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Research Article

A COMPARATIVE CLINICAL STUDY OF *TRIKATU CHURNA* AND *PIPPALI CHURNA* IN *ARTAVAKSHAYA* W.S.R. TO PCOS

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ABSTRACT

Artavakshaya, a condition described in *Ayurveda*, is characterised by scanty and irregular menstruation, which closely correlates with the Polycystic Ovary Syndrome (PCOS). PCOS is a common endocrine disorder affecting reproductive-aged women, leading to menstrual irregularities, anovulation, and metabolic disturbances. *Trikatu Churna*, a combination of *Pippali(Piper longum* Linn.*), Maricha(Piper nigrum* Linn.*),* and *Shunti(Zingiber officinale* Roscoe.*)*, is known for its *Deepana*, *Pachana* and *Kaphavatahara* properties, which may help in correcting metabolic imbalances associated with PCOS. *Pippali Churna* is recognised for its *Rasayana* and *Lekhana* actions, which may aid in improving ovarian function and hormonal balance. This study aims to compare the clinical efficacy of *Trikatu Churna* and *Pippali Churna* in managing *Artavakshaya* for PCOS. The effects of both formulations were evaluated based on clinical parameters such as duration of bleeding, irregular menstruation, amount of bleeding and quantity of menstrual blood, pain during the menstruation, Hirsutism and BMI. This comparative clinical study was conducted on a total of 40 patients diagnosed with PCOS presenting with *Artavakshaya* symptoms and were randomly divided into two groups. Group A received *Trikatu Churna*, and Group B received *Pippali Churna* for 90 Days. The primary outcome measures included improvements in duration of bleeding, irregular menstruation, amount of bleeding and quantity of menstrual blood, and pain during the menstrual period. The secondary outcomes included improvements in Hirsutism and BMI. Both treatments showed significant improvements in the management of PCOS symptoms. However, *Trikatu Churna* was found to be slightly more effective in regulating menstrual cycles. This study suggests that *Trikatu Churna* and *Pippali Churna* can be beneficial in the management of *Artavakshaya* associated with PCOS, with *Trikatu Churna* showing marginally superior efficacy.

INTRODUCTION

The polycystic ovarian syndrome is the most common endocrine disorder affecting women mainlyof 15-35 years of age group. 30-50% of women with PCOS have 3 times higher risk of miscarriage than a normal woman. In India, PCOS is reported among 9% of adolescents[1].

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It is characterized by hyperandrogenism, menstrual irregularities, and polycystic ovarian morphology[2]. Among Indian women 15-35 years of age evaluated at a rural gynaecology clinic, 13% presented with menstrual irregularities, half of which were found to have PCOS, estimating the prevalence to be around 6.5%.[3] A review of the international evidence found that the prevalence of PCOS could be as high as 26% among some populations, though ranges between 4% and 18% are reported for general populations[4]. American gynaecologists Irving F. Stein & Sr. Michael L Leventhal named it Stein Leventhal Syndrome. The syndrome is named after the characteristic cysts that may form on the ovaries, though it is important to note that this is a sign and not the underlying cause of the disorder. Incidence of this

disease is increasing now a day because of sedentary lifestyle, pollution, excessive intake of junk food. PCOS is a heterogeneous disorder of uncertain cause. There is some evidence that it is caused by a combination of genetic and environmental factors[5]. From an Ayurvedic perspective, PCOS can be correlated with *Artavakshaya*, a condition where there is an insufficient or delayed menstrual flow. Herbal formulations like *Trikatu Churna* and *Pippali Churna* are traditionally used to enhance metabolism, regulate menstrual cycles, and reduce hormonal imbalances. This study aims to compare their clinical efficacy in patients with *Artavakshaya* and PCOS.

Study Design and Participants

AIM

The present study, which is aimed to evaluate the therapeutic effect of *Trikatu* in comparison to the individual effect of *Pippali* in subjects suffering from the disease *Artavakshaya* w.s.r. to PCOS, was done by conducting clinical and analytical studies.

OBJECTIVE

To evaluate the comparative clinical efficacy of *Trikatu Churna* and *Pippali Churna* in relieving the symptoms of *Artavakshaya* w.s.r. to PCOS.

MATERIALS AND METHODS

Drug Preparation

The drug *Trikatu (Shunti, Maricha, Pippali)* were collected from its natural habitat in Paaderu, which is located in Andhra Pradesh State. Good quality material which is free from any worm infestation was cut, separated, washed, dried in the shade and stored in an airtight dried container. Fine powder of sufficient quantity is prepared and packed in a zip lock polythene bag which is used for study.

Study Plan

A special case proforma was designed, which consists of all the important data related to patients of *Artavakshaya*, the treatment adopted and other information. The study was conducted after obtaining consent from patients before including them in the open clinical trial.

Selection of Patients

A total of 40 subjects were selected from the OPD of *Prasuti Tantra* and *Stree Roga* at the Government Ayurvedic Hospital in Erragadda and randomly divided into two groups: A and B. Twenty subjects for each group will be randomly selected from the OPD of *Prasuti Tantra* and *Stree Roga* at the Government Ayurvedic Hospital in Erragadda.

Dose and Mode of Administration

The dose is decided and given as follows:

Group A: 4gm in divided doses, 2gm in the morning and 2gm at night.

Group B: 500mg in divided doses, 250mg in the morning and 250mg at night.

The drug is administered in the following way:

- Group A: *Trikatu Churna* was administered orally mixed with *Ghrita* to 20 subjects twice a day after food, after regular cessation of menstruation, for three consecutive cycles for 90 days.
- Group B: *Pippali Churna* was administered orally mixed with *Ghrita* to 20 subjects twice a day after food, after regular cessation of menstruation, for three consecutive cycles for 90 days.

Duration

For 90 days, with a follow-up once a month.

Inclusion Criteria

- Patients between the ages of 20 and 45 years.
- Having irregular menstrual cycles with a cycle interval of more than 35 days.
- Menstrual abnormalities like oligomenorrhoea, hypomenorrhea.
- Diagnosed case of PCOS by USG.
- Pre-obesity (overweight): (BMI=25.0-29.9)
- Obesity class I(BMI=30.0-34.9)

Exclusion Criteria

- Female patients of age below 20 and above 45 years.
- Heavy bleeding (menometrorrhagia, menorrhagia).
- *Garbhashaya Arbuda* (malignancy of the genital tract).
- *Janma jatha sthree jananganga vikruti* (congenital abnormalities of genital organs).
- Obesity class II or more.
- Suffering from systemic illnesses like chronic diabetes mellitus, HTN, hypothyroidism
- Pregnant women and lactating women.
- Ovarian Cyst >3cm.
- Peptic ulcers, gastric ulcers, duodenal ulcers, and oesophageal ulcers.

Diagnostic Criteria

Investigations

Routine

1. Complete blood picture.
2. Blood glucose test- FBS, PPBS.
3. Urine analysis.

Specific

1. Pelvic Ultrasonography
2. Thyroid function test- T3, T4, TSH.

Subjective Parameters

- Duration of bleeding.
- Irregular menstruation (IMP Days).
- Amount of bleeding and quantity of menstrual

blood.

- Pain during the menstrual period.

Objective Parameters

- Hirsutism (Ferriman Gallwey score) assessing hirsutism in nine areas of the body.
- BMI (25.0 – 34.9).

