STUDY OF ASCARIS LUMBRICOIDES IN CHILDREN BETWEEN AGE 1 – 12 YEARS AT KENYATTA NATIONAL HOSPITAL

PRESENTED BY
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COLLEGE NUMBER 99/09482

INDEX NUMBER 401002388

THIS PROJECT HAS BEEN SUBMITTED TO KENYA NATIONAL EXAMINATION COUNCIL IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF DIPLOMA IN MEDICAL LABORATORY SCIENCES

The Kenya polytechnic
DEPARTMENT OF HEALTH SCIENCES AND BIOTECHNOLOGY
November, 2002
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DECLARATION

I declare that this is my own personal work and has not been earlier produced by anyone in any institution for an award of diploma or degree.

Signed: ........................................

Date: ........................................

This project has been submitted for this examination with Approval from Supervisor

Supervisor ........................................

Signed ........................................

Date ........................................
DEDICATION
I dedicate to my beloved Mum
ACKNOWLEDGEMENT

Thanks goes to everybody who made this project a success.

Special thanks goes to Mrs. Christine Akoko for humbly going through my project and offering assistance where possible. Mr. Phares Mulega a Senior Laboratory Technologist in department of microbiology parasitology section.

I appreciate for his guidance during the study time. My parents will not be left out for their advice and morale support during my course work and providing finance to convert my project into a manuscript. I also appreciate the neat and presentable work done by Mrs. Ruth Lusweti to make this project to look the way it is.

Finally all the thanks goes to Almighty God for making each plan in my course work successful.
ABSTRACT

The study of *Ascaris lumbricoides* was conducted at Kenyatta national Hospital within a period of 6 months (June –December 2001). The study targeted children from 1 – 12 years of age.

The programme had a systematic procedure to be followed, where the qualified candidates were interviewed and afterward stool samples collected. There were two category of children out patient as well as in-patient. Diagnosis of *Ascaris lumbricoides* was done within 24 hours after collection of sample and two methods were employed: direct wet preparation and formal ether concentration. Out of the 300 samples collected 113 were positive while 187 were negative.

During the study it was found that children between 1 – 4 years were more affected with 49% followed by 5 – 8 years, 35% and finally 9 – 12 years, 16%. Female and male children were equally affected. Poor sanitation and overcrowding were found to be the key factors to increase of *Ascaris lumbricoides*. 
CHAPTER 1

INTRODUCTION

*Ascaris lumbricoides* is the largest nematode parasite in human intestines. It is the commonest of human helminthes and is distributed worldwide. 1 billion people are estimated to be infected.

Its occurrence is favoured with several factors like the nature of soil and temperature (20 – 30 degrees centigrade). This temperature explains why it is more prevalent in Africa than in the temperate regions.

Poor sanitation, particularly where human faeces is used as fertilizer and where children defecate directly on the ground facilitates its spread.

The population most at risk of contracting Ascaris lumbricoides infection are children who place their contaminated hands into their mouth. Sources of contamination range from children's toys to the dirt itself. People of all ages may become infected where vegetable are grown using contaminated human faeces.

The longevity of the eggs is caused by the fact that they are not easily destroyed by chemicals. Therefore they can survive for many days in soil, faecal matter, sewage and water. The eggs survive in 10% formalin used in stool processing, therefore care should be taken to avoid transmission to the lab technologist.

1.1 AIM

Reducing secondary diseases caused by manifestation of *Ascaris lumbricoides*
1.2 OBJECTIVES
1. To determine the rate of infection of *Ascaris lumbricoides* among the different age groups in children.
2. Find out the mostly affected age group of children
3. Find out the pre-disposing factors which lead to *Ascaris lumbricoides*
4. To investigate why *Ascaris lumbricoides* is the dominant worm in children rather than other helminth
5. Compare direct preparation and formal ether sedimentatal techniques

1.3 HYPOTHESIS
1. *Ascaris lumbricoides* is the most common helminth infection in human population
2. Children are at a higher risk of harbouring the parasite
3. *Ascaris lumbricoides* is the most prevailing worm due to its favouring with several factors e.g. temperature, humidity among the others
4. Lack of proper education in the communities about the spread of helminths lead to increased cases of Ascariasis

1.4 STATEMENT OF PROBLEM
Due to endemicity of *Ascaris lumbricoides* infection with its associated secondary infection, which include protein malnutrition, ascaris pneumonia, bacterial infection due to perforation out of intestines, tissue damage due to migration and allergy produced by the *Ascaris lumbricoides*. Sampling of stool was necessary to reduce this problems and could lead to expensive treatment. Samples collected and tested for ascaris ova.

