

## A CLINICAL EVALUATION OF SHANAPUSHPI (*Crotalaria verrucosa* L.) IN JWARA (ANTIPYRETIC ACTIVITY)

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### ABSTRACT

The drug *Shanapushpi* (*Crotalaria verrucosa* L.) is a shrub growing upto a meter height, belongs to Fabaceae family, commonly seen in wastelands and growing on the sea coast. In Nighantus this plant is indicated in *Ajeerna*, *Jwara*, *Raktadosha*, *Kantaroga*, *Mukharoga*<sup>[1,2]</sup>. The decoction of leaves is traditionally used for *Jwara* in and around rural area of Tumkur and Shivamogga. Clinical trials were done on 40 subjects, assigned in 2 groups of 20 each. The subjects were treated with Paracetamol and decoction prepared from the leaves of *Crotalaria verrucosa* L. in Group A and Group B respectively. The duration of the treatment was 14 days. Subjects were assessed on before treatment, after treatment and follow up was of 7 days. The result were analyzed statistically which suggested that the *Shanapushpi* (*Crotalaria verrucosa* L.) is effective in reducing the signs and symptoms of *Jwara*.

**Keywords:** *Shanapushpi*, *Crotalaria verrucosa* L., *Jwara*

### INTRODUCTION

Ayurveda is a holistic system of medicine and is the oldest form of health care system available on the planet. Plants have been used for medicinal application ever since man began caring for his body and health.

*Jwara* (fever/pyrexia) is considered to be one among the superior disease in Ayurveda. Acharyas have well-observed its importance and dedicated full chapters for *Jwara* in their treatises. *Jwara* affects both *Shareera* and *Manas*<sup>[3]</sup>. Due to the *Aharaja-Viharaja Nidana*, the *Doshas* which get aggravated, approaches the site of *Agni*, follows the path of *Rasa* which is the first product of food after transformation. By this there

is obstruction in the *Rasa-Swedavaha Srotas* and the *Uhsma* is restricted from letting out of the body. This *Uhsma* spreads all over the body leading to *Dehasantapa* which is the cardinal feature of the disease *Jwara*.<sup>[4]</sup>

The normal body temperature range is typically stated as 36.5-37.5°C (97.7-99.5°F). Any temperature above 37.5°C (99.5°F) is defined as Fever. Fever, also known as pyrexia and febrile response, is defined as having a temperature above the normal range due to an increase in the body's temperature set-point<sup>[5]</sup>.

The drug *Shanapushpi* (*Crotalaria verrucosa* L.) is a shrub growing up to a meter height. Belongs to Fa-

baceae family found in the hot regions of India, it is commonly seen in wastelands and growing on the sea coast<sup>[6]</sup>. In *Charaka* it is mentioned in *Moolini dravya* and *Vamanopaga dravya*. In Nighantus this plant is indicated in *Ajeerna*, *Jwara*, *Raktadosha*, *Kantaroga*, *Mukharoga*, *Hidroga*. The decoction of leaves is traditionally used for *Jwara* in and around rural areas of Tumkur and Shivamogga<sup>[7]</sup>. It's very important to explore the folklore uses of plant which will help to add useful drugs available around us, the present study is undertaken to evaluate *Shanapushpi* (*Crotalaria verrucosa* L.) clinically for its *Jwarahara* property (Antipyretic).

## MATERIALS AND METHODS

### Selection of Subjects

Subjects with characteristic symptomatology of *Vata-kaphaja Jwara*, irrespective of religion, education, occupation etc. were selected. 40 patients were selected on first come first serve basis from the O.P.D of Alva's Ayurveda Medical College and its associated hospitals, medical camps, referrals and from other sources.

Arranged into Two groups of 20 each.

Group A is standard group and Group B is Trial group.

### Inclusion Criteria

1. Subjects of either sex were taken for study.
2. Subjects between age group of 16-50 years.
3. Subjects whose temperature is more than 99.5<sup>0</sup>F (axillary).
4. Subjects with *Vata-kaphaja Jwara lakshanas* like *aruchi*, *pinasa*, *gaurava*, *shitata*, *shirograha* and *santapa* of body.

