



CASE REPORT

Effect of Aragwadha Arka On Pureeshaja Krimi In Children Of The Age Group 2-10 Years

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Abstract

Around 1400 million children of the world population is affected with worm infestations. India is categorized under the moderate risk areas for worm infestations as per WHO. The causes of worm infestation are poor living standards, poor sanitization facilities, improper fecal disposal, and improper waste management. The symptoms of which are stomach pain, fever, constipation, loss of appetite and under nutrition. In Ayurveda, *Krimi roga* has its detailed description in *Charaka Samhita*. Ascariasis is the commonest infestation among the children in India and Enterobiasis affects over 1 billion people over India and the prevalence in the country is calculated as 61%.

The present study has been conducted to evaluate the effectiveness of *Aragwadha arka* in *Pureeshaja Krimi* in children of the age group 2 to 10 years. The study has been conducted as pre and post interventional study. The sample size of the study was 38 which were randomly selected from the out-patient department of *Koumarabhrithya*, Govt. Ayurveda college, Thiruvananthapuram. The drug has been provided in a dose of 5 ml for subjects of 2 to 5 years with 5 ml lukewarm water before food twice daily and 10 ml with 10 ml lukewarm water for subjects of 6 to 10 years of age before food twice daily for a duration of 28 days with a follow up period of 28 days. The assessment criteria for the study were subjective parameters, stool examination, adhesive cellophane tape method for calculating the number of worms and blood parameters including Hb and AEC before and after the period of intervention and also during the follow up period.

The data obtained has been evaluated with Friedman T test for subjective parameters and Paired T test for Hb and AEC. The non parametric test Friedman's test and Paired T test of repeated measures of both subjective parameters and blood parameters shows that the change occurred before and after the period of intervention is significant at 1% level of significance (p-value<0.01). And the study can be concluded that the administration of *Aragwadha arka* for *Pureeshaja krimi* in children of the age group of 2 to 10 years (for three months) was found effective in reducing the symptoms of *pureeshaja krimi*.

Introduction

Worm infestations are one of the most important infections of public health importance (1). One fourth of the world's population is affected by worm infestations (1). The world health organization has calculated that about 1400 million people around the world is affected with Ascariasis. (2). Also 200 million young children are affected Enterobius vermicularis. (3) The infestations among which most common are Ascariasis, Hook worm infestation, Enterobiasis and Trichuriasis. Some of these helminthic infections are found to be asymptomatic in

children but most of them can lead to under nutrition, growth retardation, anaemia and poor performances in the school.

Helminths are the multi-cellular eukaryotic invertebrate organisms belonging to the phyla nemathelminths or Platyhelminthes. They include hook worm (*Ancylostoma duodenale*), round worm (*Ascaris lumbricoides*), pinworm (*Enterobius vermicularis*) and tape worm (*Taenia saginata*) (4). The global prevalence of Ascariasis around 11.01% (5). WHO has categorized India under moderate risk area for worm infestation (6). The ministry of health and family welfare has studied that the prevalence of worm infestations in India is ranging from 12.5% to 85% and Acariasis is 52% and hook worm is 42% (6). The govt. of India has started national deworming day from 2015 onwards with two-phased observation of children each year.

The causes of worm infestations are thought to be as poor living standards, poor personal hygiene, improper faecal disposal, improper waste management, over population, poor sanitization facilities in the society. The symptoms presented by the children due to these infestations may be ranging from stomach pain, fever, vomiting, diarrhoea, eosinophilia, loss of appetite, constipation, bowel obstruction, abdominal distension, fatigue, blood in the stool, under nutrition to serious emergency conditions. (7)

Ayurveda has explained worm infestations under the category of *Krimi roga* in *Charaka Samhitha Vimana Sthana* (8), *Susrutha Samhitha Uthara Sthana* (10), *Ashtanga Hridaya* (9), *Ashtanga Samgraha* (10) etc. *Acharya Charaka* has explained the treatment protocol for *krimi* are *Apakarshana* (physical extraction), *Prakruthi Vighata* (to modify the habitat of *krimi* and gut of the host), *Nidana parivarjana* (elimination of the cause of the infestation), *samsodhana* and *samsamana* (11). When children are concerned, among these three, *samsamana* is important as it is the easiest treatment for children.

