



A REVIEW ON *KRIMI ROGA* (INTESTINAL WORMS) IN CHILDREN

Shiv Mangal Prasad¹, Bijendra Shah^{2*} and Bishun Dayal Prasad Patel³

¹Associate Professor and Head, Dept. of Kaumarbhritya.

²Teaching Assistant, Department of Shalya Tantra.

³Teaching Assistant, Department of Dravyaguna, Ayurveda Campus, Institute of Medicine, T.U., Kirtipur, Kathmandu, Nepal.

***Corresponding Author: Dr. Bijendra Shah**

Teaching Assistant, Department of Shalya Tantra, Ayurveda Campus, Institute of Medicine, T.U., Kirtipur, Kathmandu, Nepal.

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ABSTRACT

Ayurveda describes worm infestation as *Krimi Roga*. The *Krimi* may be various types on the basis of their origin; *Kaphaj Krimi*, *Raktaj krimi* and *Pureeshaj Krimi*. In Ayurveda *Pureeshaja Krimi* can be correlated with the helminthiasis. From various sources such as classical literatures of Ayurveda, modern texts, online searches and original papers, data were collected. In Ayurveda, the infectious diseases caused by *krimi* are explained under the topic of *Oupasargikarogas*. The term *Krimi* is a broad term which includes all types of worms, which may be pathogenic or non-pathogenic. Among them, pathogenic is harmful to human beings and helminthiasis specifically can be correlated to the *Pureeshaja* type of *Krimi*. Treatment like *Apakarshana* (elimination therapy), *Prakriti Vighata* (to create an unfavorable environment) and *Nidana Parivarjana* (avoiding the etiology) is found to be very effective against *Krimi* in Ayurveda. In addition it is more economical and painless treatment with no or minimum side effects. The present article reviews the concept of *krimi* and its management in Ayurveda for children.

KEYWORDS: *Krimi Roga*, *Oupasargikarogas*, Intestinal worms, Helminthiasis.

INTRODUCTION

There are a vast number of worms that can live within the human body. The worms reside in the digestive tract, especially in the intestines, from where they obtain their nutrition. Hence, they are parasites living within the hosts, body of humans. Since worms dwell inside the human host biologically termed as endoparasites.

“*Krinathihimsathiithi Krimi*”^[1], although the colloquial meaning of *Krimi* refers to worms, by etymology, and is defined as the subject which causes sufferings. Intestinal worm infestation is one of the major health problems in children among developing countries including Nepal, Bangladesh, Shrilanka and India. All classics of Ayurveda describe *Krimi roga* as a major disease along with its major etiological factors such as sweet products, contaminated foods and drinks.

Worm infestations present in all aged group of population, but they are much more of a problem in children who are just beginning to learn to cope with their parasitic enemies. These are reasons of common bowel complaints and need to visit physicians. However, with some elementary information and knowledge, a person can quite effectively face the problems of worm infestations. In this context, Ayurveda has mentioned

several effective remedies for solving all kinds of worm problems.

Prevalence in some areas appears very high while less elsewhere in the country. Report showed that almost 35% population, mainly children, in Nepal take medicine against worm infestations. Developing countries in Southeast Asian region spent 3.76% of total annual budget for health in year 2010.^[2] As worm infestation appears as one of the major economic burden to the country, Nepal government has initiated National Deworming Program in recent years to control it. However, according to WHO, 1100 million people were defecating in the open resulting in high levels of environmental contamination and exposure to the risk of worm infestations in year 2008.^[3] Therefore, this study reviewed literatures related to *krimi roga* in children and role of Ayurveda in its management.

MATERIALS AND METHODS

The details of the concerned information were retrieved from various sources such as literatures of both classical as well as modern, web based database searches and published papers.

Classification of *Krimi* on the basis of habitat (Worm infestation on the basis of Habitat)^[4]

Bahya Krimi (External worms): These worms infested externally occur mainly in the hairy parts of the body. These sometimes may be responsible for urticaria, furunculosis and lymphadenitis.

Abhyantara Krimi (Internal worms): This type of infestation may occur due to the production of *Ama* (Toxin), excessive consumption of sweet and sour diet and *virudhh ahaar* (Incompatible diet).