Gradation of Clinical Features

Subjective Parameters

Table 1: Duration of Bleeding

Duration	Grade Description	Score
3-5 days	Normal	0
2-4 days	Mild	1
1-2 days	Moderate	2
Spotting more than 9 days	Severe	3

Bleeding one or more days is considered as bleeding throughout the day. Spotting is considered as bleeding just two or three drops.

Table 2: Irregular Menstruation (IMP Days)

IMP Days	Grade Description	Score
28 days	Normal	0
29-45 days	Mild	1
46-60 days	Moderate	2
Above 60 days	Severe	3

Table 3: Amount of Bleeding & Quantity of Menstrual Blood

No. of Pads Per Cycle	Grade Description	Score
10-15	Normal	0
16-19	Mild	1
20-25	Moderate	2
More than 25	Severe	3

Table 4: Pain during Menstrual Period

Pain	Grade Description	Score
No pain during menstruation	Normal	0
Menstruation is painful but daily activities are not affected, no need of analgesics	Mild	1
Daily activities are affected, need to take analgesics	Moderate	2
Daily activities are inhibited, affected, pain continues even after taking analgesics	Severe	3

Objective Parameters

Table 5: Grading for Hirsutism (Ferriman Galleway scale)

S. No.	Grading	Total score of Hirsutism
1.	Grade 0	0
2.	Grade 1	<8
3.	Grade 2	9-15
4.	Grade 3	>15

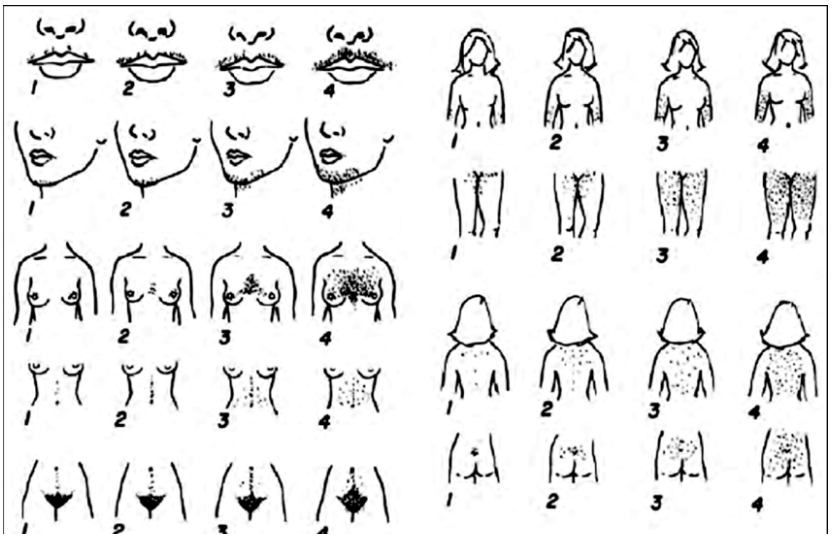

Figure 6: Ferriman Galleway Score

Table 6: Grade Description for Hirsutism

Hirsutism	Grade Description	Score
0	Normal	0
<8	Mild	1
9-15	Moderate	2
>15	Severe	3

Table 7: Grading for BMI

S.No	Grading	BMI in kg/m^2
1	Grade 0	18.5-24.9 kg/m^2
2	Grade 1	25-29.9 kg/m^2
3	Grade 2	30-34.9 kg/m^2
4	Grade 3	35-39.9 kg/m^2

Table 8: Grade Description for BMI

BMI	Grade Description	Score
18.5-24.9 kg/m^2	Normal	0
25-29.9 kg/m^2	Mild	1
30-34.9 kg/m^2	Moderate	2
35-39.9 kg/m^2	Severe	3

Statistical Data

Subjective and Objective parameters were analyzed statistically by suitable statistical parameters.

Assessment of Overall Effect

To assess the overall effect of the therapies, the net result obtained on various parameters of assessment both before and after treatment were taken into consideration. Then, it was graded in terms of percentage of relief in signs and symptoms as below:

Table 9: Percentage of Improvement

Response	Percentage
Excellent response	>75%
Good response	51-75%
Moderate response	26-50%
Mild response	0-25%

RESULTS

A total of 40 patients were selected at random from the OPD of *Prasutitantra and Stree Roga,* at Dr. B.R.K.R.Govt. Ayurvedic Hospital, Erragadda, Hyderabad, based on the signs and symptoms of *Artavakshaya*. They were divided into two groups, Group A and Group B, with 20 patients each. The treatment was planned for 90 days, with follow-ups once in a month or as per necessity. Group A was treated with *Trikatu Churna* 4gm in divided doses, i.e., 2gm in the morning and 2gm at night orally along with *Ghrita* quantity sufficient after food. Group B was treated with *Pippali Churna* 500mg in divided doses, i.e., 250mg in the morning and 250mg at night orally, along with *Ghrita* quantity sufficient after food.

Subjective and objective parameters obtained before and after treatment were recorded and analyzed statistically with suitable analytical tests.

Table 10: Distribution of Patients According to Age

Age	Group A	Group B	Percentage
20-30	13	15	70
31-40	4	4	20
41-50	3	1	10

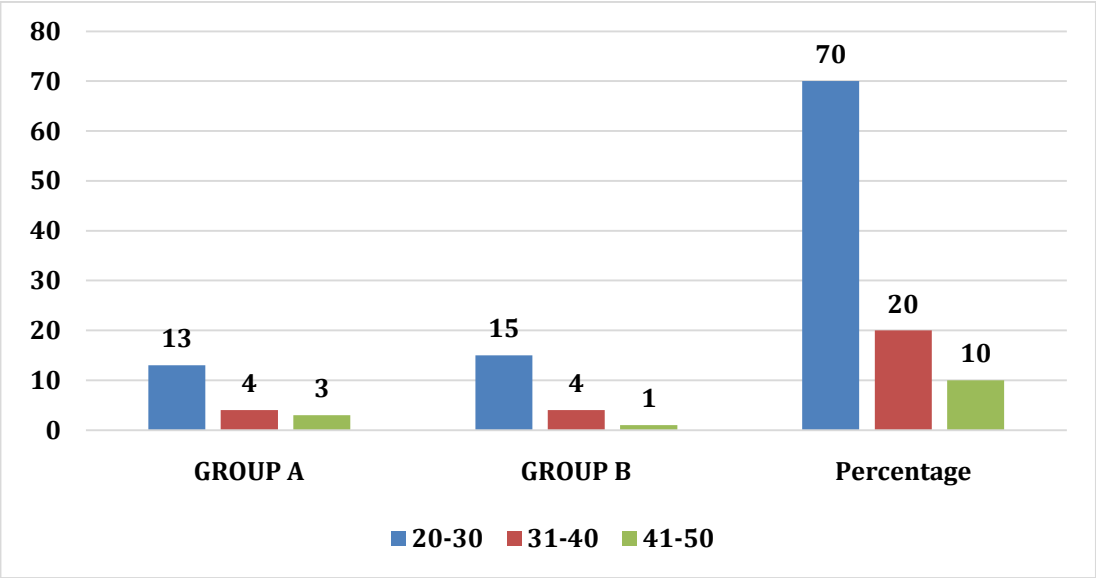

Chart 1: Distribution of Patients According to Age

The above table shows the patients ranging from 20-50 years of age in both the groups. They have been divided into three classes, with each class having 10 in the 10-year of age range. A maximum number of patients, i.e., 28 (70%), was recorded in class 20-30 years, followed by 8 (20%) in class 31- 40 years and 4 (10%) in class 41-50 years.

