

Original Research Article

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Relationship between Intestinal Helminthiasis and Haemoglobin Level in Ilorin South Local Government Area of Kwara State

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ABSTRACT

Keywords

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In developing countries, prevalence of helminthiasis and anaemia has been one of the major public health problems where they cause micronutrient deficiencies of iron, folate, vitamin B₁₂ and infectious diseases among children. Faecal samples and blood samples were obtained from 258 children. Faecal samples were examined using standard parasitological techniques, and anaemia was defined as blood haemoglobin <10 g/dL. Eighty five patients representing 47.2% were positive for hookworm, while 62 (34.4%) of the patients for *Ascaris lumbricoides* (*A. lumbricoides*). *Trichuris trichiura* (*T. trichiura*) was ranked third most positive with 25 (14%), followed by *Schistosoma mansoni* (*S. mansoni*) with only 8 (4.4%) testing positive. Eighty six patients representing 48% who tested positive for helminthes had Hb < 10g/dl and were considered anaemic, while 94 (52) also tested positive for helminthes but had Hb >10g/dl and were considered non anaemic. Sixteen of the patients representing 29% who tested negative for helminthes had Hb <10g/dl (anaemic) while 62(79%) patients who tested negative had Hb >10g/dl (non anaemic). Public enlightenment programmes should be carried out on personal and good hygiene at controlling of intestinal helminth infection and anaemia.

Introduction

Helminthiasis has continued for many years to be a world health problem in many developed countries. World populations of people that are infected with intestinal worms have been reported to be 1.47 billion, 170million and 300million for roundworm, hookworm and whipworm respectively (Ibrahium, 2011). Studies had shown that helminthes in the course of their infestation may cause adverse and pathogenic effect on their host (World Health Organization, 2002). The intestinal helminthes are those worms which may inhabit the intestinal tract of man and animal as their predilection site where

they derive nourishment (McGregor *et al.*, 1996) and their larvae can migrate to other organs causing physiological damages. These helminthes are transmitted via eggs that are passed in the faeces of infected persons that attach to vegetables or contaminated water sources and then ingested or eggs can hatch releasing larvae that penetrate the skin (World Health Organization, 2017). Their geographical distribution depends on the species life cycle, climatic as well as other conditions; *A. lumbricoides*, *T. trichiura*, *Necator americanus* and *Ancylostoma duodenale* infect more than a billion people

and the most serious helminth infections are prevalent in poor tropical and subtropical areas (de Silva *et al.*, 2003).

Very few helminthes are known to be potentially dangerous and most are pathogenic only when worm loads are high. Some individual tolerate these parasite even with very heavy worm loads, but others may show quite severe clinical manifestation. In extreme cases where the worms feed on or pierce through tissues much harm or even death may result from severe damage to the host cell. One of the ways in which pathogenesis may occur is anaemia (Chatterjee *et al.*, 2014).

Helminths such as hookworms can cause iron deficiency anaemia via blood loss because adult hookworms attach themselves to the gut wall ingesting both the gut wall cells and blood. Every 4–6 hours feeding sites are changed with secretion an anticoagulant, resulting in secondary blood loss from the damaged gut wall after the worms have stopped feeding (Koukounari *et al.*, 2008). Anaemia itself is not a disease but a sign of an underlying disorder which cause should be identified and it constitutes major public health problems in many developing countries. Efficient correction of anaemia depends on the discovery of the pathological factors causing it. Anaemia could be primarily brought about by chronic blood loss but some other factors have to be taken into consideration to explain the development and types of anaemia, such as nutritional effects. Anemia is a condition where there is less than the normal hemoglobin (Hb) level in the body, which decreases oxygen-carrying capacity (Osazuwa *et al.*, 2011). Different factors cause anaemia but nutritional deficiency is the most important cause worldwide with iron deficiency anaemia as the main source of nutrition related anaemia. Some effects of anaemia are lower birth

weight babies who have a higher risk of death, reduced work productivity in adults and limits cognitive development in children, impaired gastrointestinal functions and adverse effects on the immune system resulting in reduced resistance to infections.

Hookworm is capable of drawing from 0.03-0.2ml of blood per day and Infestation with other worms, for example *Trichuris trichiura*, also cause significant blood loss (Kaeni, 2003) *A. lumbricoides* which is usually regarded as the most common helminthes of man is estimated to infect about 25% of the world population and may cause perforation of the intestinal wall or may penetrate the parenchyma of the liver or even lungs and the most common complication is intestinal obstruction due to worm bolus (Arif *et al.*, 2011). Efficient diagnosis of anaemia depends on the haemoglobin concentration by standard method and absolute recovery of ova, larva or adult worms and in the stool of the patient. This is compared with the normal haemoglobin level which varies with age and sex.

