REDVET - Revista electrónica de Veterinaria - ISSN 1695-7504
Vol 25, No. 1 (2024)
http://www.veterinaria.org

A comparative study of Vidanga (*Embelia ribes*) & Shigru (*Moringa oleifera*) on Krimiroga with special reference to intestinal worms.

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ABSTRACT
Krimi (parasitic infestations) have been identified as a serious global public health issue (WHO, 1967; Wandan, 1983; McLaren, 1984). This concern holds equal relevance in our country, where children are disproportionately affected compared to adults (CCRAS, 1987). Krimi hinder an individual's growth and development, contribute to malnutrition, and weaken the immune system; therefore, addressing this issue effectively is essential. In some cases, Krimi may even lead to the death of an affected person. Vidanga Beeja Churna (*Embelia ribes*) and Shigru Patra Churna (Moringa oleifera) were used in the present comparative study. Most patients suffering from worm infestation exhibited facial discoloration (Vivarnata). 'Vivarnata' has been described by Acharya Charaka as one of the symptoms (Lakshana) of Purishaja Krimi and is also mentioned under Rasavaha Srotodusti Lakshana. Krimis deplete the body's nutritive essence by absorbing it through the intestinal wall—nutrients which the body acquires with great effort. This results in a deficiency of Rasa Dhatu. According to the principle of Dhatu Poshana Nyaya, if Rasa Dhatu is insufficient, the formation of subsequent Dhatus is impaired, ultimately leading to weak resistance and poor immunity.

Keywords: *Vidanga; Embelia ribes; Shigru; Moringa oleifera; Krimiroga; worm; krimighna.*

INTRODUCTION

The Ayurvedic science has been taking care of mankind since ancient time. Ancient Acharyas were well aware regarding the presence of microorganisms. Acharyas described Krimi very beautifully which lives in our body in different site means the organism invading in our body and locate in some particular site and produce various diseases. Modern science said that there are some beneficial microorganisms and some are harmful, this is previously mentioned in Samhita period but there is no broad description of beneficial Krimi. For this they are using the word Sahaja Krimi which means avaikarika (non-pathogenic) [1]. Ayurvedic medicinal system is oldest in origin with treasures of knowledge about practices. It works with the purpose of perfect health of human being i.e, physically or mentally free from diseases and has no pain.

Ayurveda is one of the world's oldest medical systems. Since the ancient period, Krimi roga (worm infestations) are present with worldwide cosmopolitan distribution among different classes. India is widely prevalent Asian country with 60% to 80% estimated cases found in West Bengal, Bihar, Orissa, Punjab, Tamil Nādu and Andhrapradesh. The greater infestations in our country are due to improper unhygienic diet and behavior due to illiteracy triggered by environmental and socio-economic status make the burden of severe nutritional deficiencies, anaemia and death. All microorganisms like bacteria, virus, parasite and fungus can be included under the word Krimi. Modern science has their own kind of division mainly in intestinal worms. (1) Flatworms (2) Roundworms (3) Hookworms (4) Pinworms (5) Whipworms

Ayurveda has dealt with the prevention and cure of the disease by introduction of herbs, minerals, organic compounds etc. The terminology "Krimi" may be correlated with helminths or parasites or microbial agents of modern medicine. As krimi is responsible for causation of several diseases and there are several herbs that have been used in Ayurveda to kill krimi, or to restrict the multiplication of Krimi and also to wash out krimi from the host's intestine. Vidanga & Shigru are some of such krimighna dravya (Anthelminthic agent) which has been mentioned by different ancient classics. More than 1.5 billion people, or 24% of the world's population are infected with soil-transmitted helminth infections worldwide. Intestinal parasitic infections are a major source of health concern in India like in any other developing nations. The overall prevalence of intestinal infections, caused by enteric parasites ranges from 12.5-67% in India. Lot of complications can occur in helminth infection, which may include anaemia, malnutrition, growth retardation, intestinal obstruction, gastrointestinal hemorrhage, etc.