Table 11: Distribution of Patients According to Occupation

Occupation	Group A	Group B	Total	Percentage
Housewife	8	8	16	40
Teacher	3	3	6	15
Student	9	9	18	45

Occupational incidence shows that among 40 patients, the highest number of patients was 18 (45%) students, 16 (40%) housewives, and 6 (15%) teachers.

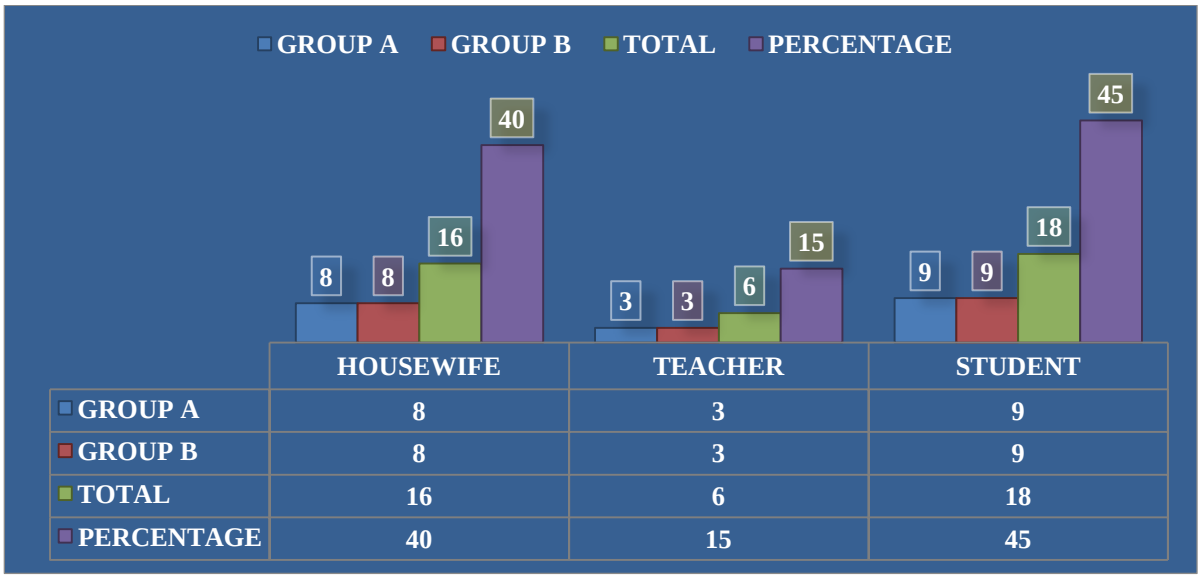

Chart 2: Distribution of Patients According to Occupation

Table 12: Distribution of Patients According to Diet

Diet habit	Group A	Group B	Total	Percentage
Mixed	11	11	22	55
Veg	9	9	18	45
Total	20	20	40	100

The above table shows the distribution of patients according to diet. Out of 40 patients, the maximum number, i.e., 22 (55%), were taking a mixed diet, and 18 (45%) were vegetarian.

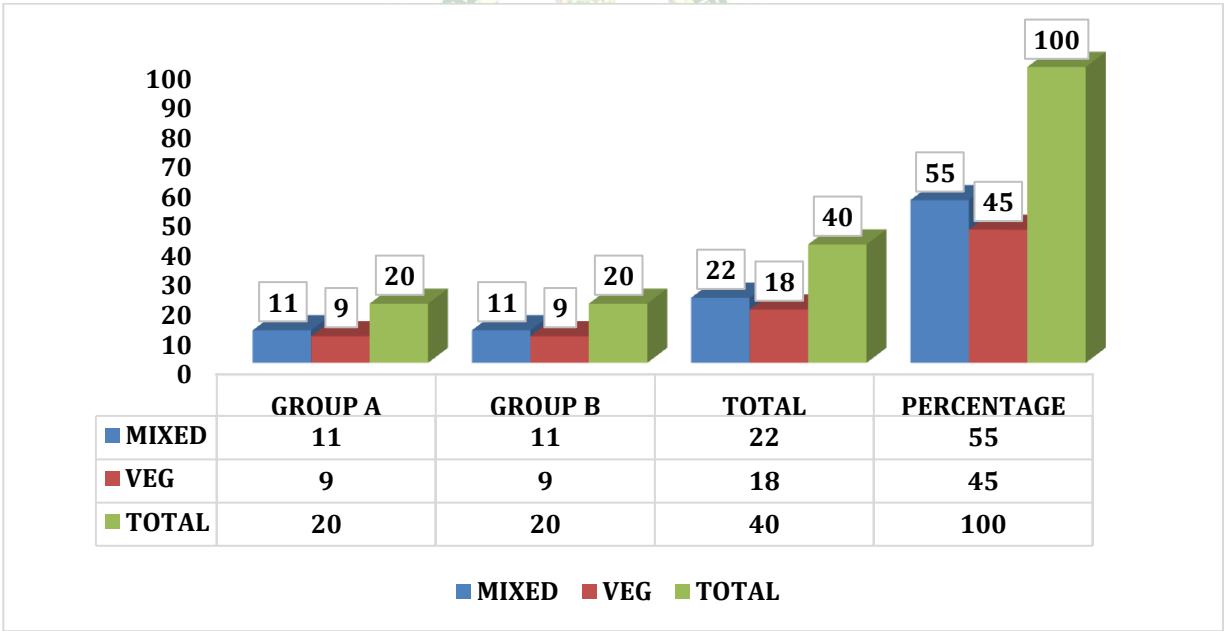

Chart 3: Distribution of Patients According to Diet

Table 13: Distribution of Patients According to Socio-economic status

Economic status	Group A	Group B	Total	Percentage
Upper class	9	6	15	37.5
Middle class	5	8	13	32.5
Lower middle class	6	6	12	30

The above table shows the distribution of patients based on socioeconomic status. Among 40 subjects, the maximum number of patients, i.e., 15 (37.5%), belonged to the upper class, 13 (32.5) patients belonged to the middle class, and 12 (30%) patients belonged to the lower class.