Causes and Transmission Modes of *Krimi Roga* (Intestinal worms)

There are numerous ways in which intestinal worms can be caused in human beings. The most projecting mode of transmission is through any kind of contact with the feces of an infected person. This can be when human excrement is used as fertilizer in farms, or when clothes of infected Child and soiled diapers of children are washed. Child who are in contact with the soil that contains human feces (like farmers) stand a high chance of getting infested with intestinal worms. Eating contaminated food with the worms is another common way of transmission. Similar infestation is caused by consuming contaminated water. Worms can exist on the outer layers of the food. Hence, children consuming foods without washing them thoroughly are prone to intestinal worms' infestation. Raw meats, milk and eggs can contain worms that can cause intestinal infestation. Meats like beef, pork and fish that are undercooked possess live worms. Child maintaining poor hygiene habits can not only get infested with intestinal worms themselves, but they can also pass the infections to other Child. Worms like hookworms enter the human body through the soles of the feet. Hence, Child who moves around on the open ground with bare feet has a very high chance of getting infested with hookworms. Worms are also transferred during sexual contact. Cunnilingus (i.e. stimulating a woman's genitals with the mouth), fellatio (i.e. stimulating a man's genitals with the mouth) and anal rimming are very common modes of transmitting worms from an infected person to the other. Ayurveda treats intestinal worms as a vitiation of the *kapha dosha*, which governs the balance between the internal and external composition of the human body. This is because all the intestinal worms have a life-cycle that moves in and out of the human body. Though the infestation is internal, the mode of transmission is always external. Different types of worms have different modes of transmissions.^[5]

Flatworms, Pinworms, Roundworms (*Ascaris lumbricoides*) and Whipworms spread through consumption of raw and undercooked meats, from person to person directly, consumption of contaminated solid and liquid foods and consumption of contaminated solid and liquid foods respectively.

Symptoms of Intestinal Worms Infestation in Humans (*Krimi Roga*)

ज्वरो विवर्णता शूलं हृद्रोगश्छर्दनं भ्रमः। भक्तद्वेषोऽतिसारश्च सञ्जतातक्रिमिलक्षणम् ॥ (सु.उ. 54-19)

Since worms are normally found in all human beings, mostly there are no symptoms observed in case of few worms living inside the intestines. In adults, there are no symptoms observed till the infestation reaches a drastic limit. Most of the symptoms are observed in children. The common symptoms of Intestinal worms in children are fever, a most common symptom and initially starting with a mild tickling sensation and gradually get converted into a severe itching or pain which is developed near the anal opening and the adjoining skin.^[6] The abdomen may become distended. Abdominal grumbling noises are found due to the activity of the worms. There is occasional pain in the abdomen, which surges and ebbs. The person may lose the appetite. Nausea sets in, and vomiting can occur. In most worm infestations, there is diarrhea. The diarrhea may be with or without bloody discharge depending on the severity of the complications. Child with worms is often flatulent. The gas released is mostly with bad odour and released noisily. The mouth becomes quite parched. Bad breath is commonly observed.^[7]

Risk of *Krimi Roga* (Intestinal worms) in Children

Worm infestations are commonly found all over the world harvesting all kinds of climates, so it is very difficult to predict children having no risk of them. Almost everyone in the world might have been infested with worms at once or more during life span. However, few groups of Children are more vulnerable than others. Susceptibility of worm infestation in children are higher in feeding improper boiled milk, poor hygiene and sanitation, foods stuffs contaminated with worms and close contact with soil.^[8] Worm infestations are also recorded higher in children working intimately with the earth, such as farmers and gardeners. Pinworms and hookworms are more common infestation in children strolling barefooted in their gardens and lawns through the soles of their feet.

Complications of *Krimi Roga* (Intestinal worms)

Intestinal worms can cause severe complications in the Children, and sometimes may even lead to the death. Some of the important complications of worm infestations have been mentioned below;

Flatworms: Folklore claims that few number of flatworms colonization in intestine are beneficial because they help to digest heavy food. However, higher colonization of worms in the intestines can cause serious health problems in children like anemia, constipation and asthma. The pork tapeworms can lodge themselves in the brain or eye. When these are killed by the antibodies within the body, they leave behind calcium deposits, causing severe complications.

Pinworms: Pinworms can cause severe digestive disorders such as diarrhea associated with bloody stools,

and accompanied dehydration could be fatal, especially in children. In women, pinworms can cause vaginal infections resulting into vaginal discharge. Insomnia is very common in Child with pinworms.

Roundworms (*Ascaris lumbricoides*): Roundworms are responsible for asthma and anemia in their victims. Child suffers insomnia and general discomfort during the daytime. Rashes occur in various places on the body. One more complication caused by roundworms is pain in the eye.

Whipworms: As in all worms, diarrhea is more common with whipworm infestation. Bloody stools rectal prolapsed, and anemia are frequently encountered symptoms in children.

Hookworms: It can directly burrow into the skin of the humans, so it is the most dangerous. It can cause severe abdominal discomfort and edema.

Prevention of *Krimi Roga* (Intestinal worms)

Following clean hygiene and sanitation habits is the best method of preventing intestinal worm's infestation. In this regards, general guidelines have been postulated; One should always ensure properly filtered and boiled drinking water for their family. The food must be properly cooked, especially if it is red meat like beef and pork. Vegetables must be washed thoroughly before putting in the cooking pot. Fruits must be washed thoroughly, and ideally peeled, before consumption. After outdoor activities like gardening, wash your hands and legs thoroughly with a disinfectant soap. Hands must be washed after each visit to the toilet. All laundry must be washed on a daily basis. Underwear must be washed and dried separately from other clothes. As an extreme measure, each person's clothes must be washed separately. Footwear must be worm whenever stepping out of the house. If one person in the house is affected, then treatment must be given to all members living in the house. This is to prevent further transmission.