Arka kalpana is the medicinal formulation in the distilled form prepared using distillation apparatus. *Arka prakasa* (12), a text book written by *Ravana* has enlisted numerous *arka yogas* for many diseases. They are *laghu* (light) in nature and is having *deepana* (carminative) properties. As *krimi roga* is caused due to *ama* (indigestion), *arka kalpana* can be considered beneficial in treating *Krimi roga*. *Aragwadha arka* is told in *Arka prakasa* as having *krimighna* property. The formulation is very appropriate for children as there are no palatability issues and the dose is also very less when compared to other dosage forms.

Title of the study: Effect of *Aragwadha Arka* on *Pureeshaja krimi* in children of the age group 2 - 10 years

Research question

Is *Aragwadha Arka* administered for a period of 28 days (5 ml for 2-5 years and 10 ml for 6-10 years) is effective in *Pureeshaja krimi* assessed by subjective symptomatic grading, laboratory stool examination and adhesive cellophane tape method in the children of age group 2 to 10 years selected from a higher tertiary centre?

Aim: To study the effect of *Aragwadha Arka* on *Pureeshaja krimi* in children of the age group 2 to 10 years.

Primary Objective: To evaluate the effect of *Aragwadha Arka* on *Pureeshaja krimi* among children of the age group 2 - 10 years assessed by subjective symptomatic grading, pre and

post laboratory stool examination and adhesive cellophane tape method.

Secondary Objective: To evaluate the changes in the blood parameters such as Haemoglobin and Absolute Eosinophil Count.

Null hypothesis: *Aragwadha Arka* has no significant effect in curing *Pureeshaja krimi* among children of the age group 2 to 10 years.

Alternative hypothesis: *Aragwadha Arka* has significant effect in curing *Pureeshaja krimi* among children of the age group 2 to 10 years.

Study Design

Single group assignment Interventional pre and post study

Study setting: OP department of *kaumarabhrithya*, Government Ayurveda College Hospital for Women and Children, Poojappura, Thiruvananthapuram.

Study population

Children of both sex of age group 2 to 10 years as per inclusion criteria selected from OPD of Govt *Ayurveda* College Hospital for Women and Children Poojappura, Thiruvananthapuram Those who are positive for either *Ascaris lumbricoides* or *Enterobius vermicularis* by stool examination (direct smear egg count)

Exclusion criteria

Children diagnosed with intestinal complications like Appendicitis, Jaundice, Convulsions, Acute abdomen, pyloric stenosis, Meckel's diverticulum.

Diagnosed cases of Hook worm infestation whose parents were not willing to participate will be excluded from the study.

Sample size: 38

Sampling technique: Cases fulfilling the inclusion criteria, attending the OPD were recruited into the study till attaining sample size.

Sampling method: Consecutive sampling

Data collection

Children with clinical features of worm infestation were selected from OPD of *Kaumarabhrithya* as per inclusion criteria, by using detailed case proforma, laboratory stool examination, blood investigation such as Hb, AEC. Signs and symptoms were assessed by using subjective symptomatic grading. Ova count was assessed by laboratory stool examination and adhesive cellophane tape method. Blood parameters such as Hb & AEC were taken before and after the study.

Materials and methods

The selected subjects were categorized into two age groups from, 2- 5 years and 6- 10 years. The study group were given *Aragwadha Arka* which was prepared as per the classical reference. *Aragwadha arka* was given in a dose of 5ml with equal amount of lukewarm water twice daily for the age group 2 to 5 years and 10 ml were given with equal amount of lukewarm water for the age group 6 to 10 years, both before food for 28 days. Assessment was carried out on the next day after the completion of study medicine and after a follow up period of 28 days.

Preparation of medicine

Aragwadha phalamajja was cleaned and then crushed. Some quantity of water is added to the drugs for soaking and kept overnight. On the following morning it is poured into the *arkayantra* and the remaining water is added and boiled. The vapour is condensed and collected in a receiver. The initial few drops and final few drops were discarded. The collected *Arka* is stored in 300 ml amber coloured bottles.

Dose

2- 5 years: 5ml with equal amount of lukewarm water twice daily before food.

6 – 10 years: 10 ml with equal amount of lukewarm water twice daily before food.

