



Review Article

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ABHYANTAR KRIMI (INTESTINAL WORM INFESTATION - PUREESHAJ KRIMI) AND THEIR MANAGEMENT: A REVIEW

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ABSTRACT

The utility of Ayurveda science is to preserve a healthy individual's health and to treat a patient's ailment. Ayurveda defines health as a balanced condition of *dosha*, *dhatu*, *agni*, *mala* and a pleasant state of soul, sense organs, and mind. In today's contemporary environment, there is less emphasis placed on health. In the midst of a flurry of labor, lower socioeconomic group members lack basic hygiene, literacy, and the usage of undercooked food or incorrect cleaning of food items, among other things. This is the main reason of *Abhyantar Krimi* (helminthiasis) in children, which is ignored by both parents and physicians as it is one of the common pediatric problems faced worldwide especially in tropical and subtropical geographical region. Helminthiasis is noticed, when it became severe and cause harm to the children. According to recent worldwide estimates, more than a quarter of the world's population is affected with one or more parasitic illnesses, the most frequent of which is round worm, *Ascaris lumbricoides*. Ayurveda classics have so many references of helminthiasis named as *Krimi roga*. Acharya states 20 type of *Krimi* classified as *Bahya* and *Abhyantar* in which helminthiasis can be correlated with *Pureeshaj Krimi*. *Krimighna* (anti helminthic) medicines are available in market, causing side effects like nausea, vomiting, lethargy, etc. Today's world, Medicinal plants are gaining relevance in the current day due to the different negative effects of modern medication and the less adverse effects of Indian medicinal herbs. Current article presented by the introduction of *Pureeshaj Krimi* and their management with herbs.

Keywords: Krimi, Pureeshaj Krimi, Bahya, Abhyantar, Herbs

INTRODUCTION

Food is regarded as an essential component of human life. The major reason of "worm" germination is contaminated food and environment. Health education and awareness play a very beneficial role in society. Healthy environment and hygienic food are the basic need for the population to remain uninfected and free from worm that causes helminthiasis. However, there is still a segment of the population that is plagued by parasitic infections that are wreaking havoc on their health. Community-based studies from India on prevalence of soil-transmitted helminth (STH) infections have reported estimates as high as 50% in children. However, prevalence estimates during pregnancy in India are lacking¹. In India, the prevalence ranges from 12.5% to 66%, with a varying prevalence for individual parasites² and these infections are common where the sanitation and hygiene is poor³. Worms are parasites, and the human body is their host. Worms are classified as endoparasites because they reside inside the body of their host. Intestinal infections are the most common. With increased morbidity, particularly in the pediatric age group, it is necessary to be familiar with the current etiopathological state of intestinal helminths. In underdeveloped nations, worm-infestation is a major source of concern for children's health. The term "HELMINTH" is derived from the Greek word helmin, which means "worms" and especially refers to intestinal worms.

Helminthes parasites are multicellular, bilaterally symmetrical animals with three germ layers. Higher animals, including humans, act as hosts for these parasites and their nutritional needs. Thus, helminthology is the study of harmful worms that live in the human body. In Ayurveda, the many kinds, diagnosis, and therapy of *Krimi roga* are detailed in all Samhitas. In Ayurveda classics the references of *Krimi Roga* can be correlate with Helminthiasis. This review article examines the notion of *Krimi*, specifically *Pureeshaj Krimi*, and its relationship with *Ascaris lumbricoides*, and its management protocol in Ayurveda.

