



REVIEW ARTICLE

CONCEPT OF KRIMI IN PERSPECTIVE OF MODERN ERA-A REVIEW

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ABSTRACT

Abstract: The existence of *Krimi* is not a new concept. From the *Vedic* period to *Samhita* period description of *Krimi* is found. Here all visible and invisible *Krimi* are described. Though there was no microscope at that period but they felt the existence of invisible *Krimi* also. Their mode of transmission, sign and symptom are almost same as worm and microbes in contemporary science. They had given description of structure, naming of *Krimias* far as possible. But worms and microbes are described in contemporary science separately. *Acharyas* also described epidemic diseases, contagious diseases in the context of *Janapadodhwamsa* and *Upasargika Roga*. Keeping these views it is try to describe about concept of *Krimi* in contemporary science.

Key words- *Krimi*, Worm, Microbes, *Janapadodhwamsa*, *Upasargika roga*

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INTRODUCTION

Krimi in *Ayurveda* in broad sense is all worms and microbes. Description of *Krimi* is found since *Vedic* period. The Visible or invisible subtle organisms that affect the living & non living things of biosphere are described very scientifically in *Ayurvedic* texts. In *Samhita* period there is an enough description about classification, *Nidana* (causes), *Chikitsa* (treatment) of *Krimija Rogas* are found. It is also found that the Infectious diseases are also mentioned in *Samhita Granthas* as *Sankramaka*, and *Upsargaja roga*. As in contemporary science there is separate branch of helminthology and microbiology but in *Ayurveda* the word *Krimi* is for all worm and microbes either it is visible or invisible. Now-a-days through microscope almost all microbes can be visible but in the Vedic era Germs are considered as *Krimi*, *Rakshas*, *Raksha*, *Pichas*, *Yatu*, *Yatudhan*, *Kimidi*, *Gandhrava*, *Apsara* etc. even the human also originated from Golden-germ. Their (Krimi) origin (*Utpatti Sthanas*) are *Parvata* (mountain), *Vana* (forest), *Oushadhi* (plants), *Pashu* (animals), *Apsu* (water)^[1] etc. Except these our *Acharya* said very beautifully about the *Krimi* which resides in our body in different site means the organism invading in our body and locate in some particular site and produced various diseases. In contemporary science it is said that there are some beneficial microbes and some

are harmful, they described all but in *Samhita* period there is no broad description of beneficial *Krimi*. They limit this portion by using the word *Sahaja* which means *avaikarika*.^[2] In ancient time the existence of *Krimi* was detected by *Anumana*, by watching sign and symptoms or by the super-human power of the sages. They felt about the contagious and epidemic diseases so described about *Janapadodhwamsa* and *Upasargika Roga* which is also on the basis of *Anumana*.

Literary Review

Etymology: The word *Krimi* is derived from *dhatu* 'Kujna Himsayam' (*sidhantakaumudi*)

which means to kill or to yield harmful effect.

Acharya Yashka has given the meaning of *Krimi* in the following way

1. Which means those organisms which grow on raw flesh
2. That which moves with legs

In *Atharvaveda* the following synonyms are used for *Krimi*

Rakshas : the organism which is a parasite of man. Hence it is required to protect the body from these organisms. These killed in lonely place and roam in night. (nirukta 4/18)

Pishacha : which eat raw flesh (vachspatya)

Yatudhana : which cause pain (sabdakalpadruma)

Kimidi : which can penetrate. (nirukta 6/11)

Gandharva : they are attracted by both smell and appearance (Satapathabrahmana 9/4/1/4)

Apsara : which lives in water(Satapathabrahmana 10/5/2/20)

Historical review of *Krimi* :

In *Vedic* period:

In *Rigveda*

In *Rigveda* there is description of *Durnama* and amoeba *Krimi*,^[3] affects the *Garbhyantra* and leads to *Garbhanasha*.^[4]

In *Yajurveda* :

Yajurveda describes the development of diseases by the *Krimi* present in utensils after eating food.^[5]

In *Atharvaveda*

In *Atharvaveda* two types of *Krimi* are described – ‘*Drishya*’ & ‘*Adrishya*’. The ‘*Kururu*’, ‘*Alagandu*’ and ‘*Shaluna*’ are said causes diseases due to lack of hygiene^[6]

Atharvaveda explained that there is *krimi* which causes diseases *rajyakshma* from one person to other by bird^[7], and mentioned that the micro-organisms may live in milk, butter milk and different type of food^[8]; they enter into human body and produces diseases.

