

Dwarf tapeworm: *Hymenolepis nana*

Introduction

Hymenolepis nana, also called as- “the dwarf tapeworm” is the smallest tapeworm to contaminate humans. It has a cosmopolitan allotment and is thought to be the most common tapeworm across the world. The infection is more commonly seen in offsprings however adults are also seen infected.

Epidemiology

The dwarf tapeworm or *Hymenolepis nana* is seen worldwide. More commonly in warmer parts of South Europe, US, Russia, India, and Latin America. Infection is mainly widespread in children, in those persons living in institutional settings, busy environments and in people who live in areas where hygiene and sanitation is insufficient and improper. Infection is most prevalent in children aged 4–10 years, in dry, warm regions of the developing nations. Estimated to have 50-75 million carriers of *Hymenolepis nana* with 5 to 25% occurrence in only children across the world. One becomes infected by unintentionally ingesting dwarf tapeworm eggs, ingesting focally contaminated water or food, by touching mouth parts with infected fingers, or by in taking contaminated soil, or by inadvertently ingesting an already infected arthropod.

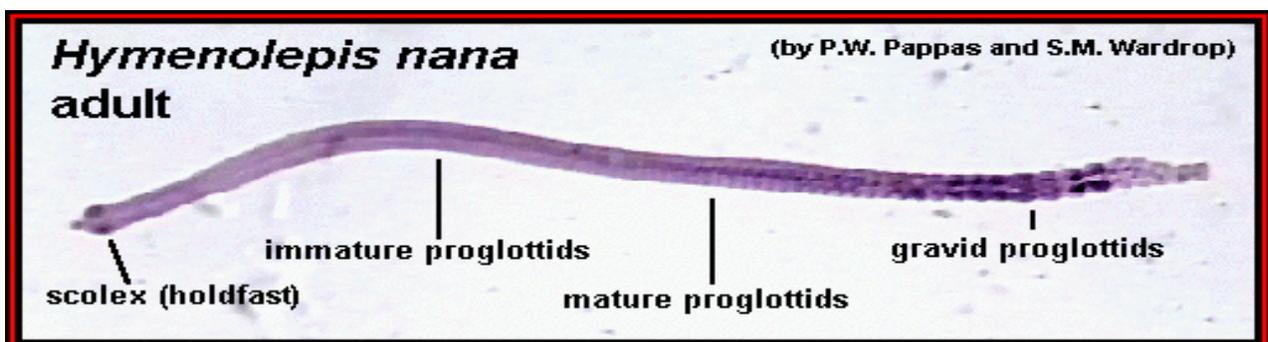
United States:

- Infection is most prevalent in the Southeast.
- Infection rates are found to be superior amongst Southeast Asian refugees in the United States

Internationally:

- Regions with elevated documented illness rates include Argentina (34% of school children), Sicily (46%), and southern regions of the former Soviet Union (26%).

Morphology



As its name says (Latin: nanos – dwarf), it is a little species, only occasionally surpassing 40 mm long and 1 mm wide. The scolex bears a retractable rostellum outfitted with a single circle of 20 to 30 hooks. The scolex additionally has four suckers, or a tetrad. The neck is long and slim, and the portions are more extensive than long. Genital pores are unilateral, and each develop section contains three testicles. After apolysis, gravid portions deteriorate, discharging eggs, which measure 30 to 47 μm in width. The oncosphere is secured with a flimsy, hyaline, external film and an inward, thick layer with polar thickenings that bear a few filaments. The substantial embryophores that give taeniid eggs their trademark striated appearance are inadequate in this. The rostellum remains invaginated in the pinnacle of the organ. Rostellar hooklets are molded like tuning forks. The neck is long and slim, at the district of development. The strobila begins with short, restricted proglottids, followed with develop ones.

H. nana, similar to all tapeworms, contains both male and female reproductive structures in each proglottid. This implies that the dwarf tapeworm, is hermaphroditic. Each fragment contains three testicles and a solitary ovary. At the point when a proglottid gets old and incapable to assimilate any more nourishment, it is discharged and is gone through the host's digestive tract. This gravid proglottid contains the fertilized eggs, which are once in a while expelled out with the excrement. Although, the egg may likewise settle in the microvilli of the small intestine, hatch and the larvae can attain sexual maturity without leaving the host.

