

LECTURE NOTE BY R.I ATABO

COMMUNITY NURSING 11

GNS 313.THIRD YEAR.

(2) Hookworm (NEMATODE)

INTRODUCTION.

Hookworms are parasitic worms that can infect humans in countries with poor sanitation and a warm, moist climate. The hookworm larvae (immature worms) are found in soil that's been contaminated with human faeces. Hookworms are intestinal parasites of the cat and dog. The name is derived from the hook-like mouthparts they use to anchor to the lining of the intestinal wall.

Class :-Nematoda

Phylum ,:-Aschelminthes that infect the intestines of humans, dogs, and cats.

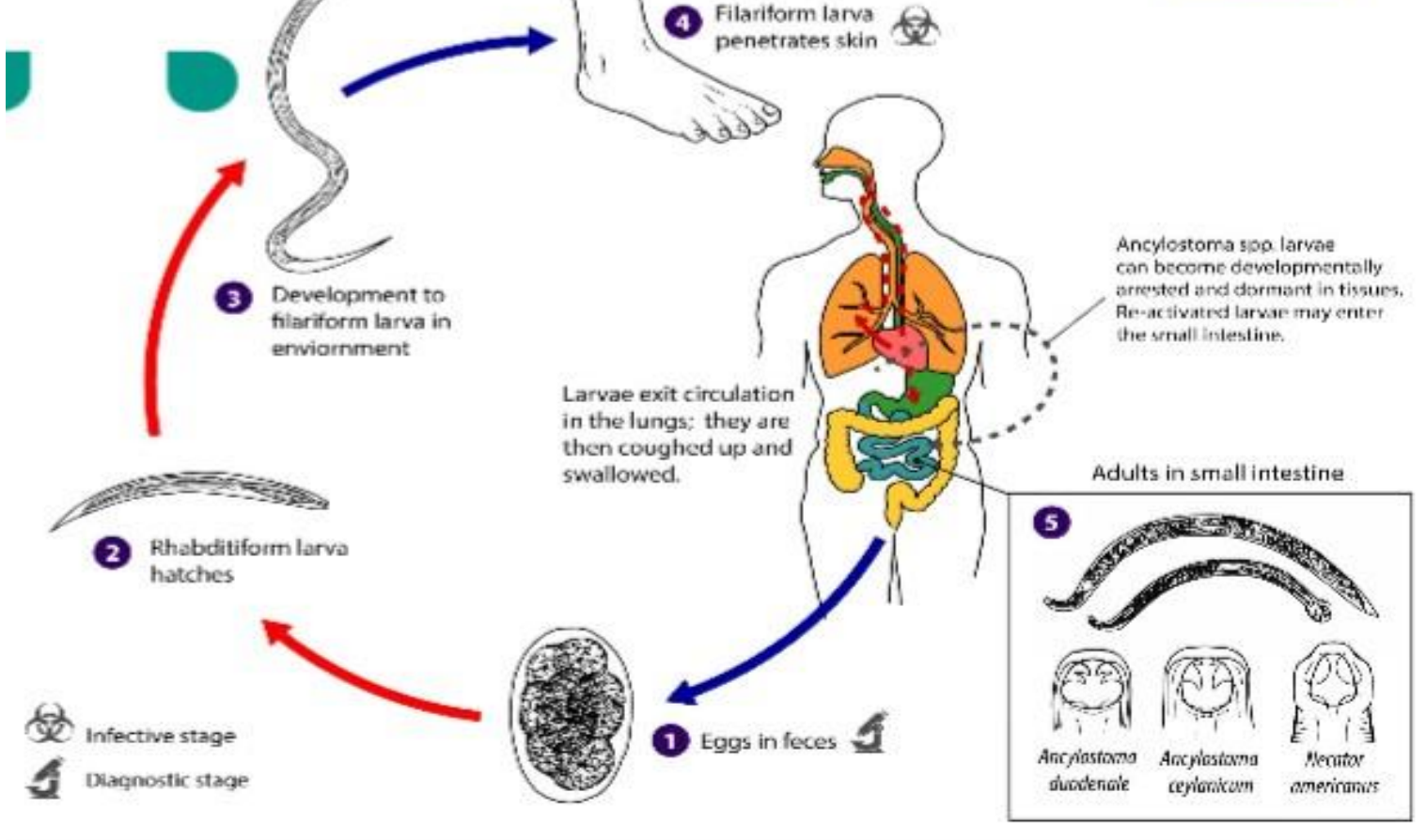
Types of hookworms

Types of hookworms that cause infection are -*Necator americanus* and *Ancylostoma duodenale*. Average adult *A. duodenale* worms range in size from 8 to 13 millimetres (0.3 to 0.5 inch), while adult *N. americanus* specimens range from 5 to 11 millimetres (0.2 to 0.4 inch). The worms then live in the intestine for many months, and some may persist for as long as 10 years. Continual reinfection and acquired partial resistance result in a more or less constant number of worms harboured. Infective larvae when swallowed can develop in the intestine without preliminary lung passage, but this mode of transmission is not common in nature. There are two dog hookworms, *A. brasiliense* and *A. caninum*, which may infect humans. Usually these cause an aberrant infection, "creeping eruption" or cutaneous larva migrans. This disease is characterized by serpiginous tunnels in the skin caused by migrations of larvae that are unable to penetrate the innermost layers.