Duration: 28 days

Follow up: 28 days

Assessment criteria

Primary parameter: *Changes in the subjective symptomatic grading, Pre and post laboratory stool examination & Adhesive cellophane tape method.*

Secondary parameter: Changes in the Blood Parameters such as haemoglobin and Absolute Eosinophil count.

Statistical analysis

Data collected was statistically analysed before treatment, after treatment and after follow up. Data regarding subjective symptomatic parameter and results of adhesive cellophane tape method was statistically analysed by using Friedman's chi square test. The laboratory stool examination was statistically analysed by using Friedman test to compare the mean values of before treatment, after treatment and follow up. The paired t test was used for statistical analysis to compare the data in haemoglobin and Absolute Eosinophil Count.

Ethical consideration

- All participants and their parents were informed about the study and provided written consent.
- Ethical clearance was obtained from institutional ethics committee
- IEC no: 630-31/08/2022
- During emergency and adverse drug reaction the child is allowed to discontinue the trial drug

Observation and results

Itching in anal region

The mean score of itching before treatment was 2.66 with standard deviation 0.53, mean score after the treatment was 1.18 with standard deviation 0.69 and at the follow up reported a mean score 0.53 with standard deviation 0.51. Since the rating scale was from 0 to 3, the mean scores indicate a decrease of about 2 units. The non parametric test of repeated measures Friedman's test shows that change in mean scores significant at 1% level of significance

Number of worms in stool

The mean score of number of worms in stool before treatment was 2.32 with standard deviation 0.81, mean score after the treatment was 0.45 with standard deviation 0.69 and at the

follow up reported a mean score 0.13 with standard deviation 0.34. Since the rating scale was from 0 to 3, the mean score indicates a decrease of about 2 units. The non-parametric test of repeated measures Friedman's test shows that the change in mean scores significant at 1% level of significance (p-value<0.01).

Abdominal pain

The mean score Of abdominal pain before treatment was 2.13 with standard deviation 0.062, mean score after the treatment was 0.42 with standard deviation 0.55. and at the follow up reported a mean score 0 with standard deviation 0. Since the rating scale was from 0 to 3, the mean scores indicate a decrease of about 2 units. The non parametric test of repeated measures Friedman's test shows that the change in mean scores significant at 1% level of significance (p-value <0.01).

Bowel movements

The mean score of bowel movement before treatment was 0.74 with standard deviation 0.45, mean score after the treatment 0.03 with standard deviation 0.16 and at the time of follow up reported a mean score 0 with standard deviation 0. Since the rating scale was from 0 to 3, the mean score indicates a decrease of about 2 units. The non parametric test of repeated measures Friedman's test shows that the change in mean scores significant at 1% level of significance (p-value<0.01).

Nature of stool

The mean score of presence undigested material in the faeces before treatment was 1.16 with standard deviation 0.68, mean score after the treatment was 0.29 with standard deviation 0.46 and at the follow up reported a mean score 0.03 with standard deviation 0.16. Since the rating scale was from 0 to 3, the mean scores indicate a decrease of about 2 units. The non-parametric test of repeated measures Friedman's test shows that the change in mean scores significant at 1% level of significance (p-value <0.01).

Aversion towards food

The mean score of subjects with aversion towards food before treatment was 2.29 with standard deviation 0.77, the mean score after treatment 0.9 with standard deviation 0.75 and at the follow up reported a mean score 0.24 with standard deviation 0.16. Since the rating scale was from 0 to 3, the mean score indicates decrease of about 2 units. The non-parametric test of repeated measures Friedman's test shows that the change in mean scores significant at 1 % level of significance (p-value<0.01).

Round worm in stool

The mean score of number of round worms in stool before treatment was 2 with standard deviation 0.70, mean score after the treatment 1.03 with standard deviation 0.68 and at the time of follow up reported that 0.13 with standard deviation 0.34. Since the rating scale was from 0 to 3, the mean score indicates a decrease of about 2 units. The non-parametric test of repeated measures Friedman's test shows that the change in mean scores significant at 1 %level of significance (p-value<0.01).

Pin worm in stool

The mean score of pinworms in ova before treatment was 1.97 with standard deviation 0.75, mean score after the treatment

1.05 with standard deviation 0.70 and at the time of follow up 0.13 with standard deviation 0.34. since the rating scale was from 0 to 3, the mean scores indicate a decrease of about 2 units. The non parametric test of repeated measures Friedman's test shows that the change in mean scores significant at 1% level of significance (p -value<0.01).