The success of eradication of this infectious disease gravely depends to a large extent upon various environmental, social and economic factors. Effective and specific treatment followed by personal and group hygiene may be necessary for the control and prevention of this disorder. Ayurveda is a holistic science which treats patient as a whole rather than treating his symptoms as separate entity. It provides preventive, curative as well as promotive aspect.
Clinical trial of drugs or a therapy plays a very much important part in the work specially in clinical subject. So, trial of two single drugs was planned here in this study.

AIMS & OBJECTIVES
To compare the clinical effect of Vidanga churna & Sigru churna in Krimiroga. and to study the complication if any occurs during the course of treatment.

MATERIALS AND METHODS
Inclusion Criteria
- Patients having classical symptomatology of Krimiroga were selected from OPD of Govt. Ayurvedic College and Hospital, Patna irrespective of caste, sex, habitat, religion, occupation etc. It consists of Sixty adult patients enrolled for treatment of this ailment after obtaining informed consent.
- Patients willing for trial
- Patients having signs and symptoms based on both Ayurvedic as well as modern views.
- Age group of patients will be between 18-60 years.
- Chronicity less than 10 years.
- Prefer more acute cases with less sign & symptom.

Exclusion criteria:
- Less than 18 years & more than 60 years
- Pregnancy
- Patients suffering from chronic diseases like TB, Cancer, Cardiac Complications
- Newly married ladies and women having desire of conceiving.
- Patient of other than round worm infestation

Sample size: As per the prevalence of the disease 120 should be the sample size for getting efficient results. But due to limitation of time and resources, only 60 patients were taken. All the screened and selected cases were divided randomly into three groups of 20 patients each as Group A, Group B and Group C.

Criteria for diagnosis: A special proforma was prepared including all signs and symptoms of Krimiroga as per ayurvedic classics. It also includes points regarding the state of dosha, dushya, desha, kala, rog & rogi bal, prakriti, satwa, satmya etc. A detailed clinical history was taken of each patient on the basis of case proforma. To exclude other conditions hematological and biochemical examinations were carried out.

Laboratory Investigation: The following laboratory investigation were under taken in each case just before beginning of drug trial and after completion of the study.
- Stool - Routine and microscopic examination
- Blood - Hb%, TLC, DC, ESR

Study Design:
- Single blind method.
- Randomized
- Efficacy study
- Clinical study
- Comparative study

Table 1: Trial Drug & Its Administration Chart:

Particulars	Group A	Group B	Group C
Trial drug	Vidanga beej churna	Sigru patra churna	Vidanga beej churna + Sigru patra churna
Dose	3 gm	3 gm	1.5 gm + 1.5 gm
Route of administration	Oral	Oral	Oral
Time of administration	BD	BD	BD
Duration of therapy	2 weeks	2 weeks	2 weeks
No. of Patients	20	20	20
Anupan	Guda	Guda	Guda

Method of Study:
- Selection of the patient on the base of complaints and stool report
- Routine laboratory investigation and sign and symptoms scoring have been carried out before and after treatment.
- Proper administration of the drug should be done perfectly during treatment time (2 weeks).
- Trial drugs were assessed on the basis of clinical observation in course of the treatment, especially the sign and symptoms beside the laboratory investigation before and after the course of treatment.
- The result was assessed and comparison of both drugs were done.

A) Qualitative variable:
- Loss of appetite (Bhaktadvesha)
- Itching in anal region (Gudakandu)
- Discoloration of skin (Vivarnata)
- Abdominal pain
- Anorexia
- Weight loss
- Headache
- Anemia & Pale face
- Fever
- Diarrhea
- Nausea
- Vomiting

B) Quantitative variable (Laboratory investigation)
- Stool RE & ME
- Hb%
- TLC
- ESR
- Neutrophil
- Lymphocytes
- Eosinophils
- Monocytes

Criteria of Assessment:
Cured: This was decided on the basis of following two points.
- Complete relief in the initial chief complaints of the patient along with the positive improvement (100% relief in signs and symptoms).
- Complete absence of ova / cyst in stool confirmed by stool microscopic examination by three subsequent stool tests.