Some examples of *Krimi* those are mentioned in *Atharvaveda* like *Atrina* (which eat), *Anvaantrya* (lives in intestine), *Asrikpawa* (which take blood), *Udumbal*(killer), *Ejatka* (which make shiver the body), *Yatumana* (which give pain), *Sirshyanya*(lives in head)

In ayurvedic text

After *Vedic* period the description of *Krimi* is found in *Samhita Kala*, in 1000 BC in *Caraka Samhita* details of *Krimiroga* is found in *Vimansthana*, in the parlance of *KrimijaHridroga&Shirashoola*, and indirectly in *Janapadodhwamsa* chapter. In *SusrutaSamhita*(600-400 BC) description of *Krimi* found in *KrimirogaNidana* and *Chikitsa*. *Caraka* was mentioned about *BahyaKrimi*, where *AcharyaSusruta* was silent about it. *Susruta* in *KusthaNidana* chapter said about that *Kustha* is a *Upasargika Roga*^[9] which means it is a contagious disease, where infection occur and microbes is responsible for it, from this it can say that *Krimi* is responsible for contagious diseases. Both of them consider *Kaphaja*, *Raktaja* and *PurishajaKrimi* but no. and name were different. In 5th century *Vagbhata* follow *Caraka* in case of classification. He also mentioned *Chikitsa* and about *KrimijaShiraroga*. In 7th century *Madhavkara* described about *BahyaKrimi* and *Abhyantara Krimi*.^[10] In 13th century *Sarangadhara* also mentioned about *Bahya* and *AbhyantaraKrimi*,^[11] but he also mentioned about *BranajaKrimi*.^[12] So, it is clear that we may get a complete knowledge about *Krimi* with the help of all *SamhitaGranthas*.

Table No.1: Classification of *Krimi* according to *Caraka* and *Madhavkara*

According to function	According to location	According to cause	According to Name
<i>Sahaja</i>	<i>Bahya</i>	<i>Purishaja</i>	<i>Bahya-1.Yuka,2. likha</i>

<i>Vaikarika</i>	<i>Abhyantara</i>	<i>Kaphaja</i> <i>Raktaja</i> <i>Malaja</i>	<i>Abhyanatra</i> – 1. <i>Purishaja-Kakeruka, Makeruka, Leliha, Sashulak, Sausarad</i> 2. <i>Raktaja : Kesad, Lomad, Lomdipa, Sauras, Udumbara, Jantumata</i> 3. <i>Kaphaja: Antarad, Udarad, Hridayad, SuruDarbhpushpa, Saugandhika</i>
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Krimi and worms: Worms are described in helminthology. Here all parasitic worms are described. Some *Krimi* can be correlated with worms in which *KaphajaKrimi* are reside in *Amasaya* [13] and *Purishajakrimis* are reside in *Pakwasaya* [14]. Based on their shape and other characteristics, helminthes are classified into two broad groups-[15]

1.class Phylum Nematelminthes-cylindrical worms

2.class Phylum Platyhelminthes- flat worms –i) Class Trematoda or flukes

ii) Class Cestoda or tapeworm

KaphajaKrimi circulate in upward and downward direction from *Amasaya* (~stomach). [16] So worm can move upto these region. The *PurishajaKrimi* circulates towards downwards and when increases they move towards *Amasaya* (~stomach). [17]

Table no. 2: Location of some helminthes in the following region.