General Introduction of *Krimi*: "*Krinathi himsathi ithi Krimi*"

⁴: Although the popular meaning of *Krimi* is worms, etymology defines it as the one who creates sufferings. *Krimi* are defined as those cause ill health and death can also occur due to this. Acharya such as Charaka⁵ and Sushruta⁶, Vagbhata⁷ and even modern writers have provided a systematic account of *Krimi rogas*, including categorization, causing factors, general description, signs and symptoms, therapy, and preventative measures. *Krimi*'s robe the digesting nutritive components through wall of intestine, which leads to *Rasa dhatu* deficit. *Krimi* is classified into three types based on its origin: *Kaphaja Krimi*, *Raktaj Krimi*, and *Pureeshaj Krimi*. The 20 illustrated *Krimi* are divided into two categories: *Bahya* (external) and *Abhyantar Krimi* (internal)⁸. *Pureeshaj Krimi* is among those who fall into

the latter category. *Ahara* as well as *vihara* both are causative factors of *Krimi*⁹. *Ahara* like milk, jaggery, sesame, fish, meat, and other things that induce *Kapha utklesha*, as well as foods that are unctuous, sweet, heavy, cold, and so on. *Vihara* like *divaswapna* (day sleep), *asana* and *avyayama* (prolonged sitting that shows a lack of exercise)¹⁰. Symptoms of worm infestations are *Jwara*, *Vivarnata*, *Shula*, *Hridroga*, *Sadana*, *Bhrama*, *Bhakatdvesha*, and *Atisara* etc.¹¹. Acharya Charaka mentioned various *vishesh roopas* (particular symptoms) such *pureeshabheda* (unformed faeces) and *karshya*, (emaciation), *lomaharsha* (cutis anserine), and so forth¹⁰. It has been claimed that the three types of therapy should be used in the following order: *apakarshana*, *prakriti vighata* is number two, *nidana parivarjana* is on number three¹². These are the general information in account of *Krimi* which are available in Ayurveda classics.

Number of Krimi: The same number of *Krimi* is not agreed upon by all authors. They considered various numbers; the work of a few of them is summarised. Classification of *Krimi* according to different Acharya.

Table 1: Classification of *Bahya* and *Abhyantar Krimi*¹²

Name of Author	Bahya Krimi	Kaphaja Krimi	Pureeshaj Krimi	Raktaj Krimi	Total
Charaka	2	7	5	6	20
Sushruta	-	6	7	7	20
Vagbhata	2	7	5	6	20

*Note; Kaphaja, Raktaj and Pureeshaj Krimi are Abhyantar Krimi.

Pureeshaj Krimi: *Pureesha* is a *sthula kitta ansha*¹³ (gross waste product) that results from food digestion. *Pureeshaj* signifies (that which is derived from *Pureesha*). *Pureeshaj Krimi* might thus be defined as the *Krimi* that originated or dwells in *Pureesha*.

Total number of *Pureeshaj Krimi* described in Ayurveda by various Acharya

1. **Charaka** (5) = *Leliha*, *Sashula*, *Sausurada*, *Kakeruka*, *Makeruka*.
2. **Sushruta** (7) = *Ajava*, *Bijawa*, *Gandupad*, *Kipyra*, *Chipya*, *Churu*, and *Dvimukh*.
3. **Madhav Nidana** (5) = similar to *Charaka*.
4. **Ashtanga Hridaya** (5) = similar to *Charaka*.

These *Krimi* have been named from their shape and the symptoms they cause. Except for *Sushruta*, all of the Acharya have delivered almost same terminology. *Sushruta* description also includes information regarding their morphology.

1. **Kakeruka:** There is no information known regarding this term.
2. **Makeruka:** This name refers to the Makara (crocodile). This category contains *Krimi* with rough ridges all over their bodies.
3. **Leliha:** This group includes *Krimi* that resemble the form of a snake.
4. **Sashula:** *Krimi* producing abdominal discomfort may be included in this category.
5. **Sausurada:** The *Krimi* of this group include those who produce discomfort in the big intestine by devouring its lumen. Except for *gandupada*, *dwimukha*, and *churu*, the other nomenclature provided by *Sushruta* has no connection to their meaning.¹⁴