Markedly relief: More than 75% relief in signs and symptoms.
Moderate improvement: 50-75% relief in signs and symptoms.
Mild improvement: 25-50% relief in signs and symptoms.
No relief: less than 25% relief in signs and symptoms. This was the group of patients which did not report either symptomatic relief in their basic complain and not have negative stool examination report after treatment.
Statistical Analysis: 'Paired t test' Was carried out at the level of > 0.05, <0.05, <0.01, <0.001 of P level. The obtained results were thus interpreted as
- $P > 0.05$ – Insignificant
- $P < 0.05$ – Improvement
- $P < 0.01$ – Significant Improvement
- $P < 0.001$ – Highly significant

OBSERVATIONS AND RESULTS

Table 2: Distribution of patients group wise:

Type	Group A	Group B
Registered	20	20
Completed	19	17
Discontinued	01	03

Effect of trial drugs on Cardinal Sign & Symptoms of Krimi:

Table 3. Effect of trial drugs on Bhaktadwesha

Group	Mean		D	% relief	SD	SE	't' value	'p' value	S
	BT	AT							
A	1.50	0.43	1.07	71.43	0.47	0.13	8.45	<0.001	HS
B	1.71	0.50	1.21	70.83	0.58	0.21	4.69	<0.001	HS

In Group A - The mean grade of Bhaktadwesha before treatment was 1.5, it lowered down to 0.43 with SD± 0.47, SE± 0.13, giving a relief of 71.43 % with 't' value of 8.45 ($p<0.001$) which was statistically highly significant. In Group B - The mean grade of Bhaktadwesha before treatment was 1.71, it lowered down to 0.50 with SD± 0.58, SE± 0.21, giving a relief of 70.83 % with 't' value of 4.69 ($p<0.001$) which was statistically highly significant.

Table 4. Effect of trial drugs on Vivarnata

Group	Mean		D	% relief	SD	SE	't' value	'p' value	S
	BT	AT							
A	1.77	0.65	1.12	71.23	0.47	0.13	8.45	<0.001	HS
B	1.75	0.56	0.19	67.86	0.54	0.14	8.73	<0.001	HS

In Group A - The mean grade of Vivarnata before treatment was 1.77, it lowered down to 0.65 with SD± 0.47, SE± 0.13, giving a relief of 71.23 % with 't' value of 8.45 ($p<0.001$) which was statistically highly significant. In Group B - The mean grade of Vivarnata before treatment was 1.75, it lowered down to 0.56 with SD± 0.54, SE± 0.14, giving a relief of 67.86 % with 't' value of 8.73 ($p<0.001$) which was statistically highly significant.

Table 5. Effect of trial drugs on Gudakandu

Group	Mean		D	% relief	SD	SE	't' value	'p' value	S
	BT	AT							
A	2	1.16	0.83	71.66	0.40	0.16	5	<0.001	HS
B	1.71	0.50	1.21	70.83	0.58	0.21	4.69	<0.001	HS

In Group A - The mean grade of Gudakandu before treatment was 2, it lowered down to 1.16 with SD± 0.40, SE± 0.16, giving a relief of 71.66 % with 't' value of 5 ($p<0.001$) which was statistically highly significant. In Group B - The mean grade of Gudakandu before treatment was 1.71, it lowered down to 0.50 with SD± 0.58, SE± 0.21, giving a relief of 70.83 % with 't' value of 4.69 ($p<0.001$) which was statistically highly significant.

Table 6. Effect of trial drugs on Atisar

Group	Mean		D	% relief	SD	SE	't' value	'p' value	S
	BT	AT							
A	2.6	0.8	1.8	69.23	0.83	0.37	4.81	>0.01	S
B	1.66	1.0	0.66	40.00	0.51	0.21	3.16	<0.05	S

In Group A - The mean grade of Atisar before treatment was 2.6, it lowered down to 0.8 with SD± 0.83, SE± 0.37, giving a relief of 69.23 % with 't' value of 4.81 ($p>0.01$) which was statistically significant. In Group B - The mean grade of Atisar before treatment was 1.66, it lowered down to 1.0 with SD± 0.51, SE± 0.21, giving a relief of 40.00 % with 't' value of 3.16 ($p<0.05$) which was statistically significant.

