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## Incidence of intestinal parasites among internally displaced persons (IDPS) in Maiduguri, Borno state

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**Abstract**

Study conducted to assess incidence of intestinal parasites among internally displaced persons (IDPs) in Maiduguri, Borno state with the aim to identify the common intestinal parasites that infects internally displaced person in Maiduguri, to determine the incidence rate of intestinal parasitic infection among internally displaced people in study population habits and complains, to proffer recommendation and confer possible solution if any. Samples used for this study are stool samples from the IDPs in their various clinics in the camps. The internally displaced persons were from different towns and villages. Samples were immediately transported to the parasitology laboratory of UMTH for analysis. Information about the demographic variables was obtained by the use of questionnaire, The stool samples were examined both macroscopically and microscopically. Findings of the study reveal out of the 220 subjects examined by both wet preparation and concentration method, 48 persons were found to be infected with one or more of the intestinal parasites and this gives an incidence of 21.8%. Based on the findings of this study *Hymenolepis Nana* has the highest occurrence among the internally displaced persons in Maiduguri, followed by *Ascaris lumbricoides* with the incidence of 12(5.5%), *Hook worm* with incidence of 7(3.2%). *Giardia lamblia* with incidence 2(0.9%) while *Trichuris trichiura* and *Strongyloides stercoralis* showed the list incidence of 1(0.5%). The study revealed that intestinal parasites among internally displaced persons if not managed will lead to serious complications and diseases, more especially within the age group 11-20years with the highest incidence.

**Keywords:** Intestinal parasites, internally displaced persons, *Hymenolepis nana*

**Introduction**

A parasite is any organism that lives and feeds on another organism. Intestinal parasites are usually worms that are found in the intestine and feed on human nutrients. Intestinal parasitic infections are most common infections worldwide. However, the prevalence of intestinal parasitic infections varies considerably from place to place in relation to the pattern of transmission of the disease (Ukpai *et al.*, 2013) [38]. Intestinal parasites are those that infect the gastro-intestinal track of humans and other animals. Intestinal parasitic infections are endemic worldwide and have been described as constituting the greatest causes of illness and diseases. Poverty, illiteracy, poor hygiene, 'lack of access portable water and hot humid tropical climate are the factors associate with intestinal parasitic infection (Mehraj *et al.*, 2008) [32].

Most infection diseases are practically prevalent in area with warm climate in which man exerts himself least in developing sanitary protection typically has low threshold of invading organism (Beaver *et al.*, 1984) [6]. Not at all parasitic infection cause diseases of climate significance. There are many factors that predispose to disease development, including host and parasite factors. The host include age, level of natural immunity at the time of infection, life style, and presence of co-existing disease or condition which reduce immune responses, e.g pregnancy, under- nutrition or malnutrition (Gendrel *et al.*, 2003) [21].

The prevalence of intestinal parasitic diseases is an indication of environmental conditions. A high index of intestinal points to deficiencies in sanitation, the standard of living and personnel habits of cleanliness as stated by (Geltman *et al.*, 2003) [20]. Internally displaced persons (sometimes abbreviated IDPs) are persons who have been forced to leave their native places, a phenomenon known as forced migration. The times was first widely use during world war II and the resulting refugee out flows from Eastern Europe when it was specifically

referred to as one from his/her native country as a refugee prisoner or slave labourer. As a result of insecurity in Maiduguri a large numbers of people from towns and villages were displaced to live in displaced camps. Among the camps for the internally displaced persons in Maiduguri includes; Government Girls College, Yerwa Government Girls College, Government College, Women Teachers College, EL-KENEMI Arabic School, Dalori quarter, Shehu Garbai Secondary School and NYSC Camps, as a result of poor hygiene, lack of proper sanitation in those camp many of the IDP have become victim of infections which include intestinal parasite among many most of those IDP became infected due poor management of food serve in the camp Recent studies have shown that the prevalence of intestinal parasites among internally displaced persons can be lack of portable water supply, poor sanitation (Aher, 2011) [3]. The challenges that has been the problem is limited and inadequate information with regards to intestinal parasitic infections, hence there is need for the study to be carried out.