### Exclusion criteria

1. Subjects with more than 102<sup>0</sup>F (axillary) temperature.
2. Pyrexia of unknown origin, malaria, typhoid etc.
3. Fever associated with surgical emergencies.
4. Severely dehydrated patients will be excluded from the study.
5. Any febrile condition associated with systemic illness.
6. Fever during pregnancy.
7. Fever of more than 7 days / *puranajwara*.

8. Fever with nausea, vomiting and diarrhoea.
9. Any febrile condition requiring an immediate intervention depending on history and general conditions will be excluded.

### Study design:

Randomized comparative trial

**Sample size and group:** A minimum of 40 subjects were selected and assigned into two groups of 20 each.

Group A is standard group and Group B is Trial group.

**Group A** - Subjects suffering from *Vata-kaphaja Jwara* were given the standard drug Paracetamol (500mg)/3 times a day<sup>[8]</sup>.

**Group B** - Subjects suffering from *Vata-kaphaja Jwara* were given decoction prepared from the leaves of *Crotalaria verrucosa* L.

### Preparation and Dose of Medicine

*Kwathachurna* (of *Crotalaria verrucosa* L.) was given to subjects and advised to prepare Decoction as per the *Sharangadhara Samhitha* and it is taken orally 3 times a day for seven

**Study duration:** 14 days

**Follow up:** For 7 days after treatment.

**Dose:** 15-20ml/3 times a day<sup>[9]</sup>

### Criteria of assessment

**Group A:** The assessment of subjects was done before treatment, after treatment and after follow up.

**Group B:** The assessment of subjects was done before treatment, after treatment and after follow up of treatment.

Following scoring pattern was adopted for the study to observe the relief in Cardinal signs and symptoms of *Vata-kaphaja Jwara*

### SUBJECTIVE PARAMETERS

#### *ARUCHI* (ANOREXIA)

Grade – 0 Absent

Grade – 1 Present

#### *PINASA* (RUNNING NOSE)

Grade – 0 Absent

Grade – 1 Present

#### *GOURAVA* (HEAVINESS OF BODY)

Grade – 0 Absent

Grade – 1 Present

### **SHIROGRAHA (HEAVINESS OF HEAD)**

Grade – 0 Absent

Grade – 1 Present

### **SHITATA (COLDNESS)**

Grade – 0 Absent

Grade – 1 Present

### **JADYA (LASSITUDE)**

Grade – 0 Absent

Grade – 1 Present

### **OBJECTIVE PARAMETERS**

#### **TEMPERATURE**

Grade-0 Normal temperature (36.6-37.2<sup>0</sup>C OR 98-99<sup>0</sup>F)

Grade-1 Low grade (37.2 - 37.8<sup>0</sup>C OR 99 - 100<sup>0</sup>F)

Grade-2 Moderate (37.8 - 38.8<sup>0</sup>C OR 100 - 102<sup>0</sup>F)

#### **RESPIRATORY RATE**

Grade – 0 14-20

Grade – 1 20-30

Grade – 2 30-40

Grade – 3 >35

#### **HEART RATE**

Grade – 0 <60-100

Grade – 1 >100

Grade – 2 >120

Grade – 3 >140

#### **Criteria for assessment of overall effects:**

Assessment of the total effect of therapy was made by analysing the data statistically as follows:

**CURED:** 100% RELIEF from all signs and symptoms.

**MARKED IMPROVEMENT:** More than 75 % improvement in chief complaints is recorded as marked improvement.

**MODERATE IMPROVEMENT:** 51-75 % improvements in chief complaints are recorded as moderate improvement.

**MILD IMPROVEMENT:** Relief between 25-50% in signs and symptoms

**UNCHANGED:** Less than 25% reduction in chief complaints or recurrence of the symptoms to the similar extent of severity is noted as recurrence.