1.5 STUDY AREA
The study was performed at Kenyatta National Referral Hospital. This hospital receives patients from different part of Kenya. The hospital have laboratories set for diagnosis of diseases in human beings. It deals with out patient as well as admission cases. Among the several laboratories, the parasitology laboratory was
of interest during the study. The laboratory was well equipped with equipment and apparatus needed. All the reagents were present and there was unity among the technologists. Interviews conducted on out patients showed that most of the children affected come from the poorly overcrowded areas like Mathare, Kawangare, Kangemi and Kibera.

1.6 LIMITATION OF THE STUDY

The study will be limited to the presence of *Ascaris lumbricoides* an intestinal helminth. Stool will be the only sample used for diagnosis samples will be collected in children between age 1 – 12 years.

Most parents were reluctant to disclose information about the life style they lived, thus giving irrelevant answers during the interview.
CHAPTER TWO

2.1 LITERATURE REVIEW

*Ascaris Lumbricoides* causes ascariasis infection. It is worldwide distributed. It is very common in areas with poor sanitation and hygiene (WHO 1994). It is very common in Asia, sub continent and sub tropical Africa (Markell and Voge). In Kenya the parasite is widespread but especially prevalent in Central, Western and Nyanza Provinces. It is less common towards the coast (R.S. Odindo).

In the 1967 WHO publication on control of ascaris. It was mentioned that *Ascaris lumbricoides*, the largest helminthic round worm in man (Linnaeus 1958) is one of the most common and widespread human parasite with an estimated 50 million infected persons in Africa. In areas of high rainfall and dense human population, there is a high likelihood of ascaris infection being more prevalent. Ascaris infection in East Africa is probably focally distributed rather than wide spread with a low prevalence in vast area of scanty rainfall (Fergus 1980). In 1987 it was believed that about 255 thousand Kenyans had ascariasis (Stephenson 1989).

2.2 TRANSMISSION

According to C.K. Jayaram paniker, Ascaris Lumbricoides can be transmitted in the following ways.

1. Ingestion of infective eggs, children place contaminated hands in their mouth. Source ranges from childrens’ toys to dirt itself.
2. The use of human faeces or manure.
3. Eggs carried with dirt may be inhaled and swallowed from the pharynx.
4. Eggs are found in soil faecal matter and water.
5. Children acquire infection due to geophagia
2.3 LIFE CYCLE

The fertilized eggs are passed in faeces but are not immediately infective. It has to undergo a period of incubation in the soil before acquiring infectivity. The eggs are resistant to adverse conditions and can survive for several years. The development of the eggs in soil depends on the nature of soil and various environmental factors. A heavy clay soil and moist shady location with temperatures between 20 degrees centigrade and 30 degrees centigrade are optimal for rapid development of the embryo. The development usually takes from 10 – 40 days during which time the embryo moulds twice and becomes the infective rhabditiform larva, coiled up within the egg.

Infection occurs when the egg containing the infective rhabditiform larva is swallowed. A frequent mode of transmission is through fresh vegetables grow in field manured with human faeces. Infection can be transmitted when soil contaminated is heavy due to indiscriminate defaecation, the eggs sometimes get airborne along with wind swept dust and inhaled.

When swallowed eggs reach the duodenum, the larvae hatch out. The rhabditiform larvae about 250m in length and 14m in diameter are actively motile. They penetrate the intestinal and enter the portal vessels and are carried to the liver. They then pass via the hepatic vein, inferior vena Cava and the right heart and in about four days, reach the lungs where they grow and mould twice. After development in the lungs in about 10 – 15 days, the larvae pierce the lung capillaries and reach the alveole. Then they crawl up, or are carried up the respiratory passage to the throat and are swallowed. The larvae moulds and develops into adult in the upper part of the small intestine. They become sexually mature in about 6 – 12 weeks and the gravid female start laying eggs. 200,000 per day (N.E.D.E.Y.). The adult worm has a life span of 12 – 20 months. The span of eggs 3 – 7 years.
2.4 CLASSIFICATION OF ASCARIS LUMBRICOIDES

Phylum : Hemathelminthes
Class : Nematoda
Order : Ascaridida
Family : Ascariodae
Genus : Ascaris
Species : lumbricoides
2.5 PATHOGENESIS AND CLINICAL FEATURES
Clinical manifestations in ascariasis can be caused by either the migrating larvae or the adult worm.