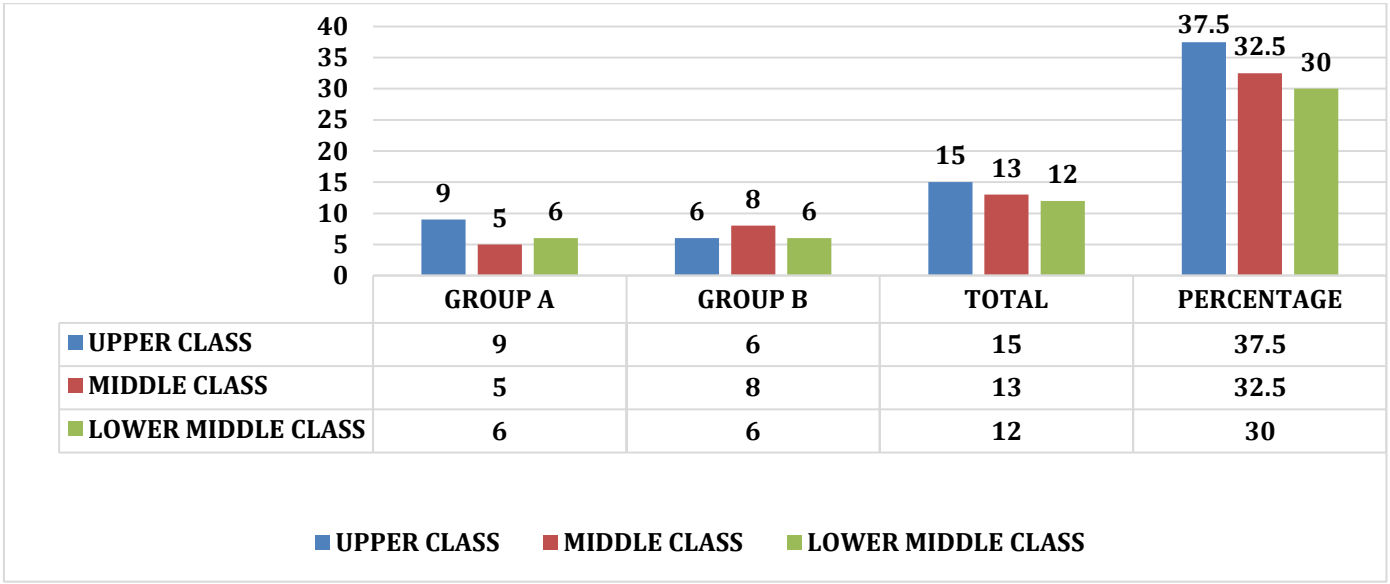

Chart 4: Distribution of patients according to socio-economic status

Table 14: Results of Duration of bleeding before & after treatment in Group A

Grade	No. of Pt. Before Treatment	Percentage	No. of Pt. After Treatment	Percentage
0	0	0	9	45
1	0	0	3	15
2	7	35	8	40
3	13	65	0	0

Table 15: Results of Duration of bleeding before & after treatment in Group B

Grade	No. of Pt. Before Treatment	Percentage	No. of Pt. After Treatment	Percentage
0	0	0	7	35
1	2	10	5	25
2	8	40	8	40
3	10	50	0	0

Table 16: Results of Irregular menstruation (IMP Days) before & after treatment in Group A

Grade	No of Pt. Before Treatment	Percentage	No of Pt. After Treatment	Percentage
0	0	0	11	55
1	5	25	6	30
2	13	65	3	15
3	2	10	0	0

Table 17: Results of Irregular menstruation (IMP Days) before & after treatment in Group B

Grade	No. of Pt. Before Treatment	Percentage	No. of Pt. After Treatment	Percentage
0	0	0	10	50
1	2	10	6	30
2	12	60	3	15
3	6	30	1	5

Table 18: Results of the Amount of bleeding and quantity of menstrual blood before & after treatment in Group A

Grade	No. of Pt. Before Treatment	Percentage	No. of Pt. After Treatment	Percentage
0	0	0	16	80
1	5	25	3	15
2	12	60	0	0
3	3	15	1	5

Table 19: Results of the Amount of bleeding and quantity of menstrual blood before & after treatment in Group B

Grade	No of Pt. Before Treatment	Percentage	No. of Pt. After Treatment	Percentage
0	1	5	14	70
1	9	45	5	25
2	6	30	1	5
3	4	20	0	0

Table 20: Results of Pain during the menstrual period before & after treatment in Group A

Grade	No of Pt. Before Treatment	Percentage	No of Pt. After Treatment	Percentage
0	0	0	11	55
1	5	25	4	20
2	13	65	5	25
3	2	10	0	0

Table 21: Results of Pain during the menstrual period before & after treatment in Group B

Grade	No. of Pt. Before Treatment	Percentage	No. of Pt. After Treatment	Percentage
0	0	0	12	60
1	1	5	4	20
2	14	70	3	15
3	5	25	1	5

Table 22: Statistics of subjective parameters of Group A

Symptoms	Median		S. D. Diff	S. E	Relief %	'Z' Value	'p' Value	Remarks
	BT	AT						
Duration of Bleeding	3	1	0.9787	22.657	66.67	-3.752	<.001	Highly significant
Irregular Menstruation (IMP Days)	2	0	0.8507	18.88	100.00	-3.575	<.001	Highly significant
Amount of Bleeding & Quantity of Menstrual Blood	2	0	0.7539	24.33	100.00	-3.884	<.001	Highly significant
Pain during Menstrual period	2	0	1.04	14.062	100.00	-3.2	<0.001	Highly significant

For the assessment of subjective parameters of Group 'A' before and after the treatment, the Wilcoxon signed rank test was performed and obtained Median, SD, SE, Z and P values. Improvement was noticed in all the parameters, and all the tests were found to be statistically highly significant.

Table 23: Statistics of subjective parameters of Group B

Symptoms	Median		S.D Diff	S. E	Relief %	'Z' Value	'P' value	Remarks
	BT	AT						
Duration of Bleeding	2.5	1	0.8751	22.147	60.00	-3.838	<.001	Highly significant
Irregular Menstruation (IMP Days)	2	0.5	0.9445	20.757	75.00	-3.661	<.001	Highly significant
Amount of bleeding & quantity of menstrual Blood	1.5	0	0.9234	18.947	100.00	-3.562	<.001	Highly significant
Pain during Menstrual period	2	0	1.0501	22.525	100.00	-3.618	<.001	Highly significant

For the assessment of subjective parameters of Group 'B' before and after the treatment, the Wilcoxon signed rank test was performed and obtained Median, SD, SE, Z and P values. Improvement was noticed in all the parameters, and all the tests were found to be statistically highly significant.

Table 24: Statistics of objective parameters of Group A

S.No.	*Lakshana*	Median		S.D Diff	S. E	Relief %	'Z' Value	'p' Value	Remarks
		BT	AT						
1.	Hirsutism	2	1	0.9987	14.013	50.00	-3.2112	< 0.001	Highly significant
2.	BMI	2	0.5	0.9987	14.013	75.00	-3.2112	< 0.001	Highly significant

For the assessment of objective parameters of Group 'A' before and after the treatment, the Wilcoxon signed rank test was performed and obtained median, SD, SE, Z and P values.

Improvement was noticed in all the parameters, and all the tests were found to be statistically highly significant.

Table 25: Statistics of objective parameters of Group B

S.No.	*Lakshana*	Median		S.D Diff	S. E	Relief %	'Z' Value	'p' Value	Remarks
		BT	AT						
1.	Hirsutism	2	0.5	0.7864	20.524	75.00	-3.7029	< 0.001	Highly significant
2.	BMI	2	0	0.887	20.703	100.00	-3.6709	< 0.001	Highly significant

To assess the objective parameters of Group B before and after the treatment, the Wilcoxon signed rank test was performed, and the median, SD, SE, Z, and P values were obtained.

Improvement was noticed in all parameters, and all the tests were found to be statistically highly significant.