Site of *Pureeshaj Krimi* according to different Acharya

1. *Charaka Samhita* = *Pakvashay*. (Small intestine and large intestine)
2. *Sushruta Samhita* = *Pakvashay*.
3. *Madhav Nidana* = *Pakvashay*.
4. *Harita Samhita* = *Malashay*. (Large intestine)
5. *Sharangdhara Samhita* = not mentioned.¹⁵

Nidana of *Pureeshaj Krimi*

1. *Charaka Samhita* = same as *Shleshmaja Krimi*. Causing factors are *guda*, *doodh*, *tila*, *anoop mansa*, and *mishtanna*, *paramanna*, *ajeerna bhojan*, *putiklinna*, *sankirna*, *viruddha* and *asatmya bhojan* etc.¹⁶
2. *Sushruta Samhita* = *Kapha Pitta prakop*¹⁷
3. *Dalhana* = Accumulation of faeces gives favourable environment for growth of *Krimi* as they are originating from vapours of faecal matter.¹⁴

Other following are the causes and ways of transmission of intestinal worms:

- 1) Contact with an infected person's faeces, such as when human excreta is used as fertiliser in farms or soiled diapers of children are cleaned. Children who come into touch with dirt that includes human faeces are more likely to become infected with intestinal worms.
- 2) Consuming contaminated food and drinking polluted water is another explanation.
- 3) Uncooked beef, hog, and fish flesh contains live worms.

Table 2: Symptoms of *Pureeshaj Krimi*¹⁸

Symptoms	Charaka	Sushruta	Ashtanga Samgraha
<i>Purishabheda</i>	+	-	+
<i>Karshya</i>	+	-	+
<i>Parushya</i>	+	-	+
<i>Lomaharsha</i>	+	-	+
<i>Gudanirgamana</i>	+	-	+
<i>Guda kandu</i>	+	-	+
<i>Shoola</i>	-	+	+
<i>Agnisadan</i>	-	+	+
<i>Pandu</i>	-	+	+
<i>Vishtambha</i>	-	+	+

Management of *Pureeshaj Krimi*

1. *Apakarshana*
2. *Prakriti Vighata*
3. *Nidana Parivarjana*¹⁹

Apakarshana: As the name implies, it relates to the extraction of *Krimi* in two methods.

- I. *Hasta / Yantra* (manual extraction) - visible *Krimi* must be manually retrieved using bare hands or *yantra* (instruments such as *Sandamsha*, for example).
- II. Therapeutic extraction by Ayurvedic herbs.
The different *shodhana* (purificatory treatments) that are to be performed consecutively on the same day for the strong ejection of the *Krimi*:
A. *Vamana* (emesis)
B. *Virechana* (purgation)
C. *Aasthapana Basti* (cleansing enema)
D. *Shiro Virechana* (errhines)

Prakriti Vighata: It refers to generating an undesirable environment or medium that is diametrically opposed to the infected region's home (intestinal lumen). This is performed by the use of medications such as *katu* (pungent), *tikta* (bitter), *kashaya* (astringent), *kshara* (caustic alkalise), and *ushna* (hot). The product rich in these properties are advised to take more than other food materials. *Maricha* (*Piper nigrum*), *Gandira* (*Amorphophallus campanulatus*), *Vidanga* (*Embelia ribes*), and other medications with *Krimighna* (anti-microbial) properties have been identified²⁰. Various classical formulations including *Danti* (*Baliospermum montanum*) and *Dravanti* (*Chlorophytum tuberosum*), *Tilvaka* (*Viburnum nervosum*) and *Udallaka* (*Bauhinia variegata*) in *Tilvaka* (*Viburnum nervosum*) *kashaya*, and so on, have also been reported¹⁴.

Nidana Parivarjana: Ayurveda emphasises the avoidance of causative causes in addition to the cessation of worms and therapeutic delivery. This includes avoiding incompatible foods, dirty foods, unfamiliar foods, undigested foods, and all of the other issues mentioned previously, such as milk. Although the preceding has been described in terms of cure, the observation of *nidana parivarjana* can also be interpreted in terms of prevention. It is in the idea of *nidana parivarjana* that Ayurveda differs in its approach to *Krimi*, allowing for both healing and prevention.