Discussion

Itching

Reduction in itching may be due to the *kandughna* and *kaphaghna* property of *aragwadha* or may be due to the reduction in worms due to the *krimighna* property of *Aragwadha arka* and also due to the *sramsana* (purgative property) of *Aragwadha*. Since the Friedman's test showed

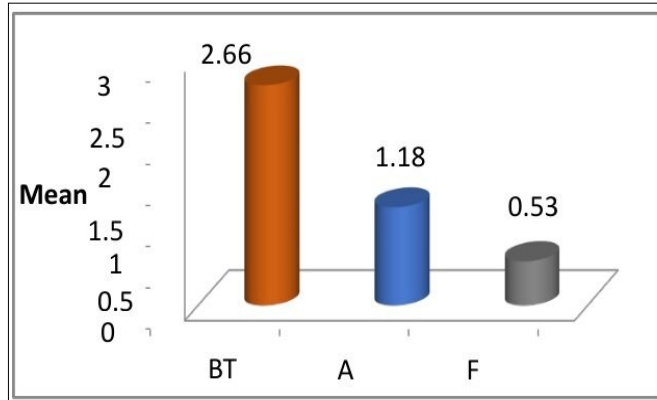


Fig.1. Distribution of itching in anal region

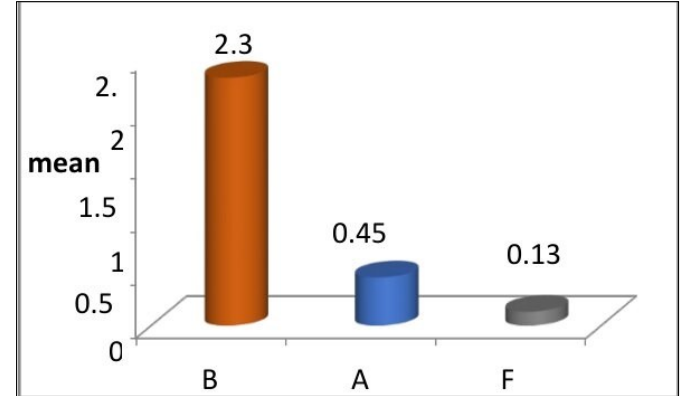


Fig 2. Distribution of worms

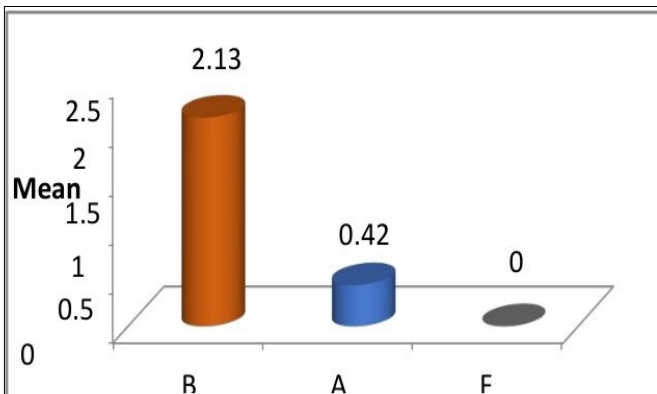


Fig.3. Distribution of pain in abdomen

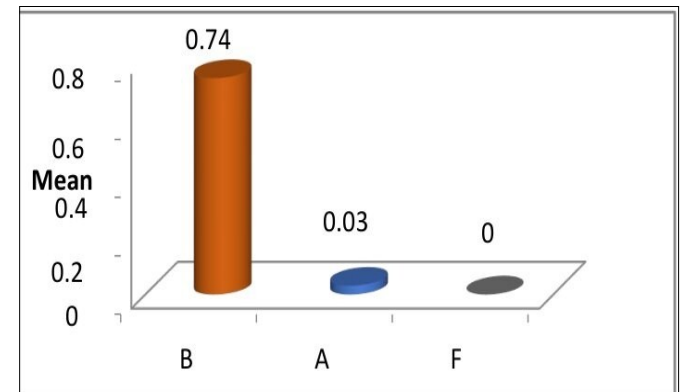


Fig.4. Distribution of Bowel Movement

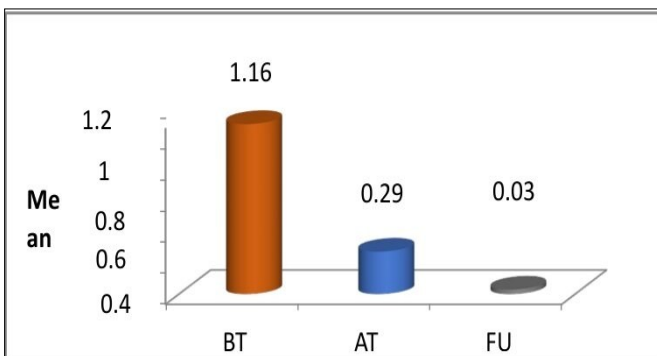


Fig 5. Distribution of nature of stools

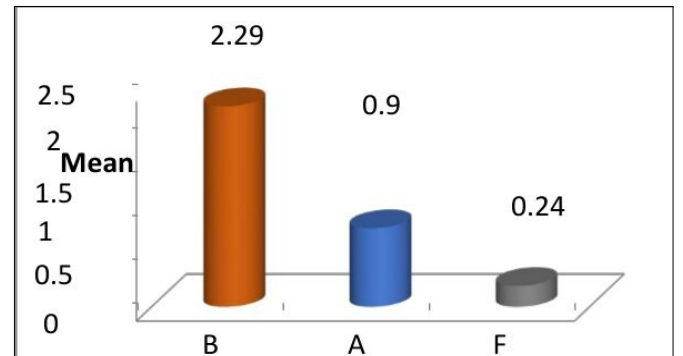


Fig.6. Distribution of Loss of Appetite

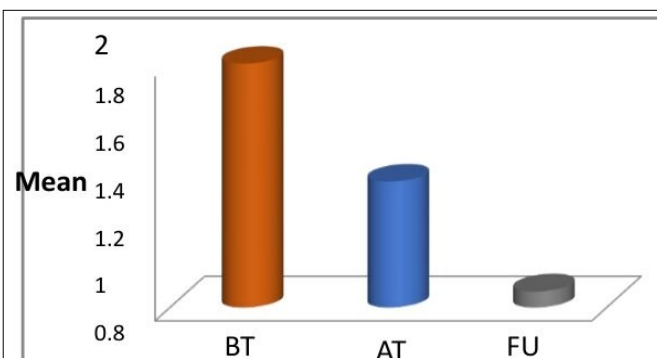


Fig.7: Distribution of round worms

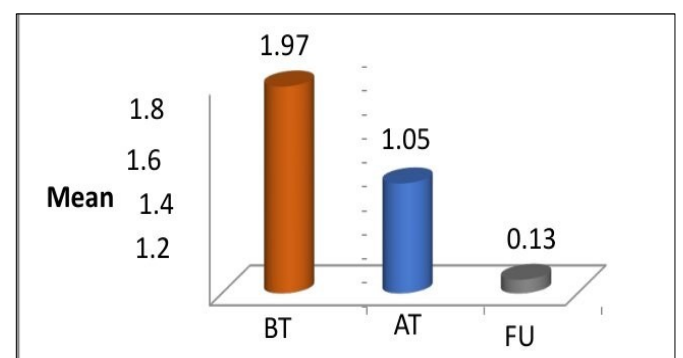


Fig.8: Distribution of pin worms

highly significant change in the scores for itching before treatment, after treatment and follow up period. The effectiveness of *Aragwadha* on itching has already been proved in many clinical studies. In a study published in the Journal of *Ayurveda* and Integrated medical sciences, the effect of *aragwadha* in reducing itching among patients of *vicharchika* has already demonstrated. (13)

Worms in stool

When the drug is analyzed, it is evident that the drug *Aragwadha* is having *tiktha* and *madhura guna*, *Tiktha guna* is having *ruksha* and *seetha* properties. *Ruksha guna* can act against the *snigdha* and *guru gunas* caused by *krimi nidanas*. And these *gunas* act against the environment created by the *aharaja nidanas* of *krimi roga* in the gut where the worm lives. These together function as the *prakrithi vighata* process told in *Krimi chikitsa*. *Aragwadha phala* is having *mridu virechana* property and it reduces *kapha* and *pitha* inside the *koshta*(gut).

