

Impact of Worms and Parasites on Child Growth and Nutrition

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ABSTRACT

More than a half of the world's population are infected with one or more species of intestinal worms of which the nematodes *Ascaris lumbricoides*, *Trichuris trichiura* and the hookworms are the most common and important in terms of child health. This paper: (1) introduces the main species of intestinal worms with particular attention to intestinal nematodes; (2) examines how such worms may affect child growth and nutrition; (3) reviews the biological and epidemiological factors that influence the effects that worms can have on the growth and nutrition of children; (4) considers the many factors that can affect the impact of treatment with anthelmintic drugs; (5) presents the results of a meta-analysis of studies of the effect of treating worm infections on child growth and nutrition; (6) discusses the results in terms of what is reasonable to expect that deworming alone can achieve; (7) describes some important characteristics of an ideal study of the effects of deworming; and (8) comments on the implications for programmes of recommendations concerning mass deworming.

Keywords: intestinal worms, anthelmintics, children, growth, nutrition

INTRODUCTION

This Intestinal worm infestations are widely prevalent in tropical and subtropical countries and occur where there are poverty and poor sanitation. The child-to-child approach is an educational process that links children learning with fusion action to promote the health wellbeing and development of themselves their families and their communities. The objective of the present study is to evaluate the effectiveness of the Child-to-Child approach on the prevention and management of worm infestation among school children in the changeset, Kancheepuram district, Tamil Nadu. Quantitative approach and pre-experimental one group pretest, post test design was adopted based on the inclusion and exclusion criteria. The total number of 100 children were selected by the non-probability convenient sampling technique. The tool used for the study comprises two sections section A and Section B. Section A comprised of demographic data which includes age, gender, siblings. Occupation of mothers, Toilet facilities, water facilities.

WHO (2012) reported that globally there are 1221– 1472 million cases of Ascariasis, 750–1050 million cases of Trichuriasis, and 740–1300 million cases of a hookworm infestation. Stephenson L.S (2000) explained that Intestinal worm infestation is a global health problem and is a matter of serious concern for third world countries. The burden of disease due to these intestinal parasites is an estimated 22.1 million disability adjusted life years (DALYs) lost for hookworm, 10.5 million for Ascaris; and 6.4 million for Trichuris. Awasthi S (2008) described that Helminthes infections are more prevalent among school children aged 5-14 years. More than 610 million children of school age are at risk of morbidity due to schistosomiasis or soil transmitted helminthiasis. Overall, they constitute 12 percent of the total disease burden in children. Crompton (2002) reported heavy hookworm burden is the major etiology for iron deficiency anemia in young children. Bhardwaj AK (1992) suggested that the Child to Child approach was developed for the International Year of the Child (1979) by a group of health and education professionals. The founder is Huge Hawes, a senior educationalist, and dr. David Morley is a senior pediatrician.

They introduced Child to Child as a new way of providing health education to school aged children. The goal was to improve health and reduce infant mortality by engendering positive health practices among children. The child has the power to spread health messages. Children have a very important role to play in the health of the community, not merely by keeping healthy by the care of adults but also by passing on health messages to younger brothers and sisters, friends and thus jointly cooperating to become a positive force for health.

Rupa Ashoka Varma (2015) explained that health education to school children is the most effective method for the protection and promotion of their health. School children are more open-minded and are likely to be receptive to changes in ideas and agreeable to modifications of their habits. Innovative approaches to education for health are essential to gains interest, support involvement, and commitment. The investigator came across the problems of environmental sanitation and poor hygiene in communities during the field experience. It was identified that children and their families do not possess basic knowledge of worm infestation, though it is a preventable condition. However,

they knew that the worms live in the gastrointestinal tract. Hence the investigator felt that there was a strong need to educate children and their families with minimum costs, within a short time with maximum effectiveness regarding worm infestation and its prevention.

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

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), *Diphyllobothrium* (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⁾

ANTHELMINTIC DRUGS

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)

PREVENTION:

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

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]}

WORM	DURG OF CHOICE	ALTERNATIVE DRUGS
Roundworm: <i>Ascaris lumbricoides</i>	Mebendazole, Albendazole, Pyrantel.	Piperazine, Levamisole, Ivermectin
Hookworm: <i>Necator americanus</i>	Mebendazole, Albendazole,	Pyrantel.
Pinworm: <i>Enterobius vermicularis</i>	Pyrantel, Mebendazole, Albendazole.	Piperazine
Threadworm: <i>Strongyloides stercoralis</i>	Ivermectin	Albendazole
Whipworm: <i>Trichuris trichiura</i>	Mebendazole	Albendazole
Whipworm: <i>Trichuris spiralis</i>	Albendazole.	Mebendazole
Filaria:		
<i>Wuchereria bancrofti</i>	Diethyl carbamazine,	Albendazole
<i>Brugia malayi</i>	Ivermectin	
Guinea worm:		
<i>Dracunculus medinensis</i>	Metronidazole	Mebendazole
Tapeworms:		
<i>Taenia saginala</i>	Praziquantel, Niclosamide	Albendazole
<i>Taenia solium</i>	Praziquantel	Niclosamide, Albendazole
<i>Hymenolepis nana</i>	Praziquantel	Niclosamide,
Albendazole Neurocy stercosis	Albendazole	Praziquantel Hydatid
disease		
<i>Echinococcus granulosus</i>	Albendazole	Mebendazole
<i>E. multilocularis</i>	Albendazole	

DEWORMING IN CHILDREN ⁽¹⁹⁾:

WHO recommendations:

Preventive chemotherapy (deworming), using a 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.

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 schoolage 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.

RESULTS AND DISCUSSION

Literature review suggests that these are few factors influencing the prevalence such as age, socio economic condition and working experience, gender, vaccination.

CONCLUSION

Literature review reveals that the Child to Child approach to health education improves the knowledge level of children and somewhat positive as well as negative by affecting the socio demographic variables in every different population. So, the result shows the average knowledge of the study.

IMPLICATION TO NURSING PRACTICE –

Nursing care includes preventive, promotive, curative and rehabilitative services. There are many new initiatives would be taken in prevention of hepatitis B infections, which would help in improving health among the individuals and health care professionals and prevalence would identify the cases and help to cure and prevent further infection among the health care personnel.

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