### **Geographical distribution**

Hookworm infection typically occurs in a zone from approximately latitude 38° N to 34° S and may be encountered in cooler regions, particularly in mines and tunnels. The geographical distribution is determined by temperature and rainfall, which influence development of free-living larvae. Other important factors are drainage, type of soil, social habits and customs, and poor sanitation. Optimum temperature for larval development is between 70° and 85° F (about 21° to 29° C), *A. duodenale* is better adjusted to the lower range than *N. americanus*, and the latter predominates in warmer regions.

### **Life cycle of hookworm (*Ancylostoma*)**



(Figure 1 .)As forwarded from (CDC)

The female worm deposits eggs in the intestine of the host.: -Eggs are passed in the stool , and under favourable conditions (adequate but not excessive moisture, warmth (25-28°C), shade), larvae hatch in 1 to 2 days.

- The rhabditiform larvae grow in the faeces in the soil, and after 5 to 10 days (and two molts) they become filariform (third-stage) larvae that are infective. \_These infective larvae can survive 3 to 4 weeks in favourable environmental conditions.

-On contact with the human host, the larvae penetrate the skin and are carried through the blood vessels to the heart and then to the lungs.

-They penetrate from the pulmonary capillaries into the pulmonary alveoli, migrate up the airways, pass down the oesophagus, through the stomach to the duodenum where the hookworms mature.

-Male locates female, they mate and eggs appear in the faeces.

Fully developed eggs and newly hatched larvae die in a few days if kept below 43° to 46° F (6° to 8° C). Mature larvae can resist freezing temperatures as long as six days, and developmental time is tripled at temperatures of 55° to 60° F (13° to 16° C). Under optimum conditions, infective larvae may remain

viable in the soil for several months or longer, but under natural conditions in the tropics the majority rarely survive longer than five or six weeks. A minimum annual rainfall of 40 inches (1 metre) is required to maintain the infection in endemic proportions. The distribution of the rainfall throughout the year is also important—a long dry season is detrimental to larvae in the soil. Drainage and subsoil water level are important in irrigated regions or where canals are present. Coarse, sandy soil with humus is much more favourable for larval development than fine clay or silt loam, since larvae migrate vertically with changes in moisture and temperature. They cannot pass rapidly through fine-textured soils and thus become dry and die.

### **Mode of transmission.**

Hookworm eggs are passed in the feces of an infected person. If an infected person defecates outside (near bushes, in a garden, or field) or if the feces from an infected person are used as fertilizer, eggs are deposited on soil. They can then mature and hatch, releasing larvae (immature worms). The larvae mature into a form that can penetrate the skin of humans. Hookworm infection is transmitted primarily by walking barefoot on contaminated soil. One kind of hookworm (*Ancylostoma duodenale*) can also be transmitted through the ingestion of larvae.

### **Signs and Symptoms of hook worm infections.**

- Abdominal pain.-Colic, or cramping and excessive crying in infants.
- Abdominal cramps.
- Nausea.
- Fever.
- Bloody frequent stooling
- Vomiting
- Loss of appetite.
- Itching and a localized rash are often the first signs of infection.
- weight loss,
- Fatigue
- Anemia.
- The physical and cognitive growth of children can be affected.

### **Complications.**

Possible Complications

Health problems that may result from hookworm infection include:

- Iron deficiency anemia, caused by loss of blood. --Nutritional deficiencies.
- Severe protein loss with fluid build up in the abdomen (ascites)

Diagnosis.

Diagnosis. Hookworm infection is diagnosed by identifying hookworm eggs in a sample of stool. Stool should be examined within several hours after defecation. Eosinophilia is often present in people infected with hookworm.

**PREVENTION.**

- Do not walk barefoot in areas where hookworm is common and where there may be fecal contamination of the soil.
- Avoid other skin-to-soil contact and avoid ingesting such soil.
- The infection of others can be prevented by not defecating outdoors or using human feces as fertilizer, and by effective sewage disposal systems.

**Treatment for hookworm**

Anthelmintic medications (drugs that rid the body of parasitic worms), such as ivermectin, albendazole and mebendazole, are the drugs of choice for treatment of hookworm infections. Infections are generally treated for 1-3 days. The recommended medications are effective and appear to have few side effects.