Effect of trial drugs on General signs & Symptoms of Krimi:

Table 7. Effect of trial drugs on Colic pain

Group	Mean		D	% relief	SD	SE	't' value	'p' value	S
	BT	AT							
A	2.12	0.87	1.0	47.05	0.53	0.18	5.29	>0.01	S
B	1.87	1.12	0.75	40	0.70	0.25	3	<0.01	S

In Group A - The mean grade of Colic Pain before treatment was 2.12, it lowered down to 0.87 with SD± 0.53, SE± 0.18, giving a relief of 47.05 % with 't' value of 5.29 ($p>0.01$) which was statistically significant. In Group B - The mean grade of Colic Pain before treatment was 1.87, it lowered down to 1.12 with SD± 0.70, SE± 0.25, giving a relief of 40.00 % with 't' value of 3 ($p<0.01$) which was statistically significant.

Table 8. Effect of trial drugs on Nausea

Group	Mean		D	% relief	SD	SE	't' value	'p' value	S
	BT	AT							
A	1.66	0.33	1.33	80	0.57	0.33	4	<0.001	HS
B	2	1.25	0.75	37.5	0.5	0.25	3	>0.05	IS

In Group A - The mean grade of Nausea before treatment was1.66, it lowered down to 0.33 with SD± 0.57, SE± 0.33, giving a relief of 80 % with 't' value of 4 ($p<0.001$) which was statistically highly significant. In Group B - The mean grade of Nausea before treatment was 2, it lowered down to 1.25 with SD± 0.5, SE± 0.25, giving a relief of 37.5 % with 't' value of 3 ($p>0.05$) which was statistically insignificant.

Table 9. Effect of trial drugs on Anorexia

Group	Mean		D	% relief	SD	SE	't' value	'p' value	S
	BT	AT							
A	2	0.5	1.5	75	0.70	0.5	3	>0.05	IS
B	1.5	1.25	0.25	16.66	0.5	0.25	1	>0.05	IS

In Group A - The mean grade of Anorexia before treatment was 2, it lowered down to 0.5 with SD± 0.70, SE± 0.5, giving a relief of 75 % with 't' value of 3 ($p>0.05$) which was statistically insignificant. In Group B - The mean grade of Anorexia before treatment was 1.5, it lowered down to 1.25 with SD± 0.5, SE± 0.25, giving a relief of 16.66 % with 't' value of 1 ($p>0.05$) which was statistically insignificant.

Table 10. Effect of trial drugs on Anemia

Group	Mean		D	% relief	SD	SE	't' value	'p' value	S
	BT	AT							
A	2	0.25	1.75	87.5	0.95	0.47	3.65	<0.05	S
B	1.71	0.71	1	58.33	0.57	0.21	4.58	<0.01	S

In Group A - The mean grade of Anemia before treatment was 2, it lowered down to 0.25 with SD± 0.95, SE± 0.47, giving a relief of 87.5 % with 't' value of 3.65 ($p<0.05$) which was statistically significant. In Group B - The mean grade of Anemia before treatment was 1.71, it lowered down to 0.71 with SD± 0.57, SE± 0.21, giving a relief of 58.33 % with 't' value of 4.58 ($p<0.01$) which was statistically significant.