Table 26: Comparative effect of treatment on subjective parameters in both the Groups

S.No.	Parameter	Percentage of Relief	
		Group A	Group B
1.	Duration of bleeding	66.67	60.00
2.	Irregular menstruation (IMP Days)	100.00	75.00
3	Amount of bleeding & quantity of menstrual blood	100.00	100.00
4	Pain during menstruation	100.00	100.00

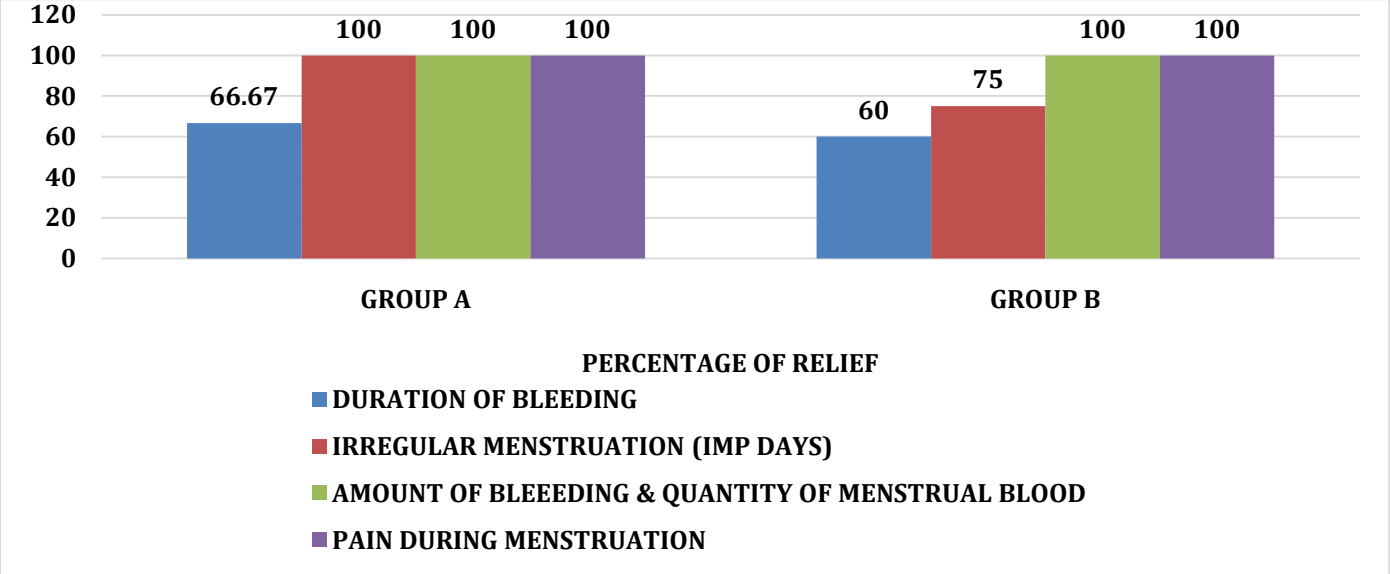

Chart 5: Comparative effect of treatment on subjective parameters in both the Groups

From the above, it is proved that the percentage of relief in all Subjective parameters was better in Group A than Group B.

Table 27: Comparative effect of treatment on objective parameters in both the Groups

S.No.	Parameter	Percentage of Relief	
		Group A	Group B
1.	**Hirsutism**	75.00	50.00
2.	**BMI**	100.00	75.00

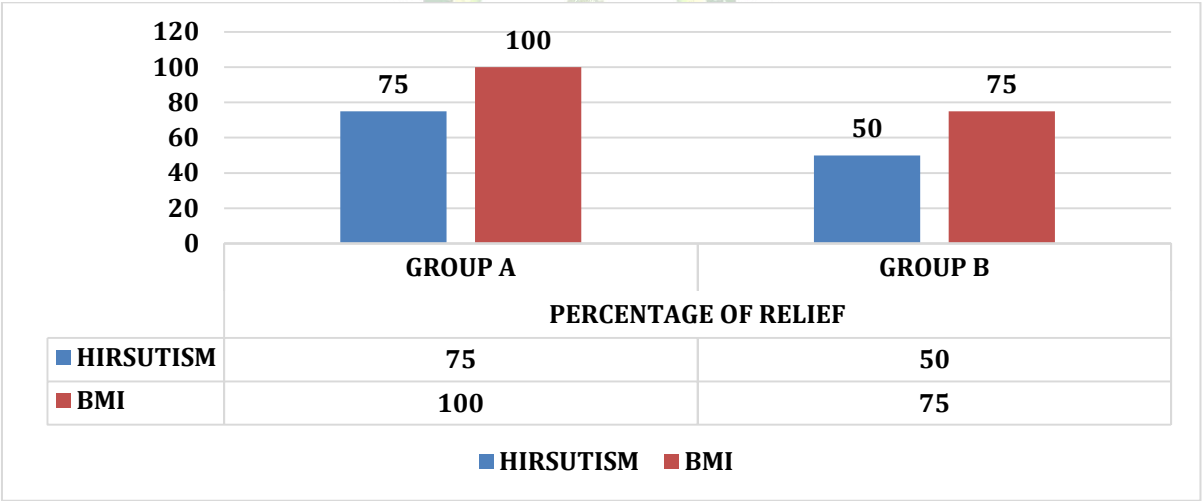

Chart 6: Comparative effect of treatment on objective parameters in both the Groups

Table 28: Overall assessment in subjective and objective parameters in both the Groups

S.No.	Parameter	Percentage of Relief	
		Group A	Group B
1.	**Subjective**	91.67	83.75
2.	**Objective**	87.5	62.5

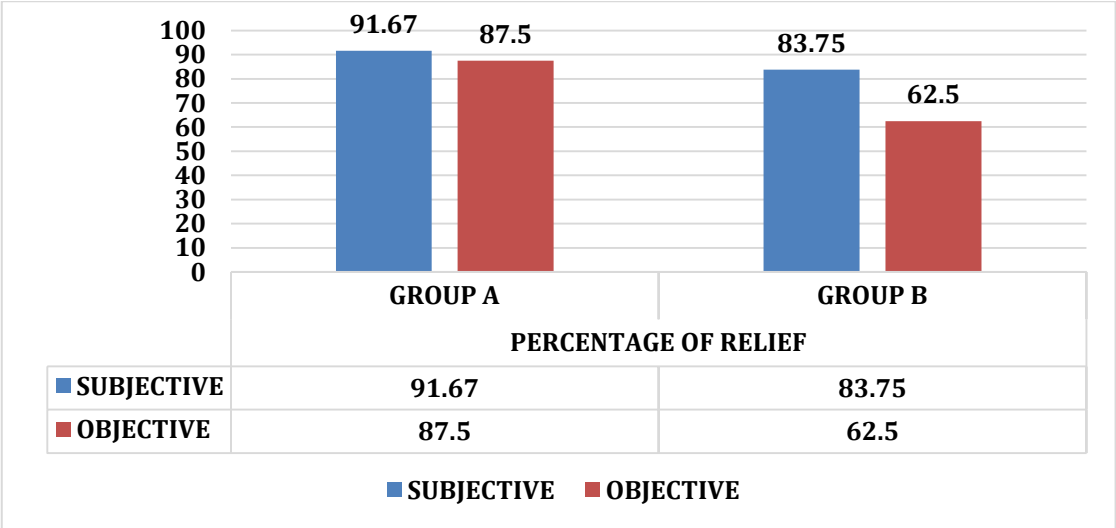

Chart 7: Overall assessment in subjective and objective parameters in both the Groups

From the above, in the overall assessment of therapy, the percentage of relief in the subjective and objective parameters was found to be better in Group A than in Group B.