### **RESULTS**

#### **Incidence according to signs and symptoms**

When the occurrence of the signs and symptoms was assessed, it was found that High Temperature and *Jadya (Lassitude)* were found in all the subjects, *Aruchi (Anorexia)*, *Gaurava (Heaviness)*, *Shirograha (Heaviness of head)* was found in 64.4% of subjects, *Shitata (Coldness)* was found in 53.3% of subjects and *Pinasa (Running nose)*, High respiratory rate and High heart rate was found in 48.8% of subjects.

#### **Effect of Treatment**

In Group A: The Standard drug has shown significant results on all the signs and symptoms with 'p' value <0.05 except heart rate (P>0.05).

In Group B: The trial drug has shown significant results on all the signs and symptoms with p value <0.05 except heart rate (P>0.05).

#### **Clinical Assessment of treatment effects in group A & B**

In Group A, 10 subjects got cured (100% relief) and in Group B 12 subjects got cured (100% relief) from signs and symptoms. In Group A 10 subjects got markedly improvement (>75% relief) and in Group B 08 subjects got markedly improvement from signs and symptoms. In Group A 0% got moderately improvement (50-75% relief) and in Group B 0% got moderately improvement from signs and symptoms. In both Group A & B 0% got partially improvement (25-50%) and 0% had no change at all in signs and symptoms (< 25%).

#### **Percentage of Relief in Group A and Group B**

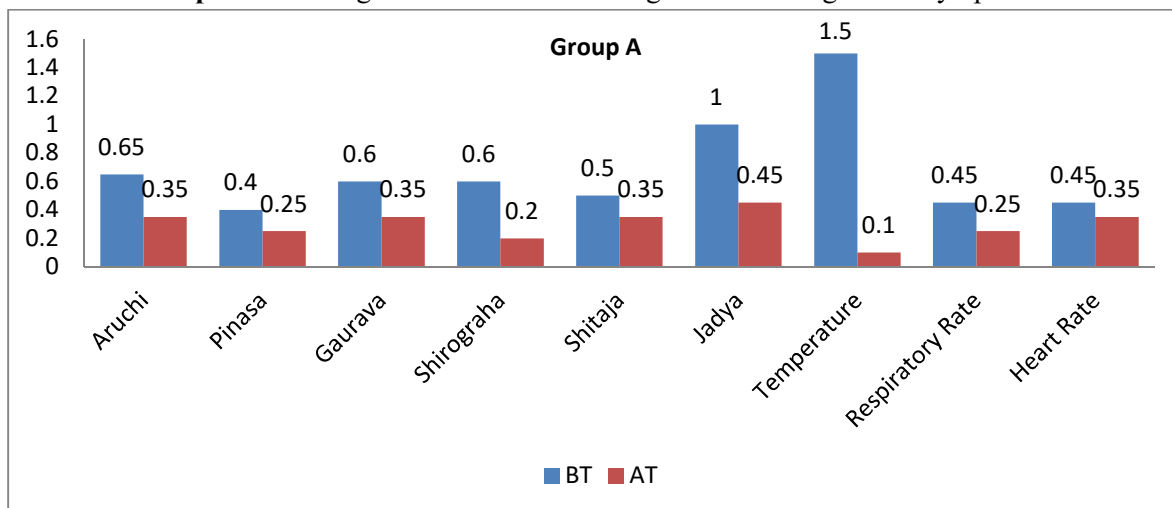
The cure percentage of group A & B in *Aruchi* were 46% and 55%, in *Pinasa* 38% and 44%, in *Gaurava* 42% and 58%, in *Shirograha* 67% and 33%, in *Shitata* 30% and 33%, in *Jadya* 55% and 65%, in Temperature 93% and 80%, in Respiratory rate 44% and 50% and in Heart rate 22% and 12.5% respectively. It is observed that *Shanapushpi (Crotalaria verrucosa L.)* has better effects on conditions like *Aruchi*, *Pinasa*, *Gaurava* and *Jadya*.