Materials and Methods

Study area

Ilorin, the capital of Kwara state is situated 360km north of Lagos, at 08 30N and 04 30N and 482KM South West from Abuja. It is the gateway between the northern and southern part of the country. The population which is estimated to be 2-3 million is made up of four main ethnic groups, namely Yoruba, Nupe, Fulani and Baruba. Kwara states shares boundary with Ekiti, Oyo, Osun, Kogi and Niger state

Sample collection

Faecal samples and blood samples were obtained from 258 children in Ilorin. Faecal samples were examined using standard

parasitological techniques, and anaemia was defined as blood haemoglobin <10 g/dL. Direct smear of the stool sample was made on a clean grease-free slide, covered with cover slips and was examined for ova of parasite under the microscope using x10 and x40 objective lens. Samples that were negative for parasite ova and cysts were subjected to a concentration method as described by the World Health Organization.

The formal ether concentration technique was used. A 1g sample of the stool was emulsified in 5 mL of formal saline, sieved, and the suspension collected in a centrifuge tube, followed by the addition of 3mL of ether. The well-mixed suspension was centrifuged at 3000 rpm for 1 minute. The supernatant was discarded, and the sediment examined microscopically using 10X and 40X estimation of haemoglobin using cyanmet haemoglobin method.

Consents were obtained from the parents of the respective subjects for the purpose of this research.

Data analysis

Data analysis of the different prevalence was carried out with simple percentage

Results and Discussion

The investigation revealed that 85 patients representing 47.2% were positive for hookworm, while 62 (34.4%) of the patients for *A. lumbricoides*. *T. trichiura* was ranked third most positive with 25 (14%), followed by *S. mansoni* with only 8 (4.4%) testing positive (Table 1).

Eighty six patients representing 48% who tested positive for helminthes had Hb< 10g/dl and were considered anaemic, while 94 (52) also tested positive for helminthes but had Hb >10g/dl and were considered non anaemic. Sixteen of the patients representing 29% who tested negative for helminthes had Hb<10g/dl (anaemic) while 62(79%) patients who tested negative had Hb >10g/dl (non anaemic) (Table 2).

Table.1 Distribution of intestinal helminthes

<i>PARASITE</i>	<i>NO. POSITIVE (%)</i>
Hookworm	85 (47.2)
<i>Ascaris lumbricoides</i>	62 (34.4)
<i>Trichuris trichiura</i>	25 (14.0)
<i>Schistosoma mansoni</i>	8(4.4)
Total	180 (70.0)

Table.2 Distribution of helminthes and haemoglobin level in subjects

<i>Helminthes</i>	<i>NO% Anaemic (Hb<10g/dl)</i>	<i>No(%)Nonanaemic (Hb>10g/dl)</i>	<i>Total</i>
+Present	86(48)	94(52)	180
-Absent	16(21)	62 (79)	78
Total	102(40)	156 (60)	258

The total helminthes prevalence observed in Ilorin South Local Government area is 70%, this is similar though lower when compared to the work of Wosu and Onyeabor (Wosu *et al.*, 2014), where they recorded 75.7% on the prevalence of Intestinal Parasite Infections among School Children in a Tropical Rainforest Community of Southeastern Nigeria. The present research revealed a very high prevalence rate of helminthes which could be as a result of poor hygiene practices among the pupils which enhanced transmission through to fecal-oral route contamination.

In the classes of helminthes, hookworm was most prevalent with 42.7% which agrees with Ejezie *et al.*, (1993) where they recorded 45.5% but did not agree with Osazuwa *et al.*, (2011) and Odebunmi *et al.*, (2007) where they recorded 16.19% and 3.2% respectively. In this study, hookworm is considered as an independent risk factor for anaemia. *A. lumbricoides* was 34.4% which is higher than 22.7% as reported by Wosu and Onyeabor but was lower than 75.6% reported by Osazuwa *et al.*, (2011). A prevalence of *T. trichiura* 14% was recorded in the present research which corresponds with the low prevalence 7.5% and 3.2% reported by Osazuwa *et al.*, and Ekpenyong *et al.*, (2008) respectively, but disagrees with the research of Wosu and Onyeabor who reported 34.5%. Least prevalent in our study is *S. mansoni* (4.4%), which agrees with a study on primary school level, 6(4.29%) and secondary school 7(5.00%) by Goselle *et al.*, (2010).

In conclusion, the overall helminthes prevalence rate in Ilorin South local Government area was 70.0% as determined by egg positive stools. This is higher than in some other tropical areas where as low as 26.0% have been recorded. Anaemia in Ilorin local government is statistically related to Intestinal helminthiasis, hookworm and *T.*

trichiura are related than *A. lumbricoides*. Public health measures should be given serious attentions to, educating the public on personal and good hygiene as well as the consequences of anaemia.

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