

Worms and Parasites in Children in India-A Review

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ABSTRACT: Intestinal parasitic infections causes significant morbidity and mortality among children and it shows important public health problem in developing countries like India.According to the World Health Organization, about 241 million children in India in the ages of 1-14 years are at a risk of parasitic intestinal worms or soil transmitted helminthiasis.India accounts for approximately 28% of the total number of children globally estimated to be at-risk of STH infections which explains the volume of the problem.

Environmental and socio-economic factors are mainly responsible for parasitic infections. They are usually associated with major complications such as intestinal obstruction, mild to severe Iron deficiency anaemia, malnutrition, recurrent diarrhea, fever, dehydration, vomiting and even colitis which are mainly due to poor sanitary conditions, unhygienic practices, absence of clean water, poor housing facilities and poverty. This review is directed towards worms and parasitic infections in children in India, their common manifestations, treatment options and commonly faced challenges by clinicians.

KEYWORDS : Parasites, Worms, helminthiasis, Clinicians, anemia, malnutrition.

I. INTRODUCTION:

Helminthiasis, also known as worm infection, is any macro parasitic disease in which a part of the body is infected with parasitic worms, known as helminths. They often live in the gastrointestinal tract of their hosts, but they may also burrow into other organs, where they induce physiological and functional damage. Helminthiasis has been found to result in poor birth outcome, poor cognitive development, poor school and work performance, poor socioeconomic development, and poverty.^(1,2) Chronic illness, malnutrition, and anemia are further examples of secondary effects.⁽³⁾ There are numerous species of

these parasites, which are broadly classified into tapeworms, flukes, and roundworms. They are,

ROUNDWORM INFECTION (NEMATODIASIS)⁽⁴⁾

- Filariasis (Wuchereria bancrofti, Brugia malayi infection)
- Onchocerciasis (Onchocerca volvulus infection)
- Soil-transmitted helminthiasis – this includes ascariasis (Ascaris lumbricoides infection), Trichuriasis (Trichuris infection), and hookworm infection (includes Necatoriasis and Ancylostoma duodenale infection)
- Trichostrongyliasis (Trichostrongylus spp. infection)
- Dracunculiasis (guinea worm infection)
- Baylisascaris (raccoon roundworm, may be transmitted to pets livestock and humans)

TAPEWORM INFECTION (CESTODIASIS)⁽⁵⁾

- Echinococcosis (Echinococcus infection)
- Hymenolepiasis (Hymenolepis infection)
- Taeniasis/cysticercosis (Taenia infection)
- Coenurosis (T. multiceps, T. serialis, T. glomerata, and T. brauni infection)

Trematode Infection (Trematodiasis)⁽⁶⁾

- Amphistomiasis (amphistomes infection)
- Clonorchiasis (Clonorchis sinensis infection)
- Fascioliasis (Fasciola infection)
- Fasciolopsiasis (Fasciolopsis buski infection)
- Opisthorchiasis (Opisthorchis infection)
- Paragonimiasis (Paragonimus infection)
- Schistosomiasis/bilharziasis (Schistosoma infection)

ACANTHOCEPHALA INFECTION⁽⁷⁾

- Moniliformis infection

II. MODE OF TRANSMISSION:

Helminths are transmitted to the final host in several ways. The most common infection is through ingestion of contaminated vegetables, drinking water, and raw or undercooked meat. Contaminated food may contain eggs of nematodes such as Ascaris, Enterobius, and Trichuris; cestodes such as Taenia, Hymenolepis, and Echinococcus; and trematodes such as Fasciola. Raw or undercooked meats are the major sources of Taenia (pork, beef and venison), Trichinella (pork and bear), Diphyllbothrium (fish), Clonorchis (fish), and Paragonimus (crustaceans). Schistosomes and nematodes such as hookworms (Ancylostoma and Necator) and Strongyloides can penetrate the skin directly. Finally, Wuchereria, Onchocerca, and Dracunculus are transmitted by mosquitoes and flies.⁽⁸⁾ In the developing world like India, the use of contaminated water is a major risk factor for infection.⁽⁹⁾

III. DIAGNOSIS:

Microscopic examination of their eggs (ova) found in faecal samples can be identified for specific helminthes⁽¹⁰⁾. Sophisticated tests such as serological assays, antigen tests, and molecular diagnosis are also available^(11,12,13)

IV. PREVENTION:

Sanitation, maintain hygiene, reduction of open defecation, food hygiene, wearing of shoes,^(14,15,16) regular deworming of pets, proper disposal of feces.