Trematoda [18]	Cestoda [19]	Nematodes [20]
Biliary tract(liver flukes):e.g. Clonorchissinensis gastrointestinal tract(intestinal flukes): small intestine- e.g. Heterphyesheterphyes Large intestine-e.g. Gastrodiscoideshominis Respiratory tract(lung fluke) e.g. Paragonimuswestermani	Adult worm in human intestine- Diphyllbothrium, Taeniasaginata, Taeniasolium, Hymenolepis nana, rarely Hymenolepisdiminuta and Dipylidiumcaninum	Smallintestine-Ascaris, Ancylostoma, Necator, Strongyloides, Trichinella Large intestine- Enterobious, Trichuris

Table 3: Some examples of common worm which can be correlated with *Krimi*

Characteristic	Worm	<i>Krimi</i>
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Morphology	Shape	Stout, cylindrical-e.g.hook worm ^[21] , large cylindrical worms, with tapering ends- e.g.round worm ^[22] short, fusiform worms with pointed ends, looking like bits of white thread- e.g. pin worm ^[23]	<i>Prithu</i> (large/board/wide), <i>Gandupada</i> (earthworm like), <i>Dhanyaankur</i> (sprout/ bud/shoot), <i>Tanu</i> (short), <i>Dirgha</i> (long), <i>Anava</i> (minute), <i>Vritta</i> (round), <i>Sthula</i> (large) ^{[24],[25]}
	Colour	pale pink or grayish white, white(tape worm, pin worm) black(liver fluke almost bright red to black in colour), yellowish(<i>dipylidiumcaninum</i> , it is dog tapeworm), brown(spider worm), red(red worm) ^[26]	<i>Sweta</i> /sita(white), <i>Tamra</i> (coppery/reddish brown), <i>Pita</i> (yellow), <i>Asita</i> (black) ^{[27],[28]}
Sign and symptom		Anemia,.Constipation,Diarrhoea,Fatigue ,GasandStomachBloating,Nervousness, Distended belly , Loss of appetite,Vomiting,Itchy anus,Loose bowel movements or diarrhea ,Itchy skin rash,Swelling around the eyes,During sleep, some worms may leave the body through the mouth, nose or anus ^[29] Hookworm can also produce abdominal pain, weight loss and diarrhea. Roundworm, or ascariasis, can cause severe abdominal pain and vomiting ^[30]	<i>Hrillas</i> (nausea), <i>Asyasravana</i> (excessive salivation), <i>Avipakama</i> (indigestion), <i>Arochaka</i> (anorexia), <i>Murccha</i> (fainting/nervousness), <i>Chardi</i> (vomiting), <i>Jwar</i> (fever), <i>Anaha/Vistambha</i> (constipation), <i>Karshya</i> (emaciation), <i>Khavathu</i> (sneezing), <i>Pinasha</i> (nasal catarrh), <i>Vidbheda</i> (diarrhea), <i>Shoola</i> (colic), <i>Parushya</i> (roughness), <i>Panduta</i> (pallor), <i>Agnisadana</i> (poor digestion), <i>Guda Kandu</i> (itchy anus), <i>Vimarga</i> (leave the body through the mouth, nose or anus) ^{[31],[32]}

<p>Causes /Nidana</p>	<p>Raw unwashed vegetables, undercooked infected meat of domestic pig, freshwater fish or wild animals (bear, walrus, etc.)From sugar, refined carbohydrates, alcohol [33] /</p>	<p>Saka(vegetable), Matsya(fish), Mamsa(meat), Guda (jaggery, contain sucrose),Masha(Phaseolusmungo), Pistanna(sugar containing substance) Sukta(~alcoholic substance), [34]</p>
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Krimi and microbes: Microbes are described in microbiology. Microbiology is the study of microorganisms, most of which are too small to be seen with the naked eye, including bacteria, algae, protozoa, and fungi, as well as acellular agents, such as viruses. Some microbes (e.g., algae and fungi) are large enough to be visible, but are still included in the field of microbiology; it has been suggested that microbiology be defined not only by the size of the organisms studied but by techniques employed to study them (isolation, sterilization, culture in artificial media) [35]

Invisible living creatures were thought to exist and were thought to be responsible for disease long before they were observed. [36]

RaktajaKrimi are those which reside in *RaktavahiSira*, they are very minute, without

legs, *Round* and *Tamra* (coppery colour). Some of them can't be visualized by naked eyes. These are 6 in number. In *Ayurvedic* text it is mentioned that these type of *Krimi* produced *Kustha* like diseases, *Kesh*, *Nakh*, *Lomaupadhwamsa*, *Branagata*, *Twak*, *Sira*, *Snayu*, *Mamsa*, *TarunasthiBhakshana*. [37]

Some microbes are found in blood stream. Here we make some examples of etiological agents of bloodstream infections [38] like-

Bacteria – e.g. staphylococcus aureus, beta-haemolytic streptococci, klebsiella pneumonia etc.