The pathogenic effect of larvae migration are due to allergic reaction and not the presences of larvae as such. Therefore in the initial exposure to larvae is usually asymptomatic except when the larvae load is very heavy. If re-infection occurs subsequently there may be intense cellular reaction to migrating larvae in th lungs with infiltration of eosinophils, macrophages and epitheliod cells.

The ascaris pneumonia is characterized by low grade fever, dry cough, asthmatic, wheezing, urticaria, eosinophilia and molted lung infiltration in the chest radiograph.

The sputum contain charlot – Ledyden crystal. The larvae may occasionally be found in sputum but are seen often in gastric washing (Loeffler’s syndrome)

Allergic inflammation reaction to migrating larvae may involve other organs such as the kidney or liver. Clinical manifestations due to adult worm vary from asssymptomatic infection to severe and even fatal consequences.

The pathological effects when present are caused by spolitative action, Toxic action and mechanical effects.

The spolitative action are usually seen when the worm burden is heavy. The worms may be present in enormous numbers, sometimes exceeding 500 in small children, occupying a large part of the intestinal tract. This interferes with proper digestion and absorption of food. Patients have loss of appetite and are often restless. Abnormalities of the jejunal mucosa are often present including broadening and shortening of villi elongation of crypts and round cell infiltration of llamina propra.
Toxic effects, are due to hypersensitivity to the worm antigen and may be manifested as fever, urticaria, angioneutrate odema, wheezing and conjunctivitis. These are more often seen in person who come into contact with the worm occupationally as in laboratory technicians and a abattoir workers than in children having intestinal infestation.

Mechanical effects can be due to masses of worms causing luminal occlusion or even a single worm infiltrating into a vital area. The adult worm live in the upper part of the small intestine, where they maintain their position due to their body muscle tone, spanning the lumen. They may stimulate reflex perstalsis causing recurrent and often severe colicky pain in the abdomen. The worms may be clumped together into a mass filling the lumen, leading to intussusception or intestinal obstruction.

The worms are restless wandering apparently showing great inquisitiveness in that they tend to probe and insimate themselves into any aperture they find on the way.

It may enter the opening of biliary or pancreatic duct causing acute bilary obstruction or pancreatitis. It may enter the liver parenchyma, where it may lead to abscesses. It may also cause lung abscesses.

2.6 LABORATORY DIAGNOSIS
The specimen is mainly stool and observation of ascaris ova or adult forms are done by use of microscope. The eggs can appear in various forms.
1. Fertilized egg
2. Decorticated fertilized egg
3. Unfertilized egg

The fertilized egg is spherical or ovoid bile stained to a golden brown colour and measure 60-75m in length and 40-50m in breadth. It is enclosed in a stout translucent shell consisting of three layers. The outer coarsely mamillated albuminoid coat, a thick transparent middle layer and the inner lipoidal vitelline membrane. The decorticated fertilized egg do not have the mamillary coat. The
unfertilized egg is longer upto 90m and more elliptical. The shell is thinner, with the outer mamilary coat scanty and irregular.

Adult *Ascaris lumbricoides* worms are creamy and a tint of pink. The male measures 15 – 30 cm in length and 2 – 4 mm in thickness. Its posterior end curved ventrally to form a hook and carries 2 copulatory spicules.

