

# PREVALENCE OF INTESTINAL PARASITES AMONG THE “ALMAJIRIS” IN SOKOTO METROPOLIS, SOKOTO NIGERIA

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**Abstract:** A total of 271 stool specimens were collected at random among pupils (Almajiris) in some “Quranic” schools of age range 5 – 25 years. These schools mostly are gender biased and comprises of males. The stools were processed and examined by standard techniques. we found the prevalence of intestinal parasitism among the “Almajiris” in this study to be (202)74.5%; of this proportion, children of age group 5 – 10 years make the largest population (42.8%) and also constitute the highest group infected (38.4%). This was followed by the age group 11 – 15 years both in number and in infection rate 81(29.9%) and 66(24.4%) respectively. The least infected group is age group 21 -25 years 1(0.4%). We observed that 254(93.7%) of the “Almajiri” live on begging while 17(6.3%) have other means of livelihood. The prevalence of parasitic infection among the beggars was found to be(200)73.8%and only (2)0.7% of none beggars were infected. We also observed that the prevalence of parasitic infection decreases as the years of duration of stay in the dormitory increases in the following trend: those with less than one year stay have 31.0% followed by 1 -2 years, 3 - 4 years and 5 years and above with prevalence of infection of 28.0%, 12.2% and 3.3% respectively. In this study, Hookworm was found to have the highest frequency of 46.0% followed by *Ascaris lumbricoides* with 20.0% and the least is *Giardia lamblia* with 2.0%. The co-infection rate was found to be 20.0%. The prevalence of intestinal parasite among the “Almajiris” school children living in urban city of Sokoto is high.

**Keywords:** “Almajiri”, Anaemias, formol-ether, intestinal parasite, stool, Sokoto.

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## I. INTRODUCTION

Intestinal parasitic infection is one of the major health burden in developing countries Particularly in Sub-Saharan Africa. It has been estimated to affect about 3.5 billion people globally and 450 million people are thought to be ill as a result of such infections, the majority being children<sup>1</sup>. In Nigeria, intestinal helminthes infections have continued to prevail because of poor standards of living, poor environmental sanitation and ignorance of simple health promoting behaviors<sup>2,3</sup>. Intestinal helminthes infections are most common in school age children and they tend to occur in high intensity in this age group<sup>4</sup>. These infections have been associated with an increased risk for nutritional anaemias, protein-energy malnutrition, growth deficits in children, physical weakness and low educational performance of schoolchildren<sup>5,6,7</sup>; and also causing morbidity and mortality.

Parasitic infections are governed by behavioral, biological, environmental, socioeconomic and health systems factors. Local conditions such as quality of domestic and village infrastructure; economic factors such as monthly income, employment and occupation and social factors such as education influence the risk of infection, disease transmission and associated morbidity and mortality<sup>8,9</sup>. These infections are more prevalent among the poor segments of the population. They are closely associated with low household income, poor personal and environmental sanitation, and overcrowding, limited access to clean water, tropical climate and low altitude. Intestinal parasitic infections such as amoebiasis, ascariasis, hookworm infection and trichiuriasis are among the ten most common infections in the world<sup>10</sup>.

A common sight in the street of towns in northern Nigeria are young pupils that should have been under the care of their parents, begging. These are the “Almajiris” a word which has lost its meaning and has become synonymous with beggars. The word “Almajiri” evolved from the Arabic word, “almuhaajiroon”—a term referring to the companions of the noble Prophet who migrated to the city of Median in the year 622CE due to the persecution of the Meccan idol worshippers<sup>11</sup>. These street urchins are a product of a failed Islamic education system and impoverished homes. They are deserted or are turned out from their parents' homes as early in life as age 5 or 6, to live with and memorize the Quran from teachers in local madrassas. Also called “makarantaalo” (Arabic schools), the madrassas are mostly dilapidated “dormitories” constructed from rotten corrugated roofing sheets or inferior bricks. The pupils' learning materials are torn fragments of papers with portions of the Qur'an or small wooden slates known in the Hausa dialect as “alo”. “Alo” is used to write down verses of the Qur'an to be memorized<sup>11</sup>.

According to the statistics released by the Ministry of Education in 2009, Kano State alone harbors 1.6 million Almajiris in some 26,000 madrassas. Sokoto, Kaduna, Niger and Borno states are home to approximately 1.1 million, 824,200, 580,000 and 389,000 Almajiri pupils respectively. They also have a large presence in neighboring West African countries like Mali, Togo, Niger Republic, Chad and Cameroon<sup>12,13,14</sup>. In Northern Nigeria alone, they are estimated to be about 10 million—indicating that approximately one out of every 16 Nigerians and one out of every 7 Nigerian Muslims is an Almajiri<sup>13</sup>. One researcher working with UNICEF estimates that 60 percent of the children never return home<sup>15</sup>. Granted that their number is a million more than the population of Sweden, they are a social menace and a liability on the Nigerian populace, and they help sustain a misconception—that Muslims are uncivilized and backward<sup>16</sup>.