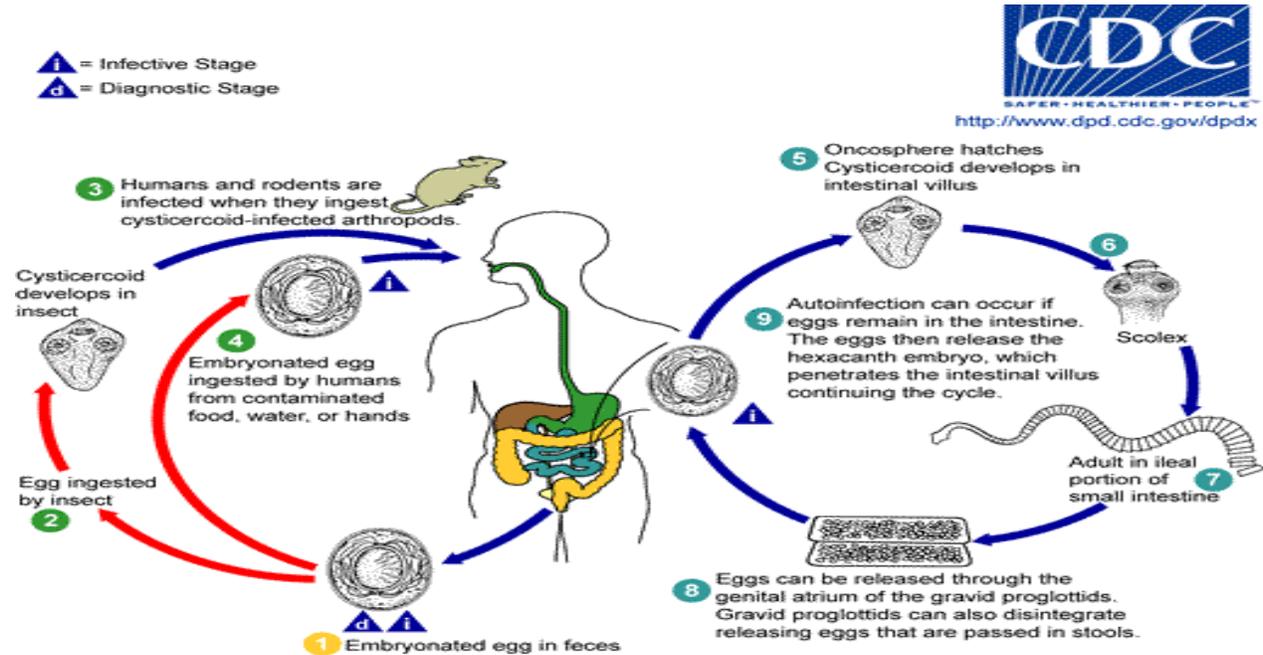
Host Range

In 1887, Grassi reported that transmission from rat to rat didn't require an intermediate host. However later, in 1921, Saeki demonstrated an immediate pattern of transmission of *H. nana* in people, transmission without an intermediate host. Notwithstanding the direct cycle, Nicholl and Minchin demonstrated that bugs can fill in as intermediate hosts between people.

Behavior of *H. nana*:

The dwarf tapeworm, like all other tapeworms, does not have a digestive system and feeds by assimilating nutrients in the intestinal lumen. They have imprecise carbohydrate necessities and they appear to absorb whatever is being passed through the intestine at that particular time. When it turns in an adult, it adheres to the intestinal walls with its toothed rostellum and suckers and has its segments attaining into intestinal space to absorb food.

Life Cycle



Disease is procured most usually from eggs in the defecation of another infected person, which are passed in nourishment, by defilement. Eggs incubate in the duodenum, discharging oncospheres, which penetrate the mucosa and come to lie in lymph channels of the villi. An oncosphere forms into a cysticercoid which has a tail and an all around framed scolex. It is made of longitudinal strands and is spade-formed with the remainder of the worm still inside the growth. In five to six days, cysticercoids develop into the lumen of the small intestine, where they join and develop.

The direct lifecycle is without a doubt an ongoing modification of the ancestral two-host lifecycle found in different species of hymenolepidids, as cysticercoids of *H. nana* can at still grow typically inside larval insects and bugs. One explanation behind facultative nature of the lifecycle is that *H. nana* cysticercoids can get developed at higher temperatures. Direct contaminative disease by eggs is presumably the most well-known course in human cases, however coincidental ingestion of a infected grain bug or insect can't be precluded. The direct infectiousness of the eggs liberates the parasite from its previous dependence upon a insect intermediate host, making rapid contamination and individual to-individual spread conceivable. The short lifespan and quick course of development likewise encourage the spread of this worm.

Pathogenesis:

Light infections: Asymptomatic

Heavy infections:

- Toxemia
- Significant intestinal inflammation
- Anorexia
- Loss of appetite
- Diarrhea
- Abdominal pain
- Nausea
- Weakness

For young children:

- Difficulty sleeping
- Head-ache
- Itchy buttocks

Treatment:

Praziquantel is generally recommended in a single dose to patients experiencing disease of *H.nana*. Praziquantel is generally utilized and favored because of its high viability. Research has shown that the cysticeroid phase of *H.nana's* life cycle is most susceptible to the Praziquantel treatment.

In 1980, research demonstrated that Praziquantel had morphological consequences for *H.nana* and other comparative cestodes. It was seen that following ten minutes of Praziquantel administration, *H. nana* was totally deadened; thirty minutes post-administration, the tapeworms were totally ousted from the caecum. This research completely demonstrated the paralyzing and dangerous nature of Praziquantel on *H. nana*, *H. diminuta*, *H. microstoma*.

Prophylaxis:

- Surroundings should be clean.
- Keep a check on arthropods growth in near be regions.
- Do not allow water to be stagnant.
- Drinking contaminated water should be avoided.