The female is larger 20 – 40mm long and 3 – 6 mm thick its posterior extremity is straight and conical. The vulva is situated mid ventrally near the junction of the anterior and middle thirds of the body.
Fertilized Egg

Mamillary Coat

Fertilized Decorticated Egg

Unfertilized Egg
2.7 TREATMENT
Several drugs are effective: They include:
- Mebandazole
- Pyrantel
- Pamoate
- Levamisole
- Piperazine atrate
- Thiabendazole

2.8 PREVENTION AND CONTROL
1. Proper sanitation; use of proper latrine
2. Treatment of sewage before use as fertilizers
3. Proper washing of hands before eating
4. Children should be kept in a hygienic environment
5. Proper washing of vegetables and fruits before use
6. Boiling water before drinking
7. Observing cleanliness especially involving fingers and hands
8. Prescribed medicine should be taken considering the dose.
CHAPTER 3

3.0  EQUIPMENT, MATERIAL AND METHODS

3.1  EQUIPMENT AND MATERIAL

Refrigerator
Centrifuge
Microscope
Mortor
Pestle
Polypots
Surgical gauze
Microscope slides
Cover slips
Centrifuge tubes
Test tube racks
Funnels
Wash bottles 500ml
Wash bottles 150ml
Rubber stoppers
Disposable gloves
Lab coat
Labels
Cotton wool
Applicator sticks

3.2  REAGENTS

2% Eosin
5% Lugol’s Iodine
0.85 Normal saline
10% Formal saline
Ether acetate
Distilled water
CHAPTER 3

3.0 EQUIPMENT, MATERIAL AND METHODS

3.1 EQUIPMENT AND MATERIAL
- Refrigerator
- Centrifuge
- Microscope
- Mortar
- Pestle
- Polypots
- Surgical gauze
- Microscope slides
- Cover slips
- Centrifuge tubes
- Test tube racks
- Funnels
- Wash bottles 500ml
- Wash bottles 150ml
- Rubber stoppers
- Disposable gloves
- Lab coat
- Labels
- Cotton wool
- Applicator sticks

3.2 REAGENTS
- 2% Eosin
- 5% Lugol’s Iodine
- 0.85 Normal saline
- 10% Formal saline
- Ether acetate
- Distilled water
- 5% Lysol (Disinfectant)
3.3 SPECIMEN COLLECTION
Clean and sterile polypots were given to patients that the request form implied that ova diagnosis be done.

The patient who were of 1 – 12 years old were legible to test. The parents of the children were asked a few questions to guide in the survey. On reception of specimen, a laboratory reference number was given and then entered into the record book. The poly pot and centrifuge tubes to be used are labeled using the patient’s reference number to avoid right diagnosis to wrong patient. The duration of the specimen should be within 24 hours to avoid false negative results. The duplicate form remain in the laboratory for filing.

3.4 METHODOLOGY
The specimens were examined both macroscopically and microscopically

3.41 Macroscopically
The consistency of the specimen was noted:
(i) Mucoid
(ii) Blood stained
(iii) Watery
(iv) Semi formed
(v) Formed

3.42 Microscopically
For microscopic study the specimen were prepare using the following methods
1. Direct wet preparation
2. Formal-ether concentration method
Direct Wet Preparation

(a) The stool in poly pot was scoped with an applicator stick
(b) It was then transferred onto 3 microscope slide.
   1st slide emulsified with Lugol’s iodine.
   2nd slide emulsified with normal saline.
   3rd slide emulsified with 2% Eosin stain.
(c) The slides were cover with cover slips
(d) They were placed on microscope stage and examine with power X 10 and for clear identification X 40
(e) Both fertilized and unfertilized eggs of ascaris lumbricoides were seen and reported.

Purpose of the reagent used
2% Eosin
Stain the background pink and eggs are easily seen.

0.85% Normal Saline
(i) Emulsify hard stool.
(ii) Protect the morphology of the eggs.

5% Lugol’s Iodine

Identification of eggs and cysts

Advantages of Direct Wet Preparation.
1. It is quicker.
2. It is cheaper.
3. Can do culture at a later stage.

Disadvantages of Direct wet preparation
1. If the infection is low it is missed.
2. May cause infection to laboratory technologist performing the test.
Formal-ether concentration technique

**Principle**

Faeces are emulsified in formal water, the suspension is strained to remove large faecal particles, ethyl acetate is added and the mixed suspension is centrifuged cysts, oocysts, eggs and larvae are fixed and sediment and the faecal debris is separated in a layer between the ethyl acetate and formal water faecal fat is dissolved in the ethyl acetate.