If anything, Nigeria's Almajiris have been denied every single right enshrined in the Child Rights Convention. They are victims of economic hardship, child neglect and abuse<sup>17</sup> and exploited by their mallams to perform domestic work (washing, fetching water, farming and getting fire wood from the bush)<sup>18</sup>. They also suffer social marginalization as they are often looked down upon even in health care centers<sup>19</sup> exposing them to self-medication, self-treatment and cigarrate and drug abuses. A report by the Kano state committee on Almajiri, observed that these young pupils suffer psychological trauma from the embarrassing treatment they often received from the public, a situation which may lead them to violent tendencies.

### Aims and Objectives:

The aim of this research is to determine the prevalence of intestinal parasites among *Almajiri* and to relate the prevalence to their behavioural Risk factors and to provide evidence based data for policy formulation.

## II. MATERIALS AND METHODS

**Study area:** Sokoto is the capital city of Sokoto State, located in the extreme Northwest of Nigeria, near the confluence of the Sokoto River and the Rima River. With an annual average temperature of 28.3 °C (82.9 °F), Sokoto is, on the whole, a very hot area, however, maximum daytime temperatures are for most of the year generally under 40 °C (104.0 °F). The warmest months are February to April when daytime temperatures can exceed 45 °C (113.0 °F). The rainy season is from June to October during which showers are a daily occurrence. It is characterized by 3-4 months annual rainfall (June-September) and 7-8 months dry season (October-May)<sup>20</sup>. These two major seasons, wet and dry are distinct. Report from the 2007 National Population Commission indicated that the state had a population of 3.6 million (NPC, 2007). The population has been projected to be approximately 4.6 million people to date as computed using the formulae  $X = P(1 + i)^n$ <sup>22</sup>; where X is the projected population; P is the initial population (3.6mil); i is the average annual population growth rate (2.5%) and n is the number of years from the initial population (8 years).

The people are made up of Hausa and Fulani majority and a minority of Zabarmawa and Tuareg and other non-indigenous settlers. The two major languages in the state are Hausa and Fulfulde, Fulfulde is spoken among the Fulani. The main occupation of the people is farming (grain production and animal husbandry). Crops produced include millet, sorghum, beans, rice and maize. Other occupations commonly practiced are dying, blacksmithing, weaving, carving, trading, and cobbling. Sokoto ranks second in livestock production in Nigeria. Modern Sokoto city is a major commercial centre in leather crafts and agricultural products.

**Ethical Consideration:**

Approval for ethical clearance was obtained from the right authorities and informed consent of the selected children involved was also obtained.

**Specimen Collection and Analysis:**

The randomly selected “Almajiri” pupils were each given a clean, dry, well labeled specimen bottle for the collection of their faecal materials. Freshly collected faecal samples were retrieved from the pupils the next morning. Their age, sex, duration of stay and means of feeding was obtained from the pupils and the collected samples were immediately transported to the laboratory for analysis where ova, cysts or larvae of intestinal parasites were identified using direct wet mount microscopic examination and the modified formol-ether concentration technique<sup>23</sup>.

**III. RESULTS**

Table 1 shows the proportion of parasitic infection among various age groups. It can be seen from the table that children of age group 5 – 10 years make the largest population (42.8%) and also constitute the highest group infected (38.4%). This was followed by the age group 11 – 15 years both in number and in infection rate 81(29.9%) and 66(24.4%) respectively. The least infected group is age group 21 -25 years 1(0.4%). The table also shows the total number of pupils infected and the prevalence of infection (202(74.5%). Table 2 is the table of distribution of intestinal parasitic infection among different means of livelihood of the “Almajiri”. It shows that 254(93.7%) of the “Almajiri” live on begging while 17(6.3%) have other means of livelihood. The prevalence of parasitic infection among the beggars constitute 73.8% while only 2(0.7%) of none beggars were infected. In table 3, the prevalence of parasitic infection decreases as the years of duration of stay in the dormitory increases. Those with less than one year stay has 31.0% followed by 1 -2 years, 3 - 4 years and 5 years and above with prevalence of infection of 28.0%, 12.2% and 3.3% respectively. Table 4 shows the types and frequency of intestinal parasite. Hookworm has the highest frequency with 46.0% followed by *Ascaris lumbricoides* with 20.0% and the least is *Giardia lamblia* with 2.0%. The co-infection rate was found to be 20.0%.