V. TREATMENT:

Anthelmintics or antihelminthics are a group of antiparasitic drugs that expel parasitic worms (helminths) and other internal parasites from the body by either stunning or killing them and without causing significant damage to the host. Pills containing anthelmintics are used in mass deworming campaigns of school-aged children in many developing countries.^{[17][18]}

ANTHELMINTIC DRUGS

WORM

Roundworm: Ascaris lumbricoides

Hookworm: Necator americans

Pinworm: Enterobius vermicularis

Threadworm: Strongyloides stercoralis

Whipworm: Trichuris trichiura

Whipworm: Trichuris spiralis

Filaria:

Wuchereria bancrofti

Brugia malayi

Guinea worm:

Dracunculus medinensis

Tapeworms:

Taenia saginala

Taenia solium

Hymenolepis nana

Neurocy stercercosis

Hydatid disease

Echinococcus granulosus

E. multilocularis

DURG OF CHOICE ALTERNATIVE DRUGS

Mebendazole, Albendazole, Piperazine, Levamisole, Pyrantel. Ivermectin

Mebendazole, Albendazole, Pyrantel. Piperazine

Albendazole.

Ivermectin Albendazole

Mebendazole Albendazole

Albendazole. Mebendazole

Diethyl carbamazine, Albendazole Ivermectin

Metronidazole Mebendazole

Praziquantel, Niclosamide Albendazole

Praziquantel Niclosamide, Albendazole

Praziquantel Niclosamide, Albendazole

Albendazole Praziquantel

Albendazole Mebendazole

Albendazole

VI. DEWORMING IN CHILDREN⁽¹⁹⁾:

WHO recommendations:

Preventive chemotherapy (deworming), using annual or biannual^a single-dose albendazole (400 mg) or mebendazole (500 mg)^b is

recommended as a public health intervention for all young children 12–23 months of age, preschool children 1–4 years of age, and school-age children 5–12 years of age (in some settings up to 14 years of age) living in areas where the baseline

prevalence of any soil-transmitted infection is 20% or more among children, in order to reduce the worm burden of soil-transmitted helminth infection.

^a Biannual administration is recommended where the baseline prevalence is more than 50%.

^b A half-dose of albendazole (i.e. 200 mg) is recommended for children younger than 24 months of age

National Deworming Day:⁽²⁰⁾

It is an initiative of Ministry of Health and Family Welfare, Government of India to make every child in the country worm free. This is one of the largest public health programs reaching large number of children during a short period.

More than 836 million children are at risk of parasitic worm infections worldwide. According to World Health Organization 241 million children between the ages of 1 and 14 years are at risk of parasitic intestinal worms in India, also known as Soil-Transmitted Helminths (STH).

In February 2015, the Ministry of Health and Family Welfare constituted NDD in 277 districts of 11 States and Union Territories (UTs) including Assam, Bihar, Chhattisgarh, Dadra and Nagar Haveli, Haryana, Karnataka, Maharashtra, Madhya Pradesh, Rajasthan, Tamil Nadu, and Tripura. In 2016, the NDD, a day and programme dedicated to deworm children, was scaled up to cover all the districts across the country. Since then it is observed twice a year on February 10 and August 10, across the nation.

Objective of the National Deworming Day:

It is to deworm all preschool and school-age children(enrolled and non-enrolled)between the agents of 1-19 years through the platform of schools and anganwadi centers in order to improve their overall health,nutritional status,access to education and quality of life ,reads the operational guidelines issued for NDD by the Ministry of Health and Family Welfare.

The deworming activity is carried out in all government and government aided schools and anganwadi centers. On this day, Albendazole tablet (deworming drug) is administered to children. The day is followed by a Mop-Up Day (MUD) with the intent of deworming children who missed the dose on the NDD.

According to the government data, in the first round of deworming, 8.9 crore children (1-19 years) were covered. With each round, the coverage of NDD has increased and in February

2019, the programme reached out to 22.12 crore children.

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