**Procedure**

(a) Approximately 1g of stool was put in the mortor.
(b) 10% formal saline was measured in a cylinder upto 7ml and poured into the mortor.
(c) Stool was emulsified using a pestle.
(d) The mixture was filtered through a 4 layer of surgical gauze.
(e) The tubes were balanced with formal saline.
(f) 3 ml of ether acetate was added to each tube.
(g) The tubes were stopped and mixed vigorously.
(h) The stopper was removed slowly to avoid splashing due to high pressure build by ethyl acetate.
(i) Centrifuge at 1500g r.p.m. for 3 minutes.
The following was observed

- Ethyl acetate and suspension
- Faecal debris
- Formal saline
- Sediments
(j) Using a swab the faecal debris was dislodged without disturbing the lower portion.
(k) The supernatant was poured off.
(i) The residual/sediments were transferred onto a microscope slide and covered with a cover slip.
(m) Thin examined under microscope power X 10  X 40 objectives.

Advantages of formal – ether concentration technique
1. The less dense infections was able to be diagnosed.
2. The micro-organism were killed thus less infection to laboratory workers.

Disadvantages
1. It is time consuming than direct wet preparation.

Purpose of reagent used
Ether
1. Used to dissolve fats.
2. Kill the life organisms.

10% formal Saline
1. Used to preserve and fix the parasite.
2. Emulsify hard stool.
CHAPTER 4

4.0 DATA ANALYSIS AND RESULTS

4.1 Table 1

<table>
<thead>
<tr>
<th>MONTH</th>
<th>SAMPLE COLLECTED</th>
<th>POSITIVE</th>
<th>NEGATIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>JULY</td>
<td>49</td>
<td>19</td>
<td>30</td>
</tr>
<tr>
<td>AUGUST</td>
<td>60</td>
<td>18</td>
<td>42</td>
</tr>
<tr>
<td>SEPTEMBER</td>
<td>37</td>
<td>17</td>
<td>20</td>
</tr>
<tr>
<td>OCTOBER</td>
<td>51</td>
<td>11</td>
<td>40</td>
</tr>
<tr>
<td>NOVEMBER</td>
<td>35</td>
<td>25</td>
<td>10</td>
</tr>
<tr>
<td>DECEMBER</td>
<td>68</td>
<td>23</td>
<td>45</td>
</tr>
<tr>
<td>TOTAL</td>
<td>300</td>
<td>113</td>
<td>187</td>
</tr>
</tbody>
</table>

The above table shows the number of sample collected within a period of 6 months. It also indicates positive samples as well as negative ones.
TABLE 1

HISTOGRAM SHOWING INFECTION IN
DIFFERENT MONTHS OF THE STUDY

MONTH

November

October

September

August

July

RATE OF INFECTION

30 25 20 15 10 5 0
### Table 2: Comparison between Direct Preparation and Concentration Technique

<table>
<thead>
<tr>
<th>MONTH</th>
<th>DIRECT</th>
<th>CONCENTRATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>JULY</td>
<td>8</td>
<td>19</td>
</tr>
<tr>
<td>AUGUST</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>SEPTEMBER</td>
<td>6</td>
<td>17</td>
</tr>
<tr>
<td>OCTOBER</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>NOVEMBER</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>DECEMBER</td>
<td>9</td>
<td>23</td>
</tr>
<tr>
<td>TOTAL</td>
<td>48</td>
<td>113</td>
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</tbody>
</table>
### Table 3

**Compare Ascaris lumbricoides Infection With Sex**

<table>
<thead>
<tr>
<th>MONTH</th>
<th>MALE</th>
<th>FEMALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>JULY</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>AUGUST</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>SEPTEMBER</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>OCTOBER</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>NOVEMBER</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>DECEMBER</td>
<td>13</td>
<td>10</td>
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<tr>
<td>TOTAL</td>
<td>56</td>
<td>57</td>
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GRAPH COMPARING ASCARIS LUMBRICOIDES INFECTION IN DIFFERENT SEX

<table>
<thead>
<tr>
<th>MONTH</th>
<th>Rate of Infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>July</td>
<td>10</td>
</tr>
<tr>
<td>August</td>
<td>10</td>
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<tr>
<td>September</td>
<td>10</td>
</tr>
<tr>
<td>October</td>
<td>4</td>
</tr>
<tr>
<td>November</td>
<td>16</td>
</tr>
<tr>
<td>December</td>
<td>12</td>
</tr>
</tbody>
</table>