### Objective of the study

1. To identify the common intestinal parasites that infects internally displaced person in Maiduguri.
2. To determine the incidence rate of intestinal parasitic infection among internally displaced people in study population habits and complains.
3. To proffer recommendation and confer possible solution if any.

### Literature review

Ascariasis is one of the most common and important causes of morbidity and mortality in the tropics among patients. Ascariasis is caused by *Ascaris lumbricoides* and the common name is round worm (Arora *et al.* 2012) [2]. Despite their diversity, *Ascaris* infection have certain properties which characterised them as a group and explained their resistance to therapy. These characteristic includes; *Ascaris* infection is long lived, allergies develop with eosinophilia, re-infection can occur many times and good immunity does not develop during their infections. Parasite is an organism that resides on or within, another living organism in other to find the environment and nutrients required for its growth and reproduction (Ochie, 2008). Helminths or parasitic worms are multicellular, bilaterally symmetrical, elongated, flat or round animals. Helminths which occur as parasites in humans belongs to two phyla, phylum platyhelminthes and phylum Nematoda. Phylum platyhelminthes or flat worms are dors-ventrally flattened, leaf-like or tape worm-like. Human pathogenic helminths of this phylum belong to two classes; the Cestodes and Trematodes. The phylum nematodes are unsegmented dieicious worms which are usually filariform. Phylum Nematoda is devided into two (2) classes; the Adenophora and Secernentea.

### Epidemiology of *Ascaris lumbricoides*

Incidence rates for intestinal parasitic infection caused by *Ascaris lumbricoides* among patients almost 100% in some tropical areas but the intensity of the infection is light in the majority and not associated with significant pathology or any symptoms (Hall & Holland, 2000) [23]. Low incidence rates with higher intensity of infection may cause significant clinical problems. *Ascariasis* is a wide spread disease particularly in Africa, Middle east and far east. It is endemic in some of the countries of the world (most especially region

mentioned above) and infects more than 1.4 billion people worldwide representing 2.5% of the world population (Jessica *et al.*, 2004) [28]. *Ascaris* infection tends to cluster in families and worm burden correlates with the number of people living in a home (cross, 1998) [11]. The highest prevalence of *Ascariasis* occurs in tropical countries where worm, wet climates provides environmental conditions that favour year round transmission of infection. The prevalence is also greater in areas where sub-optimal sanitation practices lead to increased contamination of soil and water. Majority of people with *Ascariasis* live in Asia (73%), Africa (12%) and South America (8%), where some population have infection rates as high as 95% (Beaver *et al.*, 1984) [6].

### Methodology

#### Material and method

#### Study area and Sample Collection

The study area is internally displaced persons camps within Maiduguri metropolitan, The samples used for this study are stool samples from the IDPs in their various clinics in the camps. The internally displaced persons were from different towns and villages which includes: Bama, Konduga, Gwoza, Izge, Damboa, Pulka, Wuje Dallori, Mollai and others. Samples were immediately transported to the parasitology laboratory of UMTH for analysis. Information about the demographic variables was obtained by the use of questionnaire.

#### Methods

The stool samples were examined both macroscopically and microscopically.

#### Macroscopic Examination

The stool sample was examined for physical appearance, such as colour, consistency, soft/formed, presence of blood/mucus and whether adult worms are present or not (Ochei and Kolhatkar, 2007) [37].

#### Microscopic Examination.

These includes;

- a) Direct wet preparation method by the use of saline/iodine.
- b) Formalin-ether sedimentation technique (Ochei and Kolhatkar, 2007) [37].

#### Wet mount (saline and iodine preparation)

- A drop of normal saline was placed on a centre of the half of the slide and a drop of iodine solution in the centre of the half of the slide.
- An applicable stick was used to pick a small amount of the stool (about 2mg) and emulsified with saline on the slide to form a uniform suspension. In the same way, a suspension of faeces in the iodine on the slide was made.
- The saline preparation was covered with a coverslip by holding it at an angle and lowered gently on the glass slide to reduce formation of bubbles. Iodine preparation was covered with another coverslip, taking care not to mix it with the saline suspension.
- The wet preparation was mounted on the stage of the microscope and examined using x10 and x40 objectives with the condenser iris diaphragm sufficiently closed to detect the presence of parasitic cyst, eggs or larvae.