Virus-e.g. HIV, Epstein Barr, Cytomegalo virus
 Fungi- e.g. candida, cryptococcus, coccidioides immitis etc.

Parasites- e.g. Plasmodium, trypanosome, Babesia, wuchereria etc.

Table no. 4: Some examples of common microbes of blood stream which can be correlated with *Raktaja Krimi*

	Microbes	<i>Krimi</i>
Morphology	Microscopic	Which are invisible due to subtle nature (<i>Sukshmaadardrashanat</i>) [39]

Media for growth/ nidan for raktajakrimi	Blood agar- e.g. Staphylococcus, streptococcus, neisseria [40],[41],[42] Blood – e.g. plasmodium vivax(erythrocyte) [43] Sugar– e.g. glucose broth (streptococcus),virus, fungi(Sabouraud dextrose agar) [44],[45],[46]	<i>Rakta</i> (because <i>Raktaja Krimi</i> survive in <i>RaktavahiniSira</i>) <i>Madhura Dravya</i> -(which contain sugar) <i>Pistanna</i> –different type of sugar containing food. <i>Guda</i> (jaggery)- it contain sucrose(sugar) [47]
Sign and symptom	Damaged skin-staphylococcus [48] Impetigo –streptococcus pyogenes [49] Wound or burn-streptococcus pyogenes [50] Nerve damage- e.g. in HIV [51] pyomyositis,Chondritis e.g. staphylococcus aureus [52] Nail and body hair damage in – beta haemolytic streptococci [53]	Symptoms like <i>Kustha</i> Symptoms like <i>Kustha</i> <i>Branagata</i> <i>SnayuBhakshana</i> <i>Mamsabhakshana,Tarunasthibhakshana</i> <i>Nakhaand Loma Dhwamsa.</i> [54]

PurishajaKrimis are reside in intestine. In *Ayurvedic* text it is not mentioned that these are invisible but in modern science there are some microbes found in intestine which causes gastroenteritis. In gastroenteritis diarrhoea, dysentery, tenesmus, vomiting etc. occur. In *PurishajaKrimi* also *Malabheda, Shoola, Krishata, Agnimandya* etc. occur.

Some examples of etiological agents of gastroenteritis infections [55]

Bacteria – vibrio cholera, E. coli, Salmonella species, Shigella species etc.

Virus- Rotavirus, adenovirus, Astrovirus

Fungi- Candida albicans

Parasites- E. histolytica, B.coli, T. solium, H. nana etc.

***Krimi* and *Janapadodhwamsarogas* (Epidemic or Endemic Diseases)**

In *VimansthanaChakrapani* said, the commentator of *Charakathat* though the individuals have difference in physical constitution(*Prakriti*), food habits(*Ahara*), suitability(*Satmya*), strength(*Bala*), age(*Vaya*) etc. still there are some factors which are common to all individuals and vitiation of these factors produce diseases of same symptoms at same time and cover a huge area and destruct the community. The factors which are common for all the individual of a country are air, water, land and season. [64]*Charaka* has divided the etiological factors into *Sadharana* and *AsadharanaHetu*. The *AsadharanaHetu* are the inevitable disastrous factors includes the harmful effects of *Ahara, Vihar* which vitiates *Vata, Pitta* and *Kapha* whereas the *SadharanaHetu* are the evitable disastrous



***Krimi* and *Upasargicrogas* (Contagious Diseases)**

Diseases which is spread from one person to another by contact is termed as *SankramikaRogas*. *Sushruta* has mentioned that diseases (*UpasargikaRogas*) like kushta (skin disorder), *Jwara* (fever), *Sosha*(tuberculosis), *Netrabhishyanda* (conjunctivitis) etc. infectious diseases spread from one person to the other. The exposure or contact can be a simple association, touch, inhalation of other's expired air, eating together, sleeping & lying together and wearing other's clothes, using cosmetics of others etc things.^[66] Even sexual contact with an infected person can give rise so many sexual transmitted diseases. According to modern science there are mainly 3 routes by which infection can occur. These are- skin, nasal, and faecoral route.