Table 29: Overall assessment of response in both the Groups

S.No.	Response	No. of Patients & Percentage in Group-A		No. of Patients & Percentage in Group-B	
1.	Excellent Response	8	40%	8	40%
2.	Good Response	5	25%	7	35%
3.	Moderate Response	7	35%	3	15%
4.	Mild Response	0	0%	2	10%

In the overall assessment of response, 'Excellent response' was noticed in 40% of Group A patients and 40% of Group B patients while 'Good response' was observed in 25% of Group A and 35% of Group B. 'Moderate response' was noticed in Group A at 35% and in Group B at 15%. Mild response in Group A 0% and Group B 10%. The overall percentage of improvement in group A was found to be more compared to Group B.

Thus, in this comparative study, Group 'A' (*Trikatu Churna*) produced better results than of Group 'B' (*Pippali Churna*).

DISCUSSION

Artavakshaya is associated with disorders of the *Artava* and *Yoni*, typically manifesting as irregular or absent menstruation, which can be linked to hormonal imbalances like those in PCOS. In PCOS, there is an imbalance in the endocrine system, often resulting in irregular menstruation, anovulation, and ovarian cysts. From an Ayurvedic standpoint, PCOS could be considered as a condition of *Kapha dosha* predominance, characterized by excess *Ama, Mandaagni* and *Vata* derangement affecting the reproductive system.

The word *Artavakshaya* implies scanty menstrual flow associated with pain of variable duration. The *Doshas* chiefly involved are *Vata* and *Kapha.* The *Artava,* which is formed out of *Rasa dhatu,* is affected by the abnormality of *Bhutagni* and *Dhatvagni*. This condition develops into *Artavkshaya* due to *Gunataha vriddhi* of *Kapha* and *Vata* but *Pramana kshaya* of *Artava* due to increased *Tikshna* and *Ushna gunas*, depleting the *Drava* and *Sara guna* of *Pitta*.

Process of Manifestation: The disease *Artavakshaya/ Ksheena artava dushti* is understood to be manifested only with *Lakshanas* like *Yathochita kala adarshanam, Alpata* and *Yonivedana*.

Due to the vitiation of *Kapha* and *Vata*, poor proliferation occurs, causing an inadequate surge of essential hormones like luteinising hormone, and due to poor performance of FSH, there is a possible occurrence of thin endometrium, being insufficient for menstrual flow. This is clinically expressed as a prolonged secretory phase– *Yathochita kala adarshanam*. Due to poor endometrium, there is scanty outcome of menstrual flow, which is expressed as *alpata.* Due to regionally aggravated *Kapha* and *Vata*, wherein there is no adequate *Garbhashaya shodana* resulting in pain in the lower abdomen and low backache– *Yonivedana* due to *Pratiloma gati* of *Apana Vayu*. Discussion on *Chikitsa Siddhanta:* "*Samprapti vighatanameva chikitsa*" in *Artavakshaya*, according to *Acharya Sushruta*, the treatment is through administration of *Agneya dravyas*, which

corrects "*Artava pramanahani*". These *Agneya dravyas,* when administered orally, help in the proper proliferation of the endometrium and regulate the thickness of the endometrium through their *Agneya guna*. The trial drugs *Trikatu churna* and *Pipplai churna* contain *Agneya dravyas,* which are by *Prabhava artava janaka* and *Garbhashaya sankochaka* properties, which will act on *Artavakshaya.*

Mode of action based on phytochemical study: The drugs used here have the following properties.

- *Trikatu Churna* has the following healing properties: The phytochemical *Piperene* present in *Trikatu* is a great bio-enhancer (increases bioavailability of other medicine), hypo-glycaemic, hypolipidemic, and anti-inflammatory[6].
- *PIPERENE* present in *PIPPALI* has hypocholesterolaemic activity[7].
- 5-*Alpha* reductace inhibitors are a class of medications with anti-androgenic effects. These are present in *Maricha,* which is known to be effective in the treatment of hirsutism in women and androgenic alopecia in both men & women[8].
- 6– SHOGAOL present in *SHUNTI* has exhibited the most potent antioxidant and anti-inflammatory properties[9].

The antioxidant property of drugs helps in proper maintenance of oestrogen production, ovulation and proper maintenance of luteal phase, progesterone-regulating whole H- P-O axis for proper physiology of menstruation.

In the present clinical study, a total of 40 patients were diagnosed as *Artavakshaya* and were selected randomly from OPD of *Prasutitantra and Stree Roga* department, Dr. B.R.K.R. Govt. Ayurvedic Hospital, Erragadda, Hyderabad. The patients are categorized according to their age, occupation, diet, socioeconomic status and made into two groups Group A and Group B with 20 patients each and treated with *Trikatu Churna* at a dose of 4gm in divided doses i.e., 2gm in the morning and 2gm at night with *Ghrita* after food for Group A patients and with *Pipppali Churna* at a dose of 500mg in divided doses i.e., 250mg in the morning and 250 mg at night with *Ghrita* after food for Group B patients. The total duration was 90 days, with follow-ups once every month and up to two menstrual cycles after the treatment.

Age: Forty patients were divided into three age groups: 20-30, 31-40, and 41-50. Among these groups, it was observed that the incidence of the disease was highest in the 20-30 age group at 70%. In the other two age groups, the incidence was 20% (8 patients) for the 31-40 group and 10% (4 patients) for the 41-50 group, respectively.

Occupation: Out of 40 patients, 16 (40%) are housewives, 6 (15%) are teachers, and 18 (45%) are students. It was observed that the majority of patients belonged to the students, i.e., 45%.

Diet: Out of 40 patients, 22 people, i.e., 55% of the patients, were consuming a mixed diet, while 18 people, i.e., 45%, were vegetarians. It was observed that mixed diet people are more in incidence. Patients with mixed diet are habituated to include more non-vegetarian food like sea foods, red meat, chicken in their daily dietary schedule, whereas vegetarians are habituated to take high protein diet like peas, dal etc in their dietary schedule.

Socioeconomic status: Out of 40 patients, 15 (37.5%) belonged to the upper middle class, 13 (32.5%) to the middle class and 12 (30%) to the lower middle class. So, the prevalence observed is more in upper-middle-class people, i.e., 37.5%.

Subjective Parameters

The assessment of subjective parameters was analyzed by giving individual scores to symptoms, and the percentage of the result was assessed for each symptom and in every patient. The gradation of symptoms is given by scale; the absence of symptoms is given by grade-0 normal, grade-1 is mild, grade-2 is moderate, and grade-3 is severe. The total scores are counted. For each and every character, individual scoring was given before & after treatment and percentage relief was calculated.

Duration of Bleeding

In Group A, 66.67% regularization was observed in the duration of bleeding. The median score of duration of bleeding before the treatment was three, which came down to 1 after the treatment and was found to be statistically highly significant at a P value of <0.001 and Z value -3.725.

In Group B, 60% of regularization was observed in the duration of bleeding. The median score of duration of bleeding before the treatment is 2, 5 which came down to 1 after the treatment and was found to be statistically highly significant at P value of <.001 and Z value of -3.838.

Irregular Menstruation (IMP Days)

In Group A, 100% of regularisation was observed in irregular menstruation (IMP Days). The median score of irregular menstruation before treatment was 2, which came down to 0 after the treatment and was found to be statistically highly significant with a P value at <0.001 and Z value -3.575.

In Group B, 75% of regularization was observed in irregular menstruation. The median score of irregular menstruation before treatment was 2, which came down to 0.5 after the treatment and was found to

be statistically highly significant with a P value of < 0.001 and Z value -3.661.