List of herbs beneficial for roundworms (*Pureeshaj Krimi*)²¹

1. *Hyoscyamus niger* with jaggery –removal of *Krimi*.
2. *Mallotus philippinensis* –mild purgative helps for expulsion of *Krimi*.
3. *Butea monosperma* = seeds have *lekhan, bhedan* property.

Taken with butter milk or rice water twice daily.²²

- Surasadi gana = Much effective in worms.
- *Aegle marmelos* = Anthelmintic kills worms. Used in anti-inflammatory condition of intestine.
- *Embelia ribes* = Anti-flatulent with laxative. Taken with jaggery helps in removal of worms.

Anthelmintic properties of some Ayurvedic Herbs

Vacha (*Acorus calamus*): The combination of *Acorus calamus* rhizomes and *Vitex negundo* root was shown to have substantial anthelmintic effect when tested on *Pheretima posthuma* (Indian earthworm)²⁶. According to the findings, *A. calamus* rhizomes have strong dose-dependent anthelmintic effects against intestinal helminths, and the active principle B-asarone has somewhat greater anthelmintic effects than crude extract.²³

Vasa (*Adhatoda vasica*): The crude aqueous extract of *Adhatoda vasica* roots shown relatively minor anthelmintic efficacy against a variety of gastrointestinal nematodes in sheep. Reduction in EPG (eggs per gramme of faeces) counts and/or worm recovery at necropsy have previously been used as criterion to evaluate plant anthelmintic effectiveness^{24,25}.

Neem (*Azadiracta indica*): Aqueous extract of neem displayed dose-dependent anthelmintic action, with maximal effectiveness at 40 mg/ml concentration for all three species of worms, Earthworm (*Pheretima posthuma*), Roundworm (*Ascaridia galli*), and Tapeworm (*Raillietina spiralis*). Plant extract was more effective against roundworm (*Ascaridia galli*) at the lowest dose (10 mg/ml). The extract's anthelmintic activity was compared to that of the standard medication Piperazine citrate (10 mg/ml). Neem, which has historically been used to treat intestinal worm infestations, has substantial anthelmintic action²⁶.

Palash (*Butea monosperma*): Palasonin, a substance derived from *Butea monosperma* seeds, shows anthelmintic activity²⁷. The anthelmintic action of *Butea monosperma* var. *lutea* aqueous and ethanolic extracts is connected to the presence of alkaloid and tannins in the extract²⁸.

Latakaranja (*Caesalpinia crista*): The whole plant and crude aqueous and methanolic extracts of the plant were tested on Trichostrongylid nematodes of sheep for adult motility assay and egg hatch test, and the plant demonstrated anthelmintic actions that are dosage and duration dependent by affecting worm death and egg hatching inhibition^{29,30}.

Kampillaka (*Mallotus philippinensis*): The anthelmintic action of the plant's resin on tape worm was investigated in albino rates,

with deadly effects of 35.69% and 78.21% in the small intestine at doses of 60 and 120 mg/kg, respectively^{29,30,31}.

Yavani (*Trachyspermum ammi*): Phytochemical tannins are chemically polyphenolic compounds that have been proven to induce anthelmintic actions. Tannins can attach to free proteins in the gastro intestinal tract of the host animal or glycoproteins on the cuticle of the parasite, causing death. The aqueous extract of *Trachyspermum ammi* seeds at a higher concentration (40 mg/ml) demonstrated good anthelmintic activity, and the alcoholic extract of *Trachyspermum ammi* at a normal concentration demonstrated good anthelmintic activity when compared to the effect produced by the reference standard drug albendazole. This experimental data demonstrated anthelmintic action³².