**Table 1: Distribution of intestinal parasitic infection according to their age.**

	Age (years)				Total
	5-10	11-15	16-20	21-25	
Infected	104 (38.4%)	66(24.4%)	31(11.5%)	1(0.4%)	202(74.5%)
Not infected	12(4.4%)	15(5.5%)	29(10.7%)	13(4.8%)	69 (25.5%)
Total	116(42.8%)	81(29.9%)	60(22.1%)	14(5.2%)	271(100%)

The above table shows the proportion of the “Almajiri” infected and those not infected with intestinal parasite(s) according to their age groups. It can be seen that children of age group 5 – 10 year make the largest population (42.8%) and also constitute the highest group infected (38.4%). This is followed by the age group 11 – 15 years both in number and in infection rate 81(29.9%) and 66(24.4%) respectively. The least infected group is age group 21 -25 years 1(0.4%). The table also shows the total number of pupils infected and the prevalence of infection (202(74.5%).

**Table 2: Distribution of intestinal parasitic infection according to means of feeding**

Work			Total
	Begging	Not begging	
Infected	200(73.8%)	2(0.7%)	202(74.5%)
Not infected	54(19.9%)	15(5.5%)	69(25.5%)
Total	254(93.7%)	17(6.3%)	271(100%)

The table above shows the distribution of intestinal parasitic infection based on the means of feeding of the “Almajiri”. It can be seen from the table that 254(93.7%) of the “Almajiri” live on begging while 17(6.3%) have other means of livelihood. The prevalence of parasitic infection among the beggars constitute 73.8% while only 2(0.7%) of none beggars were infected.

**Table 3: Distribution of intestinal parasitic infection according to duration of stay**

	Duration				Total
	<1 year	1-2 years	3-4 years	5(+years)	
ResultInfected	84(31.0%)	76(28.0%)	33(12.2%)	9(3.3%)	202(74.5%)
Not infected	8(3.0%)	33(12.2%)	13(4.8%)	15(5.5%)	69(25.5%)
Total	92	109	46	24	271

In the above table, the prevalence of parasitic infection decreases as the years of duration of stay in the dormitory increases. Those with less than one year stay has 31.0% followed by 1 -2 years, 3 -4 years and 5 years and above with prevalence of infection of 28.0%, 12.2% and 3.3% respectively.

**Table 4: Frequency distribution of intestinal parasites**

Types parasites	HW	Al	Ts	Tt	Gl	Eh	Total
Frequency	93	40	16	22	4	27	202
Percentage	46.0%	20.0%	8.0%	10.1%	2.0%	13.9%	100%

Table 4 shows the types and frequency of intestinal parasite. Hookworm has the highest frequency with 46.0% followed by *Ascaris lumbricoides* with 20.0% and the least is *Giardia lamblia* with 2.0%. The co-infection rate was found to be 20.0%.

**Key: Hw– Hookworm, Al – *Ascaris lumbricoides*, Ts – *Teania saginata*, Tt – *Tricuris tricura***

**Gl – *Giardia lamblia* and Eh – *Entamoeba histolytica***

#### IV. DISCUSSION

In this study we found the prevalence of Intestinal parasitosis to be 74.5%, a prevalence that is higher when compared with previous findings in south-west Nigeria (28%)<sup>24</sup>; south-eastern Nigeria (55.2%)<sup>25</sup> and south- south Nigeria (67.2%)<sup>26</sup>. But the prevalence is lower when compared with the previous findings in the North-east Nigeria (80.9%)<sup>27</sup>. It is however in agreement with the findings of Wosu and Onyeabor who observed a high infection rate of 75.7% among School Children in a Tropical Rainforest Community of South eastern Nigeria<sup>28</sup>. The relatively high prevalence we observed in this study agrees with previous findings in other parts of Northern Nigeria<sup>29,30</sup> and Other reports from parts of tropical Africa have shown very high (>70%) infection rates of intestinal helminthes<sup>31</sup>.

High prevalence of intestinal parasitic infestation is apt to occur in low socio economic condition, characterised by inadequate water supply, poor hygiene and poor sanitary disposal of faeces. This situation is typical of the live of the “Almajiris” that is a common practice in the northern part of Nigeria. The live of the “Almajiris” in one way or the other are endangering the health of the community by contaminating the environment through urinating and passing stools indiscriminately. It was reported that95%<sup>32</sup> of the almajiri schools do not have toilets and bathrooms<sup>33</sup> thereby defecating in the bushes which result in the contamination of soil with eggs and larvae of helminthes and bathing in stagnant lake or rivers which could expose them to water born disease. Most of the “Almajiris” walk bare footed, go around a refuse dump and eat without washing hands all of which might have been predisposing factors in this group of pupils.

Congestion has been reported to aid in the spread of communicable diseases, this is a common scene in the “Almajiri” schools where many of them learn while sitting on the floor and mostly in a congested classroom. A researcher reported that as much as 180 pupils can be found in one local small class room which has normal capacity of 50 pupils or less<sup>34</sup>. One of the consequences of intestinal parasitic infestation include the risk of anaemia. Zakir and fellow workers observed that 62% of the pupils complain of hunger and tiredness, this may not be unrelated to the fact that 74.5% of them are harboring intestinal parasites.