Table 11. Effect of trial drugs on Fever

Group	Mean		D	% relief	SD	SE	't' value	'p' value	S
	BT	AT							
A	2.33	0.66	1.66	71.42	0.57	0.33	5	<0.01	S
B	2.5	0.5	1.5	60	0.70	0.5	3	>0.05	IS

In Group A - The mean grade of Fever before treatment was 2.33, it lowered down to 0.66 with SD± 0.57, SE± 0.33, giving a relief of 71.42 % with 't' value of 5 ($p<0.01$) which was statistically significant. In Group B - The mean grade of Fever before treatment was 2.5, it lowered down to 0.5 with SD± 0.70, SE± 0.5, giving a relief of 60 % with 't' value of ($p>0.05$) which was statistically insignificant.

Table 12. Effect of trial drugs on Weight loss

Group	Mean		D	% relief	SD	SE	't' value	'p' value	S
	BT	AT							
A	2.6	0.8	1.8	69.23	0.83	0.37	4.81	>0.01	S
B	1.66	1.0	0.66	40.00	0.51	0.21	3.16	<0.05	S

In Group A - The mean grade of Weight loss before treatment was 2.6, it lowered down to 0.8 with SD± 0.83, SE± 0.37, giving a relief of 69.23 % with 't' value of 4.81 ($p>0.01$) which was statistically significant. In Group B - The mean grade of Weight loss before treatment was 1.66, it lowered down to 1.0 with SD± 0.51, SE± 0.21, giving a relief of 40.00 % with 't' value of 3.16 ($p<0.05$) which was statistically significant.

Table 13. Effect of trial drugs on Headache

Group	Mean		D	% relief	SD	SE	't' value	'p' value	S
	BT	AT							
A	2	0.33	1.66	83.33	0.57	0.33	5	>0.05	IS
B	1.66	1.0	0.66	40.00	0.51	0.21	3.16	<0.05	S

In Group A - The mean grade of headache before treatment was 2, it lowered down to 0.33 with SD± 0.57, SE± 0.33, giving a relief of 83.33 % with 't' value of 5 ($p>0.05$) which was statistically insignificant. In Group B - The mean grade of headache before treatment was 1.66, it lowered down to 1.0 with SD± 0.51, SE± 0.21, giving a relief of 40.00 % with 't' value of 3.16 ($p<0.05$) which was statistically significant.

Effect of trial drugs on Hematological parameters:

Table 14. Effect of trial drugs on Hb%

Group	Mean		D	% rise	SD	SE	't' value	'p' value	S
	BT	AT							
A	10.95	11.22	-0.275	2.52	0.66	0.15	1.81	>0.05	IS
B	10.89	11.09	-0.193	1.78	0.37	0.09	2.09	>0.05	IS

In Group A - The mean grade of Hb% before treatment was 10.95, it rises up to 11.22 with SD± 0.66, SE± 0.15, giving an increase of 2.52 % with 't' value of 1.81 (p>0.05) which was statistically insignificant. In Group B - The mean grade of Hb% before treatment was 10.89, it rises up to 11.09 with SD± 0.37, SE± 0.09, giving an increase of 1.78 % with 't' value of 2.09 (p>0.05) which was statistically insignificant.

Table 15. Effect of trial drugs on ESR

Group	Mean		D	% relief	SD	SE	't' value	'p' value	S
	BT	AT							
A	27.73	22.05	5.68	20.49	4.384	1.005	5.65	<0.001	HS
B	27.56	23	4.56	16.55	1.931	0.482	9.45	<0.001	HS

In Group A - The mean grade of ESR before treatment was 27.73, it lowered down to 22.05 with SD± 4.384, SE±1.005, giving a relief of 20.49 % with 't' value of 5.65 (p<0.001) which was statistically highly significant. In Group B - The mean grade of ESR before treatment was 27.56, it lowered down to 23 with SD± 1.931, SE± 0.482, giving a relief of 16.55 % with 't' value of 9.45 (p<0.001) which was statistically highly significant.