**Table 1:** Distribution of subjects based on signs and symptoms

Signs and symptoms	No of Patients		Total	Percentage %
	A	B		
<i>Aruchi</i>	15	14	29	64.4%
<i>Pinasa</i>	10	12	22	48.8%
<i>Gaurava</i>	15	14	29	64.4%
<i>Shirograha</i>	14	15	29	64.4%
<i>Shitata</i>	13	11	24	53.3%
<i>Jadya</i>	23	22	45	100%
Temperature	22	23	45	100%
Respiratory rate	11	11	22	48.8%
Heart rate	12	10	22	48.8%

**TABLE 2:** Effect of Standard Drug in Signs and Symptoms on 8<sup>th</sup> Day Group AAll the signs and symptoms are significant except heart rate ( $P>0.05$ )

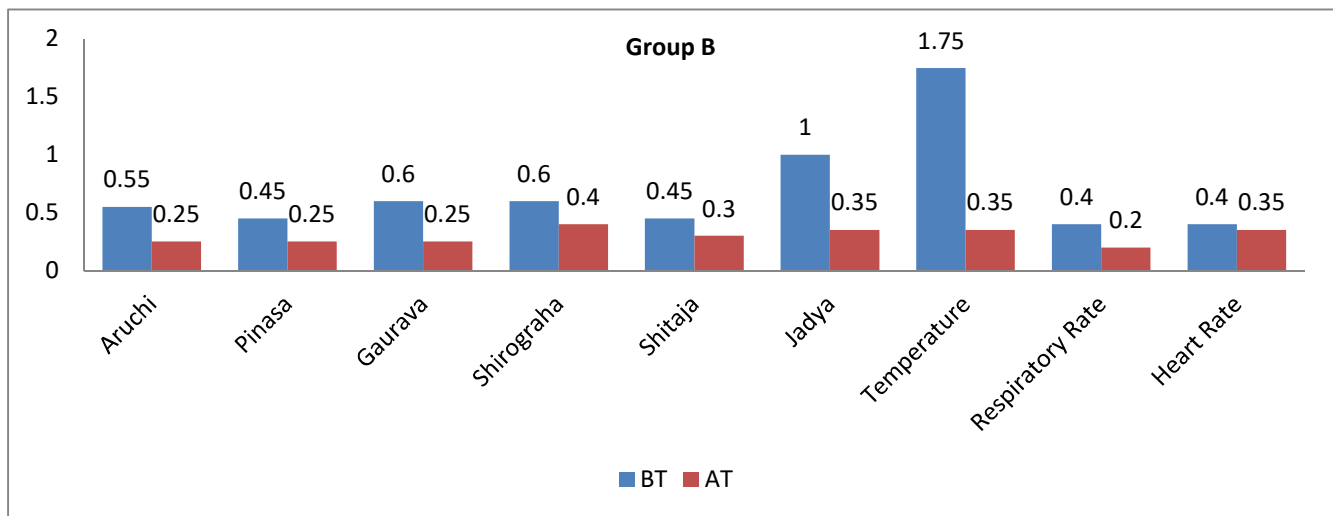
Signs and symptoms	Mean		SD	SE	Relief %	“t” value	“p” value
	BT	AT					
<i>Aruchi</i>	0.65	0.35	0.470	0.105	46	2.854	<0.05
<i>Pinasa</i>	0.4	0.25	0.366	0.082	38	1.831	<0.05
<i>Gaurava</i>	0.6	0.35	0.444	0.099	42	2.517	<0.05
<i>Shirograha</i>	0.6	0.2	0.503	0.112	67	3.559	<0.05
<i>Shitaja</i>	0.5	0.35	0.366	0.082	30	1.831	<0.05
<i>Jadya</i>	1	0.45	0.510	0.114	55	4.819	<0.05
Temperature	1.5	0.1	0.598	0.133	93	10.466	<0.05
Respiratory Rate	0.45	0.25	0.410	0.092	44	2.179	<0.05
Heart Rate	0.45	0.35	0.308	0.069	22	1.453	>0.05

**Graph 1:** Showing Effect of Standard Drug on various Signs and Symptoms

**TABLE 3:** Effect of Test Drug In Signs And Symptoms On 8<sup>th</sup> Day Group B  
All the signs and symptoms are significant except heart rate (P>0.05)