- **FEMALE**
- **MALE**
<table>
<thead>
<tr>
<th>MONTH</th>
<th>1-4 YEARS</th>
<th>5-8 YEARS</th>
<th>9-12 YEARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>JULY</td>
<td>9</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>AUGUST</td>
<td>12</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>SEPTEMBER</td>
<td>9</td>
<td>6</td>
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</tr>
<tr>
<td>OCTOBER</td>
<td>6</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>NOVEMBER</td>
<td>10</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>DECEMBER</td>
<td>9</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>TOTAL</td>
<td>55</td>
<td>40</td>
<td>18</td>
</tr>
</tbody>
</table>

1-4 Years: 55 x 100 = 49%

5-8 Years: 40 x 100 = 35%

9-12 Year: 18 x 100 = 16%
DISTRIBUTION OF ASCARISLUMBERICOIDES AMONG DIFFERENT AGE GROUPS

- 1.4 YEARS: 49%
- 5.8 YEARS: 35%
- 9-12 YEARS: 16%
Table 5

CONSISTENCY OF STOOL SAMPLE RECEIVED

<table>
<thead>
<tr>
<th>CONSISTENCY</th>
<th>NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mucoid</td>
<td>20</td>
</tr>
<tr>
<td>Blood stained</td>
<td>1</td>
</tr>
<tr>
<td>Watery</td>
<td>5</td>
</tr>
<tr>
<td>Semi-formed</td>
<td>87</td>
</tr>
<tr>
<td>Formed</td>
<td>187</td>
</tr>
<tr>
<td>Adult forms</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>300</strong></td>
</tr>
</tbody>
</table>
CHAPTER 5

5.1 DISCUSSION

A total of 300 samples were collected from children between age 1-12 years. 113 samples were found to be positive.

It was found that 1-4 years age group was the most affected group with 49% followed by 5-8 years age group constituting 35%. The 9-12 years age group was the least affected with 16%. This showed that children of the lower age had no knowledge about hygiene practice, and parents were not sensitive enough to monitor their children’s behaviour. It was found that children in 1-4 years age group were found of putting dirty article in their mouth. The dirty articles usually carried the infective form of *Ascaris lumbricoides*, which made the group to be the most affected.

The 9-12 years age group were school going children. Most of them knew the simple rules of cleanliness which were taught by their teachers. The rules included:- washing hands after visiting the latrines, washing hands before and after meals, keeping nails short and avoiding eating their nails. They were also informed on eating clean washed fruits. As per interview it explains why this group was the least affected.

The month of November registered the highest rate of infection (22.1%). This is because the rainy seasons were beginning and most of the infective forms of the *Ascaris lumbricoides* were swept to a place to form a muddy pad. Children are fond of playing in these areas as a source of fun. Some of them drink the water which later infect them. December was the next month constituting 20.4%. The rate of infection was increasing due to the rainy season but lower than the month of November because the sample collected consisted of children between 9 – 12 years who are least affected. October registered the least infection rate 9.7%
Formal-ether concentration technique was effective during the study than direct wet preparation. This is because it gave sufficient positive results. No missing out of positive *Ascaris lumbricoides* egg was reported because the samples were examined twice.

Both female and male children were equally infected. It showed that *Ascaris lumbricoides* is a non selective helminth. Most of the children whose samples were found to be positive had previously complained of abdominal pains and discomfort. As far as the study was conducted, there were no serious cases which could have lead to Ascaris pneumonia, acute biliary obstruction and abscesses. Out of the 113 positive samples, 5 cases of malnutrition were reported and 2 cases of anaemia.

*Ascaris lumbricoides* was the dominant worm in children due to its resistance to most chemicals and its longevity of its eggs. Samples placed in 10% formalin were found to be positive 2 weeks later. The production of numerous eggs by the ascaris female worm was an added reason for its dominancy.