Effect of trial drugs on intestinal parasite based on stool examination.:

Table 16. Effect of trial drugs on Ascaris lumbricoides (Intestinal parasite)

Group	Mean		D	% relief	SD	SE	't' value	'p' value	S
	BT	AT							
A	2.3	1.3	1	49.47	0.47	0.14	6.70	<0.01	S
B	2.12	0.87	1.25	41.82	0.70	0.25	5	<0.01	S

In Group A - The mean grade of Ascaris lumbricoids count before treatment was 2.3, it lowered down to 1.3 with SD± 0.47, SE± 0.14, giving a relief of 49.47 % with 't' value of 6.70 (p<0.01) which was statistically significant. In Group B - The mean grade of Ascaris lumbricoids count before treatment was 2.12, it lowered down to 0.87 with SD± 0.70, SE± 0.25, giving a relief of 41.82 % with 't' value of 5 (p<0.01) which was statistically significant.

DISCUSSION

Krimiroga is most common disease in today's world. Around 1/3rd patients who are attending the O.P.D. of Kaya Chikitsa are suffering from this condition. Effective & safe remedies on Krimiroga are one important part in the management of Krimiroga. So, we decided to use two single drugs. In case of single drug, it is easy to prove the effect of drug on specific type of parasite so we avoided the compound formulations. So, we selected to study the comparative effect of Vidanga and Shigru on Krimiroga w.s r. to round worms. By going through the Samprapti of Krimiroga, it became evident that the Kapha Dosha plays an important role in it. It is a Kapha predominant Vyadhi, with the involvement of Vata and Dusya involved are Rasa, Annarasa, Purisha and Rakta. The Srotodusti"Sanga" is seen here. Considering all these, a drug which opposes the Kapha and Ama does Shodhana of Ruddha Srotas and corrects the status of Agni should be ideally prescribed to cure the Krimi Roga. Vidanga has Rasa Katu, Tikta, Laghu, Ruksha, Teekshana Guna, Ushna Virya and Katu Vipaka [2]. Katu Rasa does Deepana, Pachana, Kaphahara. Katu Rasa is mentioned as a Krimighna also [3].

The Ushna Virya of the drug again helps in Agni Pradeepana, correction of Dushta Kapha and Ama. It also acts as Kaph vatahara. The presence of Katu Vipaka and KatuRasa also helps in Srotoshodhan. Thus, in total the drug stimulates the Agni, relieves Agnimandya, reduces the Ama formation and thus relieves Srotorodha. All are opposite with the Guna of Kapha and thus works as Kapha Vata Samaka. Katu Rasa is also mentioned by Acharya Charaka in Sutrasthana 26 as Krimin Hinasti. Vidanga has Krimighna, Kushthghna, Deepana, Pachana, Anulomana, Shirovirechana [4]. Vidanga has anthelmintic, astringent, carminative, alternative and stimulant action [5]. Shigru Churna has Rasa Katu, Tikta; Laghu, Ruksha, Teekshana Guna; Ushna Virya; Katu Vipak, all are opposite with the Guna of Kapha and thus works as Kapha Vata Samaka [6]. Katu Rasa corrects Agni Mandya [7].

From the above clinical trial, it was found that the effect of Vidanga churna on cardinal sign & symptoms have calculated the result is highly significant (p <0.001) in Bhaktadvesha (71.43%), Vivaranata (71.23%) & Gudkandu (71.66%) and statistically significant in Atisar (69.23%). General Symptoms are also significantly prevented. Statistically significant result (49.47%) is found in Ascaris lumbricoides. Effect of Shigru Patra Churna is slightly less than Vidanga Churna. The effect of Shigru Patra Churna on cardinal sign & symptoms have calculated the result is highly significant in Bhaktadvesha

(70.83%), Vivaranata (67.86%) & Gudkandu (70.83%), Significant in Atisar (40.00%). General Symptoms are also significantly prevented. Statistically significant (41.82%) result is found in Ascaris lumbricoides slightly less than the effect of vidanga churna.

CONCLUSION

Having analyzed the result on statistical parameters, we can conclude that Vidanga and Shigru are highly effective for the treatment of intestinal parasite especially round worms. Even in between these two vidanga churna is more effective on krimiroga than Shigru churna. There was no side effect observed in patients registered and so it is free from various drug hazards.

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