Amount of Bleeding and Quantity of Menstrual Blood

In Group A, 100% of regularization was observed in the amount of bleeding and quantity of menstrual blood. The median score of amounts of bleeding and quantity of menstrual blood before treatment is 2 and came down to 0 after treatment and found to be statistically highly significant at P value of < 0.001 and Z value-3.884.

In Group B, 100% of regularization was observed in the amount of bleeding and quantity of menstrual blood. The median score of amounts of bleeding and quantity of menstrual blood before treatment is 1.5, which came down to 0 after the treatment and was found to be statistically highly significant at P value of <0.001 and Z value -3.562.

Pain during menstrual period

In Group A, 100% of relief was observed in pain during the menstrual period. The median score of pain during the menstrual period before treatment was 2, which came down to 0 after the treatment and was found to be statistically highly significant at a P value of <0.001 and Z value -3.2.

In Group B, 100% of relief was observed in pain during the menstrual period. The median score of pain during the menstrual period before treatment was 2, which came down to 0 after the treatment and was found to be statistically highly significant at a P value of <.001 and Z value -3.618.

Objective parameters

Clinical diagnosis of *Artavakshaya* is done based on Parameters like hirsutism and BMI.

Hirsutism

After the treatment, Group A showed an average of 50% relief at P<.001 and a Z value of -3.2112, which is statistically highly significant.

After the treatment in Group B, showed an average of 75% relief at P<.001 and Z value of -3.1029 which is extremely statistically significant.

BMI

After the treatment, Group A showed an average of 75% relief at P<.001 and Z value of -3.2112 which is statistically highly significant.

After the treatment in Group B, showed an average of 100% relief at P<.001 and Z value of -3.6709 of which is statistically highly significant.

Overall Assessment

Group A- Among the 20 patients at the end of the treatment, 8 (40%) patients had excellent relief, 7 (35%) patients had good relief, 3 (15%) patients had moderate relief and 2 (10%) patients had mild relief.

Group B- Among the 20 patients at the end of the treatment, 8 (45%) patients had excellent relief, 5 (25%) patients had good relief, 7 (35%) patients had moderate relief and 0 (0%) patients had mild relief.

By statistical analysis, it can be concluded that both showed significant results, but *Trikatu churna* is a little more than *Pippali churna*.

Probable Mode of Action

Samprapti Vighathana is said to be a treatment as per Ayurvedic view. The action of drug is to overcome *Samprapti Ghathaka* of the disease. Hence, explaining the mode of action is in establishing a relationship between *Samprapti Ghathaka* of the disease and the principles of *Rasa, Guna, Veerya, Vipaka* and *Prabhava* of the drug.

Probable Mode of Action of *Pippali* in *Artavakshaya*

Pharmacological and Therapeutic Properties of *Pippali* (Piper longum Linn.)

- *Pippali* is known for its *Tikta* and *Katu rasas* and its qualities of being *Ushna* and *Laghu*. In Ayurveda, these properties are believed to stimulate *Agni* and help in the absorption of nutrients.
- It has been traditionally used as a *Rasayana* herb and for its ability to balance *Kapha* and *Vatadoshas*, both of which are implicated in the pathophysiology of PCOS.
- Additionally, *Pippali* is believed to enhance *Srotoshodhana*, thus improving the *Artava* and *Yoni* by removing *Ama* and improving circulation to the reproductive organs.

Pippali* and its effects on the *Doshas

- *Vata* imbalance is often seen in PCOS, contributing to irregular menstrual cycles, anovulation and infertility. *Pippali*, with its *Ushna* and *Laghu* properties, has the potential to pacify *Vata* by stimulating *Agni* and improving circulation.
- *Kapha* imbalance, which results in the formation of ovarian cysts (common in PCOS), may be balanced by *Pippali* due to its *Katu* and *Ushna* effects, which help reduce stagnation, *Ama* accumulation, and fluid retention in tissues.
- For *Pitta*, though *Pippali* is *Ushna*, its effect is balanced by its ability to stimulate digestion and promote absorption of nutrients, potentially preventing the *Pitta*- associated inflammation often seen in the reproductive tissues of individuals with PCOS.

Pippali*'s Effect on *Dhatus

- *Rasa Dhatu*: *Pippali* enhances digestion and metabolic activity, which helps in improving the *Rasa Dhatu*, promoting better nutrient absorption and nourishment to the *Artava Dhatu*.
- *Rakta Dhatu*: The *Vata*-balancing effect of *Pippali* helps regulate circulation, and its *Ushna* nature could promote healthy circulation in the uterus, thus addressing blood stagnation that could contribute to ovarian cysts or menstrual irregularities in PCOS.
- *Artava Dhatu*: By stimulating the *Agni* and improving the overall metabolic processes in the body, *Pippali* may help regulate *Artava,* reduce *Ama*, and enhance menstrual regularity and quality, which is often disrupted in PCOS.

Pippali*'s Mode of Action Through the *Panchamahabhutas

Pippali is primarily composed of *Agni* and *Vayu*, which play key roles in its therapeutic actions.

- ***Agni*:** *Agni* is central to metabolism and tissue formation. In the case of *Artavakshaya*, *Pippali* helps to stimulate *Agni* and promote proper digestion and nutrient absorption. This is crucial for the formation of *Artava*, which depends on the nourishment of *Rasa Dhatu* and *Rakta Dhatu*. The *Agni* component helps stimulate *Agni* and *Pitta*, promoting metabolic activities in the body, including improved ovarian function and hormonal regulation. The *Ushna* property of *Pippali* also helps clear *Ama* from the reproductive system, restoring proper function to the *Artava Dhatu* and preventing blockage in the reproductive channels.
- ***Vayu*:** *Vayu* governs movement and circulation within the body. In *Artavakshaya*, *Vata* imbalance leads to poor circulation and stagnation in the reproductive organs. *Pippali*, with its *Vata*-pacifying properties, enhances circulation and restores movement in the *Srotas*, thereby improving the flow of menstrual blood and the health of the ovaries and uterus.
- ***Jala*:** In the context of *Artavakshaya*, water is important for nourishing the tissues, including the reproductive organs. *Pippali*'s action in improving *Agni* helps the body to properly metabolize fluids, ensuring that there is no excess *Kapha* (which can lead to stagnation) or dryness (which can lead to dysfunction in tissue formation).
- ***Prithvi* and *Akasha*:** These *Mahabhutas* are involved in the structure and space needed for proper tissue function. *Pippali*'s effect on circulation and tissue nourishment allows for the proper structural integrity of the reproductive system, ensuring the healthy formation of *Artava Dhatu.*

***Pippali*'s probable mode of action in *Artavakshaya* includes:**

- Pacifying *Vata* and reducing *Kapha* to restore a healthy flow of *Artava*.
- Enhancing *Agni* at the digestive and tissue levels for proper *Dhatu* nourishment and transformation.
- Improving circulation and relieving stagnation through its *Ushna* and *Tikshna gunas*.
- It provides mild rejuvenation to support the long-term health and balance of the reproductive system.
- In this way, *Pippali* promotes a regular and healthy flow of *Artava*, making it effective in managing *Artavakshaya*.

