Area of Kwara State in Nigeria. The 28.9% prevalence of STH in this study is against the report of [17] who reported 43.5% prevalence of STH for mothers and 4.9% for children. It is also against the reports of [18, 19, 20, 21, 22, 23, 24] who all reported higher prevalence of STH in their various researches. But the prevalence of STH in this study is higher than the prevalence reported by [25, 26]. The order of prevalence among the three STH studied in this research was found to be ascariasis > hookworm > trichuriasis and this correlates with the reports of [18, 24, 27] who both reported the same order of prevalence among the three helminth infections (ascariasis, hookworm and trichuriasis), but it is against the reports of [16, 25, 21, 22, 23, 28] who all reported different order of prevalence among the three STH.

The results of this study showed higher prevalence in males than females for the three STH (ascariasis, hookworm and trichuriasis) which is against the report of [22] who reported higher prevalence in females than males and also reported co-infection for ascariasis/hookworm in line with the results of this study, but there was no co-infection for Ascariasis/trichuriasis and hookworm/trichuriasis in this study. The higher prevalence in males recorder in this study may be due to the playing activities of male children. In general, the high prevalence of STH among adolescents in this community could be associated with the poor hygiene and sanitation, poverty in the land. Higher percentage lives in mud housing with no toilets. The people are predominantly farmers, depending solely on stream water, uncovered wells for their drinking water, which may be polluted from the source with faecal materials as children defecate in their surrounding environment. It has been reported that children are more vulnerable to the infection which could be due to their low level of immunity. They easily put their hands to mouth when playing in contaminated soil and eating with contaminated hands [29, 30].

In conclusion, the prevalence of STH is considerably high with ascariasis taking the lead among adolescents in Ilara-Mokin so; there is need for government intervention to introduce de-worming in the community. An integrated approach that includes education on personal hygiene, improved sanitary and environmental conditions, provisions of portable drinking water are inevitable measures in achieving a sustainable elimination of these infections.

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