By skin- syphilis, gonorrhea, titany, erysipelas and measles

By nasal – tuberculosis, influenza, rhinnorea, whooping cough, pneumonia, etc.

By faecoral route- typhoid, diarrhea, cholera etc.

Even though the Ancient authors not clearly described about the various modes infectious diseases transmission, but we can understand from the above statement that the some infectious diseases will spread by direct skin contact or use of used articles of the patient (*Kushta*, *Netrabhishyanda*etc),^[67] some by

direct droplet infection (*Yakshmaetc*)^[68], some by oral ingestion (*Jwaraetc*)^[69], some by sexual intercourse (*Upadamsaetc*).^[70] In this way the authors of ancient *Ayurvedic* texts have highlighted the infectious diseases.

DISCUSSION

The word *Krimi* broadly described for worms, microbes. From the *Vedic* period its existence was felt. But details of it is somewhat found in later period. In modern science due to invention of microscope the study of microbes become easy. Among the two types of *Krimi* – *Drishya* and *Adrisya*, the *adrisya* one is *Anumangamya*. The three types of *RogiPariksha* mentioned in ayurvedic text among which *Anumana* is used for *AdrishyaKrimi*. Though there was no microscope but with the help of *AnumanPramanait* was felt the existence of *Kimi* by analysis the sign and symptom. Though there is mention of *Krimi* in different *Veda* but there is somewhat difference in references to diseases. According to *Rigveda* there is a particular *Krimi* that affects the “*Garbhayantra*” and causes to “*Grabhanasha*” is the infections of vagina, *Yajurveda* describes the *Krimicausing* headache and abdominal pain. In *Atharvaveda* two types of *Krimi* are described as ‘*Drishya*’ & ‘*Adrishya*’. *Atharvaveda* explained that the micro-organisms can originate, from plants, water, earth and forest, they enter into human body and produces diseases. In *Samhita* period

mainly two types – *Bahya* and *Abhyantara* is found. In *CarakaSamhitaJanapadodhwamsa*, can be correlated to endemic/pandemic, which is supported by *AdrishyaKrimi* existed in environment according to *Atharvaveda* and produced diseases. Again *Susruta* mentioned about *UpasargikaRogas* which mode of transmission support the infectious diseases. *Krimis* which can be visualized may compare as adult worm and which never visualized with naked eye may be considered as larva stage of worm and microbes. The description of various types of *krimi* as a whole found in different texts of *Ayurveda*. They had given stress towards *KaphajaKrimi*, *RaktajaKrimi*, and *PurishajaKrimi*, and in case of *RaktajaKrimi* they mentioned the word *Adarshanator* invisible for some types(*Krimi*) but did not used the same term for *PurishajaKrimi*, and *KaphajaKrimi*. But now aday's some microbes are found in intestine, stomach, respiratory system which cannot be visualized through naked eye, which can be considered as *PurishajaKrimi* and *KaphajaKrimi*. In case of *Purishaja* and *KaphajaKrimi* it is found that they move upward and downward direction, means we can include here all the worms or microorganism reside in liver, bile duct, respiratory system, mouth,anus etc. In case of characteristics of *Krimi* it is mentioned some specific characteristic.The *Nidana* mentioned for different *Krimi* may be compare with the source of infection and different media for the

growth, because both this help in growing (as a nutrient) of the microbes for causing or aggravating the diseases.

CONCLUSION

The concept of *Krimi* is not new. From the period of *Veda* its existence was felt. All the microbes exists in environment and in our body and worm can be considered as *Krimi*. That consideration may make a new avenue to think about its remedy.

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