Children diet in *Krimi Roga* (Intestinal worms)

One must ensure that whatever food is consumed, it must be washed and cooked thoroughly. The same applies for drinks. Some foods to avoid during worm infections are:-

- Red meats including mutton, beef and pork
- Milk and milk products (especially milk that is not pasteurized properly)
- Ghee
- Water that is not boiled
- Vegetables that are not washed and cooked well

Some foods that are beneficial during worm infestations are

- Rice that has been aged and wet
- Buttermilk
- Vegetables like *brinjals* and bitter gourd
- Garlic, coriander and asafoetida

Ayurvedic Treatment of *Krimi Roga* (Intestinal worms)

Principal of treatment^[9]

- *Nidan parivarjana*
- *Apakarshana*
- *Prakritivighata*

Ayurveda has a very effective means to cure intestinal infection. The following is a list of the single drugs that are beneficial in treating *Krimi*.

Ajwain: Ajwain is botanically obtained from *Hyoscyamus niger* (Family; *Solanaceae*) which is a poisonous plant. Its seeds have a beneficial effect in curing intestinal worms. Ajwain seeds taken with jaggery and dissolved in cold water early in the morning help to expel worms out during defecation.

Bael: Bael is obtained from *Aegle marmelos* (Family; *Rutaceae*) and exhibited anthelmintic activities. It is also useful in all inflammatory conditions of the bowels.

Karpoora: Karpoora has been extracted from leaves of *Cinnamomum camphora* (Family *Lauraceae*). It is used as a general treatment for intestinal worms.

Palasha: It is obtained from *Butea monosperma* (Family; *Leguminaceae*) seeds. The seeds of the palasha are taken with buttermilk twice daily for removal of roundworms.

Tulsi: It collects from *Ocimum basilica* (Family; *Lamiaceae*, a botanically sources. Its seeds are highly cooling effects. It is also taken as the sweet basil in the form of a drink. This is a highly beneficial remedy in curing all kinds of intestinal worms, especially tapeworms.

Vidanga: It is obtained from *Embelia ribes* (Family; *Rubiaceae*) which has anti-flatulent and laxative properties. Its seeds must be powdered and taken on an empty stomach. This is beneficial in the expulsion of tapeworms.

Ayurvedic preparations for *Krimi* in Children

Asava/Arishta : *Khadiradi Arishta, Vidanga Arishta, Deva Darya Arishta, Vidangaasav, Kutjarista.*

Bhasma/Kashaya : *Loha Bhasma, Vanga Bhasma*

Choorna : *Vidanagadi Choorna*

Ghrita : *Bimbi Ghritam, Vidanagadi Ghritam*

Rasa : *Krimikaalanala Rasa, Krimi Mudgarasa, Krimikuthara Rasa*

Taila : *Bhallatak Taila*

Pathyapathya in *Krimi* infested children

Pathya

Rasa: *Tikta & Kashaaya.*

Dugdha: *Cow Ghrita & Goat Dugdha.*

Drava: *Tila Taila, Kaanjika, Tushodaka, Gomootra, Suraa & Sauveeraka.*

Phala: *Apakva Kadalee, Pakva Taalaphala & Nimbuka Rasa.*

Kritaanna: *Madhu, Taambula, Aasthaapana Basti, Dhoopa, Abhyanaga & Kaphaghna*

Apathya

Rasa: Amla & Madhura

Guna: Drava

Maamsa: Pork

Dugdha: Mahisha Dugdha

Phala: Badara

DISCUSSION AND CONCLUSION

Krimi Roga is a global health problem and is a matter of serious concern for the developing countries. Most important group of intestinal worms is Soil-transmitted helminthiasis (STH) infections, which are responsible for 27% of entire school-aged and preschool-aged children population in the World that need anthelmintic treatment.^[10] In last few years, use of herbal medicine in the treatment of worm infestation has been growing because of fewer side effects as compared to molecular medicines. Studies are being carried out nowadays on large scale to discover herbal alternatives for various allopathic medications. Because use of modern medication to treat worms are having side effects like hallucinations, fever, chills, confusion, nausea, vomiting, skin rashes, dark urine, blurred vision, seizures and jaundice. The existing review reveals prevention and Ayurvedic management of *Pureeshaja Krimiroga* (Intestinal worm infection) in children by *Prakruti Vighata*, *Nidana Parivarjana*, through improving their sanitary and living conditions by treatment of infested individuals and delivery of drinkable water. There is increasing number of controlled experimental studies required that aim to verify, validate and quantify plant activity in scientific manner.

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