Consistency corresponded with kind of cyst and eggs found in the samples. The *Ascaris lumbricoides* eggs were found in the formed and semi-formed samples. Adult worms were not reported. Samples which were mucoid, blood stained and watery consisted other parasites which were not of interest in the study. They included; *Entamaeba histolytica, Schistosoma mansoni, Trichuris trichura* and hookworm infection). Some indicated undigested starch.
5.2 CONCLUSION

Most parents do not understand the mode of transmission of *Ascaris lumbricoides*. Thus it is advisable for members of health sector to hold seminar to educate the parents with appropriate information.

Most people fail to understand the use of diagnosis before treatment. The parents buy deworming drugs without knowing exactly what the children are suffering from. It was evident that poor sanitation and overcrowding in the slum areas were the major factors which lead to the infection of children. This consisted of 80% of the infection.
5.3 **RECOMMENDATION**

1. Parents of children between 1-4 years old should take care of their young ones in order to reduce ascariasis.

2. Children should be taken to hospital and the doctor is supposed to examine the child and if need be request for a laboratory diagnosis before the administration of any deworming drug.

3. High standards of hygiene should be encouraged to all members of public, to avoid the high expenses of disease treatment.

4. Small children who can not go to latrine or toilet should have a special container where they defaecate and the waste disposed in the latrine. The container should be washed with disinfectant like hypochlorite (Jik) and left in the sun to dry. The container must be kept out of reach of children.

5. School going children should be discouraged to eat uncleaned fruits and fruit sellers on the other hand must provide clean water for washing the fruits.

6. Parents should avoid giving salads to the young ones and vegetables bought at market place should be washed severally with running tap water and properly cooked.

7. Places where water collects after raining must be filled soil to avoid children fetching such water and playing with it.
REFERENCES

1. MONICA CHEESEBROUGH
   Cambridge University

   Intestinal parasites in Health and Disease in Kenya edited by VOGEL L.C.
   MULLER A.S. ADINGO R.S. ONYNAGO Z AND DE GEUS A. East African
   Literature Bureau

3. DOUMENG E.J.P. AND MOH K.E. 91954
   Altas world health 8:10
   The East African medical journal 1993

4. CREW W. DAVEY T.H. 1993
   A guide to human Parasitology
   9th Edition

5. STEPHENSON 1989
   Evaluation of four year project to control Ascaris

6. MARKWELL AND VOGEE
   Medical parasitology

7. F.J. WRIGHT AND J.P. BAIRD
   Tropical disease
   Fifth Edition
8. CHUNGE R.N. KAMUNVI F. AND KINOT S.N. 1985
   Intestinal helminthes in Kenya 1900 – 1983
   East African medical journal 62: Special supplement

9. C.K. JAYARAN PANIKER
   Medical parasitology
   Published by
   Joypee brothers
   Medical Publisher
   (India)

10. H.R.A. PILIPS
    Practical Parasitology

11. ELIZABETH A. ZEIBIG
    Clinical parasitology

12. A.C. CHANULER % C.P. READ
    Introduction to parasitology
    Tenth Edidtion

13. LYNCH AND RAPHAEL
    Medical Laboratory Technology and Clinical Pathology

14. WHO 1991 Basic Lab Methods in medical parasitology
APPENDIX

PREPARATION OF REAGENTS

1. NORMAL SALINE
   Composition
   0.85g Sodium Chloride
   100ml distilled water
   Procedure
   (i)  Weigh 0.85g of sodium chloride
   (ii) Dissolve the salt in 100ml distilled water

2. 2% EOSIN STAIN
   Composition
   2g of Eosin powder
   100ml distilled water
   Procedure
   (i)  Weigh 2g of Eosin powder
   (ii) Dissolve in 100ml distilled water

3. 5% LUGOL’S IODINE
   Composition
   3g potassium iodide
   2g iodine crystal
   100ml distilled water
   Procedure
   (i)  Weigh 3g of potassium iodide and 2g of iodine crystal
   (ii) Dissolve them in 100ml of distilled water
4. **10% FORMAL SALINE**

**Composition**
10ml of formal saline
90ml distilled water

**Procedure**
(i) Measure 10ml of formal saline using a measuring cylinder
(ii) Add 90 ml of distilled water and mix well

5. **5% LYSOL**

**Composition**
5ml Lysol
95ml distilled water

**Procedure**
(i) Measure 5ml of absolute Lysol in a measuring cylinder
(ii) Add 95ml of distilled water and mix thoroughly