**Formal-ether sedimentation technique**

- About 0.5g of stool (1/2 tea spoon) was transferred to 10ml of formalin in a test tube.
- It was mixed and allowed to stand for 30mins for adequate fixation.
- It was sieved through two layers of gauze in a funnel into clean centrifuge tube.
- About 3 to 4ml of diethyl ether was added, the tube closed with a glass stopper and shake well for 15minutes. The stopper was removed carefully.
- The tube was centrifuged using the centrifuge machine for 5minutes at 5000 revolution per minutes, four layers were found.
- Decant the supernatant, a small amount of the sediment at the bottom of the tube containing parasites, a layer of formalin, a plug of faecal debris, and a layer of ether at the top.
- The plug of debris was loose from the side of the tube, using an applicator stick.
- Rapidly the tube was inverted and poured off the ether, the debris and the formalin.
- All sediment was transferred on to a clean grease free slide and covered with a coverslip and examined for parasites using x10 and x40 objectives respectively.

**Results**

Out of 220 subjects examined by both wet preparation and concentration method, 48persons were found to be infected with one or more of the intestinal parasites. This gives an incidence rate of 21.8%. *Hymenolepis nana* was the most prevalent amongst the internally displaced persons examined with 12(11, 4%), followed by *Ascaris lumbricoides* with the incidence of 12(5.5%), *Hook worm* with incidence of 7(3.2%), *Giardia lamblia* with incidence of 2(0.9%) while *Trichuris trichiura* and *Strongyloides stercoralis* showed the least incidence of 1(0.5%) Table 1 Comparing the distribution of the parasites within the age limit. Prevalence of intestinal parasites infection by age showed that intestinal parasites infection varies according to age, *Hymenolepis Nana* was the most encountered parasites among the internally displaced persons within the age group

11-20years with the incidence of 25(11.4%), followed by *Ascaris lumbricoides* within the age group of 0-10years and *Trichuris trichiura* within age group of 21-30years with the incidence of 8(3.6%) both, then *Giardia lamblia* within the age group 31-40years with the incidence of 4(1.8%). *Hook worm* within the age group 41-50years has incidence of 2(0.9%), *Strongyloides Stercoralis* within the age group 51-60years with incidence of 1(0.5%). The incidence is statistically significant (p<0.01). Table 2

Based on the source of water, most of the internally displaced persons examined have access to reservoir water, out of 137 tested samples, 62.3% tested positive representing the highest incidence, followed by those that have access to tap water, out of 51 which showed that 23.2% which showed 14.5% tested positive representing the least incidence. There is no relationship between water source and parasites seen (p<0.01). Table 3

The incidence of intestinal parasites among internally displaced person in Maiduguri is moderate. Out of total of 220 subjects examined, 48 internally displaced person were found to be infected one or more intestinal parasites. This gives a incidence of (21.8).

The internally displaced persons were from different towns and villages which includes: Bama, Konduga, Gwoza, Izge, Damboa, Pulka, Wuje Dallori, Mollai and others. This study showed that out of 220 stool samples analysed by both wet preparation and concentration methods, *Hymenolepis Nana* is the common intestinal parasites that infect the internally displaced persons in Maiduguri as of the distribution of the parasites within the age limit i.e incidence of intestinal parasite infection by age. It shows that intestinal parasites varies according to age, *Hymenolepis nana* was the most encountered parasites within the age group11-20years with an incidence of 25(11.4%), followed by *Ascaris lumbricoides* within the age group 21-39years with an incidence of 8(3.6%) both, then *Giardia lamblia* within the age group 31-40years with an incidence of 4(1.8%), *Hook worm* within the age group 41-50years with an incidence of 2(0.9%), *Strongyloides stercoralis* within the age group of 51-60years with an incidence of 1(0.5%).