Signs and symptoms	Mean		SD	SE	Relief %	“t” value	“p” value
	BT	AT					
<i>Aruchi</i>	0.55	0.25	0.470	0.105	55	2.854	<0.05
<i>Pinasa</i>	0.45	0.25	0.410	0.092	44	2.180	<0.05
<i>Gaurava</i>	0.6	0.25	0.489	0.109	58	3.199	<0.05
<i>Shirograha</i>	0.6	0.4	0.410	0.092	33	2.179	<0.05
<i>Shitaja</i>	0.45	0.3	0.366	0.082	33	1.831	<0.05
<i>Jadya</i>	1	0.35	0.489	0.109	65	5.940	<0.05
Temperature	1.75	0.35	0.598	0.134	80	10.466	<0.05
Respiratory Rate	0.4	0.2	0.410	0.092	50	2.179	<0.05
Heart Rate	0.4	0.35	0.224	0.05	12.5	1	>0.05

**Graph 2:** Showing effect of Test Drug on various Signs and Symptoms



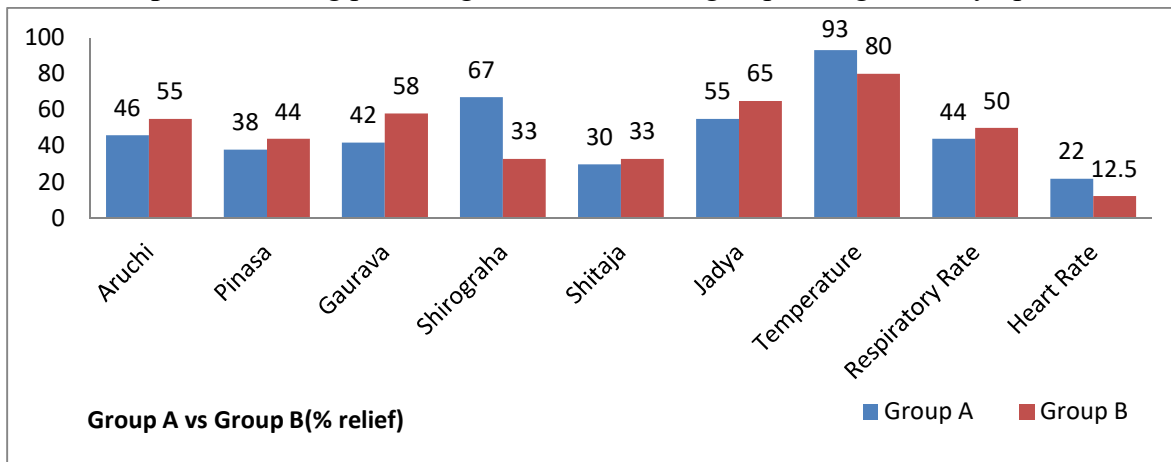
**TABLE 4:** Comparative Effect In Both Groups In Signs And Symptoms On 8<sup>th</sup> Day

Signs and symptoms	Mean Difference		“t” value	“p” value
	Group A	Group B		
<i>Aruchi</i>	0.3	0.3	0	>0.05
<i>Pinasa</i>	0.15	0.2	0.406	>0.05
<i>Gaurava</i>	0.25	0.35	0.677	>0.05
<i>Shirograha</i>	0.4	0.2	1.378	>0.05
<i>Shitaja</i>	0.15	0.15	0	>0.05
<i>Jadya</i>	0.55	0.65	0.632	>0.05
Temperature	1.4	1.4	0	>0.05
Respiratory Rate	0.2	0.2	0	>0.05
Heart Rate	0.1	0.05	0.588	>0.05

**TABLE 5:** Percentage Of Relief In Group A And Group B

Assessment criteria/Parameter	Group A	Group B
Aruchi	46%	55%
Pinasa	38%	44%
Gaurava	42%	58%
Shirograha	67%	33%
Shitata	30%	33%
Jadya	55%	65%
Temperature	93%	80%
Respiratory rate	44%	50%
Heart rate	22%	12.5%