Methika (*Trigonella foenum-graecum*): When compared to commonly used drugs, the seeds of *Trigonella foenum-graecum* demonstrate powerful anthelmintic efficacy. It is equivalent to normal medication. Aqueous and alcoholic extracts caused earthworm paralysis and death when compared to albendazole as a reference medicine at the same concentration. When compared to the same concentration of reference medicine, an alcoholic extract at 60 mg/ml took less time to elicit paralysis and a bit longer to cause earthworm death³³.

Gokshura (*Tribulus terrestris*): Extracts of *Tribulus terrestris* fruit have strong and far superior antibacterial and anthelmintic activities³⁴. Anthelmintic activity of *Rheum palmatum* methanolic extract and *Tribulus terrestris* petroleum ether extract was investigated. In dose-dependent mannequin tests, both extracts demonstrated anthelmintic action³⁵.

Tulsi (*Ocimum sanctum*): Tulsi leaves have anthelmintic properties and can reduce vomiting³⁶. The essential oil of *Ocimum sanctum* L shown substantial anthelmintic action in *Caenorhabditis elegans* (nematode), and eugenol, the essential oil's major component, is proposed as the anthelmintic principle³⁷.

Sheesham (*Dalbergia sissoo*): The anthelmintic activity of *Dalbergia sissoo* ethanolic extract Roxb bark was equivalent to the usual medications, causing worm paralysis and death in a manner similar to Piperazine citrate and albendazole. The anthelmintic action was tested on adult Indian earthworm *Pheretima posthuma* as well as human worm parasite *Ascaridia galli* (nematodes)¹⁰.

DISCUSSION

If there is an excess of *Kleda* and *Ama* in the human body, it causes *agnimandya* and increases the likelihood of production. *Pureeshaj Krimi* development is accelerated because *Kleda* and *Ama* serve as the foundation for *krimi utpatti*. *masha, guda, pishmma, tila, snigdha* and *sheet ahar, lavana rasatmak ahar, anoop mansa, madhura rasatmak ahara, kusumbha sneha, viruddha ahar, avyayama, paryushit ahara, divaswapna* and *asatmya ahara* are regarded the key causative elements for *Pureeshaj krimi*. Eating outside food such as fast food, bakery products, has the traits of *ushna, trishna, vidahi*, and *guru* (heavy for digestion). ingested food goes in *pakvashay*, also known as the *sthana* for *Pureeshaj Krimi*, is a section of the intestine located between the Ileocecal junction and the sigmoid colon. According to current parasitology, organisms such as *Ascaris lumbricoides* (round worms), hook worms, and others live in the same area. The shape of *Pureeshaj Krimi* is *sookshma* (minute), *vritha* (round), *deergha* (long), *sthoola* (large), *prithavapucksa* (flat tail), and *tanu* (thin)¹⁰ have all been used to characterise *Pureeshaj Krimi*. *Ascaris lumbricoides*, on the other hand, has

been discovered as a spherical, elongated worm reaching 15-30 cm in males and 20-40 cm in females, with curving proximities and an extended and flat tail end and *varna* of *Pureeshaj Krimi* are *shweta* (white), *shyava* (pale), *neela* (blue), *harita* (green), *peeta* (yellow)¹⁰ on the other hand *Ascaris* worms, are pinkish white and occasionally yellowish in hue. A try has been made to correlate the *Pureeshaj krimi* to the *Ascaris lumbricoides* from its origin, transmission, symptoms, diagnosis and management.

CONCLUSION

Worm infestations are mostly in paediatric age group. Children are the future of the upcoming time. These worms like round worm and hook worm mostly affects the growth of the children and also affect the internal system. Helminthiasis remains unnoticed until it causes any severe problem to the children so, there is need to take attention on the helminthiasis in children to promote growth of children. Many Modern medications are available in the market though there are side effects of these medicines. Indian system of medicine contains so many herbs and formulations which are very beneficial to children without causing any side effects. An attempt has been taken to enlighten the most burning topic in the paediatric age group.

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