**Table 1:** parasites examined by both methods among IDP Subjects

Parasite seen	Frequency	percent	V. percent	Cumulative
NPS	172	78.2	78.2	78.2
Ova of H nana	25	11.4	11.4	89.5
Larva of H. Worm	7	3.2	3.2	92.7
Ova T. Tichura	1	05	5	93.2
Ova of lumbricoides	12	5.5	0.55	98.6
Cyst of G. Lamblia	2	0.9	0.9	99.5
Larvae S stercoralis	1	0.5	0.5	100.0
Total	220	100.0	100.9	

**Table 2:** incidence of parasites among internally displaced persons based on Age and Sex

Age Group	Frequency	No. Infected	Percentage
0-10	30	8	3.6
11-20	131	25	11.4
21-30	41	8	3.6
31-40	6	2	0.9
41-50	7	4	1.8
51-60	5	1	0.5
Total	220	48	21.8
Sex			Percentage
Male	119	78	
Female	101	69	80.95
Total	220	147	68.70

**Table 3:** Incidence of Intestinal Parasites among Internally Displaced Persons Based on Occupation, Sources of Water, and Mucus

Occupation	Frequency	Percentage	T. Test
Students	157	71.4	*
Business	29	6.4	*
House wives	34	15.5	Ns
Total	220	100	
Source of water			
Tap	51	23.2	Ns
Reservoir	137	62.3	*
Well	32	14.5	Ns
Total	220	100	
Frequent			
Not at all	12	5.5	
Frequent	15	56.8	*
Less frequent	83	37.7	NS
Total	220	100	
Deworming profile			
Not dewormed	140	63.6	*
Dewormed	80	36.4	NS
Total	220	100.0	
Diarrhoea			
No Diarrhoea	178	80.9	Ns
Diarrhoea	42	19.1	NS
Total	220	100.0	
Mucus			
No mucus	199	90.5	*
With mucus	21	9.5	NS
Total	220	100.0	

### Discussion

The incidence is statistically significant; the study project determined the incidence of intestinal parasites infection among internally displaced persons and its relation to socio-demographic factors, and environmental factors. Relationship between water source and intestinal parasites among internally displaced persons showed that inadequate clean water and cleanliness attention to sanitation contributed to the incidence of intestinal parasites in the camp. Reservoir water recorded the highest rate incidence rate with 137(62.3%), this could be due to the high degree of contamination and impurities. Some reservoir are left opened, most often do not have cover that will prevent particles from entering especially when used for public purpose. Another source of water is the tap water since it is under certain level of purification process yet not 100% pure which has prevalence rate of 51(23.2%) due to contamination by reservoir host such as infected person using different kinds of containers or materials for fetching water which may have contributed to the development of intestinal parasites during domestic purpose and thus, risk of infection is high. Well water is the list with the incidence of 32(14.5%) based on geographical location being a desert and urban city, only very few people use well water in the IDPs camps. It is very difficult to dig well, hence the water level is very far and even if the well is deep, the degree of sterility is less. Reservoir and well water have less degree of purity. Some of them are often reservoirs contain all kinds of impurities, this may contribute to the development of some parasites when such water is used, the risk of infection is high. However, there is no slight different between purity but it has no statistical significance ( $p < 0.01$  or  $p < 0.05$ ). Though the majority of the samples examined was diarrheic and the patients does not reveal major symptoms of

intestinal parasitic infection among the internally displaced persons that was examined were relatively moderate. This could be due to low socio-economic status and poor hygiene standard of living.

### Recommendations

Provision of adequate public services such as water supply for domestic use at the IDPs camps. Thorough hand washing after any domestic activities e.g. contact with rodents and domestic animals, defecation, before preparing or eating food. Implementation of weekly sanitation and drainage. Procurement of efficient health services including laboratories capable of diagnosis and drug supplies for correct treatment. Surveillance and monitoring of data derived from inpatients and outpatients health services to determine the pattern and distribution of parasitic diseases. Sustenance of vector control measures e.g. reduces rodent population and also avoidance of close contact of rodents with human food supplies as in the case of *H. Nana*. Chemotherapy with drugs like praziquantel, Levamisole and Niclosamide e.t.c. are the drugs of choice for the treatment of intestinal parasites.

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