As *apakarshana* is a part of *krimi roga chikitsa* and it intend to expel the worms inside the body, purgation is a good treatment of choice and expulsion of *kapha* and *pitha* from the *koshta* is important. During the follow up period also the patients were advised to follow the *pathyas*. They were asked to not consume *madhura*, *snigdha*, *guru ahara*s and *guda*, *seetha*, *dadhi* etc. Due to the practice of these regimens even after the treatment period, these may act as a part of *nidana parivarjana* which is one of the elements of *krimi chikitsa*.

Pain in the abdomen

The study showed significant differences in pain in the abdomen after the treatment and after the follow up period with *aragwadha arka* in *pureeshaja krimi* as per the present study. This may be due to *deepana* nature of *aragwadha arka* and *soolaghna* property of *aragwadha*.

Bowel movements

The results showed significant changes in bowel movements after the treatment. Irregular bowel movements were caused due to worm infestation. *Aragwadha* is *sramsana* in nature, which causes mild purgation, and is having *tiktha rasa* due to which the drug is *deepana* in nature and which may cause reduction in *ama* due to *krimi roga*. Along with that the *kalpana* itself is having *deepana* properties. These characteristics of the drug *Aragwadha arka* was capable of reducing the symptom of irregular bowel movements caused due to intestinal infestation of worms. In a study conducted by the department of *Dravya guna*, Institute of medical sciences, BHU, which was published in the "Journal of natural remedies" the laxative effect of *Aragwadha* has been proved (14).

Nature of stool

The values showed significant changes in the nature of stools after the treatment. These findings can be considered as due to the *deepana* property, *kapha pitha hara* property and *sramsana* property of the drug. Studies proved that the presence of Anthraquinones in the seeds of *Aragwadha* stimulates bowel movement (15).

Loss of appetite

Before the treatment 47.4% cases were showed aversion towards food and 34.2% cases didn't have interest to take food which was reduced after the treatment. 26.3% cases showed loss of interest in taking food after the treatment and none of

the cases had loss of interest in food after the follow up period. Aversion towards food was not there in any of the cases both after the treatment and after the follow up period. The study showed significant results in loss of appetite with the particular medicines after the treatment. As per *Bhava Prakasa*, the *Aragwadha phala* is *ruchya*, it promotes appetite and this can be considered as the cause for improved appetite.

Round worm

None of the patient's stool were devoid of worms on examination before the study. After the period of treatment 21.1% cases were found stool without any round worms and it was again increased to 86 % after the follow up period. Before the treatment, 23.7% cases were having one worm in the stool during examination, 52.6% cases with two round worms in the stool, and 23.7% cases with three round worms in the stool. After the treatment, 55.3% were observed with one round worm in the stool and 23.7% cases were observed with 2 worms in the stool and none of the patients were having any round worms in the stool.

After the follow up period, 13.2% cases were having one round worm per stool, and none of the cases were having more than one worms in the stool. The mean value of number of worms before the treatment was 2 with a standard deviation 0.70 and after the treatment was 1.03 with a standard deviation 0.68.

Pin worm

Before the study, none of the cases were devoid of pin worm in their stools, it was increased to 21.1% after the treatment and 86.8% after the follow up period. 28.9 patients were having one pin worm in their stools, 44.8% cases were having two worms in their stools and 26.3 cases were having three pin worms in their stools before the treatment. The values were changed after the treatment. 52.6% cases were with one pin worm, 26.3% cases with two pinworms and none of the patients were presented with pin worms in their stools after the treatment period. After the follow up period 13.2 % cases were presented with one pin worm in their stool and none of the cases were having more than one pin worm in their stools.

Conclusion

With this study, it can be concluded that the drug *Aragwadha arka* shows significant effect in reducing subjective parameters, blood parameters and worms in stools in *pureeshaja krimi* (Ascariasis and Enterobiasis) in children of age group of 2 to 10 years. The results obtained in this study suggest that the drug shows reduction in all the symptoms which is statistically significant. The drug is having no adverse effect as per the current study and is of low expense to afford for people belonging to all the strata in the society.

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