In table 1 above, the prevalence of parasitic infestation is higher among children of age group 5 – 10 year (38.4%). This is followed by the age group 11 – 15 years both in number and in infection rate 81(29.9%) and 66(24.4%) respectively. The least infected group is age group 21 -25 years 1(0.4%). We noticed that 68.3% of infestation occur among children of less than 15 years of age which confirms the well reported findings that intestinal parasite thrive more in children causing growth retardation, anaemia, intestinal obstruction and poor performance in school among school children. A similar trend was reported<sup>35,36</sup> in which the bulk of parasitic infestation occurred in the 8-15 years age group. We also observed that the prevalence of intestinal parasites decreased with age in this study. Similar observation was earlier reported<sup>37</sup>. The inverse relationship between the age and the prevalence of intestinal parasites might be due to higher level of awareness and good hygienic practice in the older age groups. Children might be exposed to soil-transmitted parasites more than older children by playing outside.

Our findings in this study shows that 254(93.7%) of the “Almajiri” live on begging while 17(6.3%) have other means of livelihood. The prevalence of parasitic infection among the beggars constitute 73.8% while only 2(0.7%) of none beggars were infected. Many researchers report a higher rate of infection among children in rural areas than urban cities, a reflection of the poor health care and bad sanitation<sup>38,39</sup>. Sokoto is an urban city, but the “Almajiri” schools are a ‘rural settlement’ in a city a situation and system that has long requires drastic and holistic approach to tackle. It is not surprising therefore when early in April 2012, President Goodluck Jonathan of Nigeria inaugurated a repackaged and rebranded of almajiri school in the Gagi area of Sokoto (a suburb of Sokoto town)<sup>40</sup>. It is in recognition of the need for the reform of the more than century old system so that it can enable the moral training and modern skill acquisition of the almajirai. These children, who often resent their parents, authorities and society at large, do not have access to basic care and education<sup>41</sup>. Not surprisingly, the unveiling of the repackaged almajiri project was seen as a milestone in Nigeria, especially in northern region, the most educationally backward part of the country. The initiative is particularly commendable in light of the age old deprivation, neglect and abuse these children have been subjected to. Despite this laudable nature of this new policy, however, certain issues have to be addressed, consistency and sustainability. To achieve this, the recommendations of Elechi *et al.*, is much in place where they recommended that Parents who are bent on sending their children to the obnoxious almajiri system should themselves be offered educational opportunities; Legislation that criminalizes those who persist in the old practice should be put in place and vigorously executed; Government should promptly provide for citizens and should not create room for situations to degenerate before an intervention is made in order to avoid disaffection by those who are excluded and interventionist programmes should be properly articulated to guarantee equity, operability, sustainability, as well as to reflect a truly federal nation<sup>41</sup>.

We also found in this study that the prevalence of parasitic infection decreases as the years of duration of stay in the dormitory increases. Those with less than one year stay has 31.0% followed by 1 -2 years, 3 - 4 years and 5 years and above with prevalence of infection of 28.0%, 12.2% and 3.3% respectively. This may be understood as the newly students found it extremely difficult to live and adapt to their new environment; seeing that they came from rural areas (where infection rate has been reported to be high) to urban centres for the purpose of acquiring Qur’anic education<sup>42</sup>; modernization and advancing in age may also have been responsible for lower prevalence among those who stays longer.

Table 4 shows the types and frequency of intestinal parasite. Hookworm has the highest frequency with 46.0% followed by *Ascaris lumbricoides* with 20.0% and the least is *Giardia lamblia* with 2.0%. The co-infection rate was found to be 20.0%. The predominance of Hookworm infection as well as *Ascaris lumbricoides* in this study is in line with other previous reports<sup>43</sup>. The danger with ascariasis is that it is intimately related with intestinal obstruction and malnutrition in children while that of hookworm infections posed even more danger of anaemia. The prevalence of *Entamoeba histolytica* and *Tenia saginata* was higher in this study compared with that of adult population<sup>44</sup>.

## V. CONCLUSION

This study showed a high prevalence of intestinal parasitism among the Almajiris in the Sokoto metropolis, Nigeria. It is suggested that children with intestinal parasites should be treated periodically using broad spectrum or multi-agent drug combinations because of the multiple parasitism susceptibility in children.

Enhancing socioeconomic status, improving sanitation facilities, instilling health education and promoting ways of keeping personal hygiene can be good strategies to control these infections in the area. Public enlightenment and emphasis on personal hygiene and clean environment may be necessary in the prevention and control of parasitic infections among children in rural areas.



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