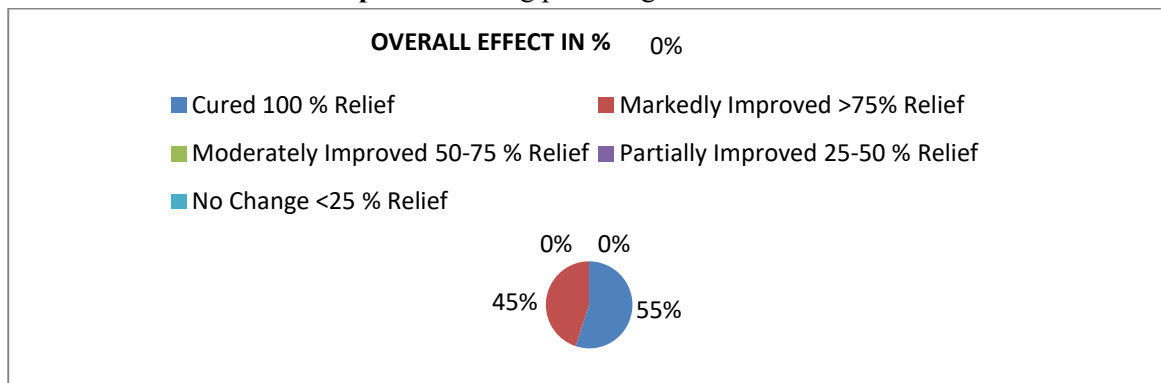
**Graph 3:** Showing percentage of relief in both groups in signs and symptoms



**Table 6:** Overall effects of treatment in group A and group B

Effect of Therapy	Group A	Group B	Total	%
Cured 100 % Relief	10	12	22	55.0
Markedly Improved >75% Relief	10	08	18	45.0
Moderately Improved 50-75 % Relief	00	00	00	00.0
Partially Improved 25-50 % Relief	00	00	00	00.0
No Change <25 % Relief	00	00	00	00.0

**Graph 4:** Showing percentage of overall effect.



## DISCUSSION

The *Rasapanchaka* of *Crotalaria verrucosa* L. *Tikta*, *Katu*, *Kashaya* and *Madhura Rasa* and by *Rasonipatha* method it was found that the leaf of drug has *Tikta* as *pradhanarasa* and *Kashaya anurasa*. *Tikta Rasa* of *Dravya* acts as *Deepana*, *Pachana*, *Dahashamana*, *Vishahara*, *Jwaraghna*, *Krimihara*, *Pitahara* and *Kaphahara*. Because of *Tikta*, *Kashaya Rasa*, *Sheetaveerya* and *Katu Vipaka* it contributes in reducing body temperature and helps in *Samprapthi vighatana*. *Tikta* rasa acts as liver tonic and it corrects metabolic function. So it corrects the *Agni*, This increases the appetite and brings the *Pittadosha* into normal state. *Panchabhutika* compositions of *Tikta* rasa are *Vayu* and *Akasha* predominant. So it enters the *srotas*, does the *Amapaachana* and clears the *srotas*. *Sheetaviry*a of *Shanapushpi* can be of help in reducing the temperature. Thus *Tikta*, *Katurasa*, *Sheetaviry*a and *Ruksha guna* of *dravya* helps in mitigating the excessive *Pitta* which in turn brings down the increased temperature in the *Shareera*. The antipyretic potentials of Steroids, Tannins, Flavonoids and Phenols have been reported in various studies. Therefore the antipyretic activity of *Crotalaria verrucosa* L. may be due to Steroids, Tannins and Flavonoids present in the drug. Present studies do show that drug can be a potential drug in treating *Jwara*.

## CONCLUSION

From above clinical study it can be concluded that decoction of leaves of *Shanapushpi* (*Crotalaria verrucosa* L.) possess significant antipyretic activity. This may be due to the *Tikta*, *Kashaya Rasa*, *Sheetaveerya* and *Katu Vipaka* of the drug and presence of reported active phytoconstituents like Steroids, Tannins, Flavonoids and Phenols and their influence on the prostaglandins. A further study regarding other pharmacological activities was may be undertaken in for further studies.

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