Probable Mode of Action of *Maricha* in *Artavakshaya*

Maricha* and its effects on the *Doshas

- *Vata*: *Artavakshaya* often involves a *Vata dosha* imbalance as *Vata* governs movement, including the flow of *Artava*. *Maricha* has *Ushna veerya* and *Katu Rasa*, which can help pacify *Vata* by balancing its *Sheetha* and *Rukshna gunas*. The *Tikshna* and *Laghu* qualities of *Maricha* further support *Vata* alleviation by encouraging circulation and movement within the body.
- *Kapha*: *Kapha* imbalances lead to stagnation, which can also play a role in *Artavakshaya*. The *Ruksha* and *Ushna* properties of *Maricha* help to reduce *Kapha*, breaking down the blockages or obstructions that might interfere with the normal flow of *Artava*.
- *Pitta*: *Maricha* is *Ushna* and can potentially aggravate *Pitta* if overused. In small quantities, it can help kindle *Agni*, aiding metabolic transformation. For *Artavakshaya* cases involving digestive issues or *Ama*, *Maricha* can improve digestion, thus supporting proper nutrient absorption and aiding *Dhatu* formation, which may influence menstrual health.

Maricha's* Effects on *Dhatus

- In Ayurveda, the nourishment of *Artava dhatu* is dependent on the proper transformation of previous *Dhatus*, particularly *Rasa* and *Rakta*.
- *Maricha*, as an *Agni-deepaka*, may help improve *Jatharagni* and *Dhatvagni,* facilitating better nutrition and formation of *Artava*.
- By enhancing *Agni* and helping eliminate *Ama*, *Maricha* indirectly ensures that *Dhatus* receive proper nutrition, thereby supporting the reproductive system and potentially addressing deficiencies that contribute to *Artavakshaya*.

Maricha's* Mode of action through *Panchamahabhutas

- *Tejas*: *Maricha* primarily influences the *Tejas* due to its *Ushna virya*, which helps to balance *Sheetha* and *Vata* attributes.
- *Vayu:* Its sharp and penetrating qualities align with *Vayu*, which supports movement, possibly helping the downward flow of *Artava* by alleviating blockages.
- *Aakasha:* The light and subtle properties of *Maricha* can help prevent stagnation within the *Dhatus*, particularly relevant for *Kapha*-related stasis that could contribute to menstrual irregularities.
- So, the probable mode of action of *Maricha* in *Artavakshaya* can be summarized as follows**:**
- Circulatory Enhancer: By promoting circulation and warming the body, *Maricha* may help facilitate the downward flow of *Artava*. It also promotes sweating and circulation, further assisting in alleviating any cold-induced *Vata* imbalance.
- Stimulant and Detoxifier: *Maricha*'s *Deepana* and *Pachana* properties aid in reducing digestive disturbances that can indirectly affect menstruation**.**
- Hormonal Regulation: While this is more of a modern understanding, *Maricha*'s effect on *Agni* and metabolism might have subtle implications on hormone regulation within an Ayurvedic framework, improving the overall health of the reproductive system**.**
- So, the probable mode of action of *Maricha* in *Artavakshaya* includes:
- Pacifying *Vata* and reducing *Kapha*.
- Enhancing *Agni* for proper *Dhatu* transformation.
- Improving circulation and reducing stagnation.
- Aligning the *Panchamahabhutas* by warming and mobilizing stagnant energies.
- These actions, combined, support *Maricha*'s potential to influence and regulate the menstrual flow, making it a helpful remedy for *Artavakshaya*.

Probable Mode of Action of *Shunti*

Shunti and its effects on the *Doshas*

- *Vata*: *Artavakshaya* often arises from an imbalance in *Vata dosha*. *Shunti*, with its *Ushna veerya, Katu rasa,* and *Snigdha guna*, counteracts *Vata's sheeta* and *Ruksha gunas,* which can contribute to menstrual irregularities. By pacifying *Vata*, *Shunti* helps promote a more regular flow of *Artava*.
- *Kapha:* In cases where *Kapha* contributes to stagnation or obstruction in the reproductive system, *Shunti*'s *Ushna* and *Ruksha gunas* help mobilise *Kapha*, clearing blockages that might restrict *Artava*. Its *Deepana* and *Pachana* actions break down *Ama* and mucus that may obstruct the reproductive channels.
- *Pitta*: While *Shunti* is *Ushna* and could potentially aggravate *Pitta*, its controlled use is generally balanced and doesn't overly stimulate *Pitta*. It gently ignites *Agni*, which is critical for the transformation and proper formation of *Dhatus*, including *Artava dhatu*.

Shunti*'s effects on *Dhatus

- The formation of *Artava dhatu* depends on the proper nourishment and transformation of previous *Dhatus*, particularly *Rasa* and *Rakta*. *Shunti*'s ability to stimulate *Agni* helps in the effective breakdown and absorption of nutrients, which facilitates the production of healthy *Artava*.
- By promoting digestion and eliminating *Ama*, *Shunti* ensures that *Dhatus* receive proper nutrition and are free from impurities. This action can reduce the deficiencies or imbalances that lead to *Artavakshaya*.
- The formation of *Artava Dhatu* depends on the proper nourishment and transformation of previous *Dhatus*, particularly *Rasa* and *Rakta*. *Shunti*'s ability to stimulate *Agni* helps in the effective breakdown and absorption of nutrients, which facilitates the production of healthy *Artava*.
- By promoting digestion and eliminating *Ama*, *Shunti* ensures that *Dhatus* receive proper nutrition and are free from impurities. This action can reduce the deficiencies or imbalances that lead to *Artavakshaya*.

Shunti*'s Mode of action through *Panchamahabhutas

- *Tejas*: *Shunti* predominantly influences *Tejas* due to its *Ushna virya*, which helps counteract the *Sheeta guna* of *Vata dosha*. This effect is essential for ensuring proper circulation, warmth, and flow of *Artava*.
- *Vayu*: Its *Tikshna* and subtlety also align with *Vayu*, which governs movement in the body. *Shunti*'s light, mobile nature can aid in regulating *Vata*-related functions in the body, supporting the downward movement of *Artava*.
- *Prithvi* and *Aap*: *Shunti*'s slightly *Snigdha* quality offers gentle nourishment to *Dhatus*, which is helpful when there is a lack of grounding and stability due to high *Vata*. This slight nourishing effect supports *Rasa* and *Rakta Dhatu*, aiding in the maintenance of *Artava*. So, the probable mode of action of *Shunti* in *Artavakshaya* includes:
- Pacifying *Vata* and reducing *Kapha* to promote a free, downward flow of *Artava*.

- Enhancing *Agni* for proper *Dhatu* nourishment, leading to the healthy formation of *Artava*.
- Reducing stagnation and improving circulation, especially in the pelvic area, by aligning the influences of *Tejas* and *Vayu*.
- It supports hormonal balance and reproductive health indirectly through its effects on digestion and metabolic transformation.
- *Shunti*, therefore, addresses *Artavakshaya* by balancing *doshas*, enhancing *Agni,* and aiding the proper formation and flow of *Artava*, thus supporting overall reproductive health.

CONCLUSION

The disease *Artavakshaya* is understood as *Vatakapha pradhana artava dushti,* i.e., one among "*Ashta Artava Dushti*" as mentioned by *Acharya Sushruta* & *Acharya Vagbhata*.

It is understood as a premonitory condition of *Nashtartava* or *Anartava.* This condition could be compared to oligomenorrhea/hypomenorrhea based on its clinical presentation, and it is also stated as a precursor of amenorrhea according to contemporary science. The pathology includes an altered or irregular H-P-O axis leading to infrequent and scanty menstruation. Assurance and hormonal therapy are accepted lines of management. According to Ayurveda, in *Artavakshaya,* the line of management is the administration of *Agneya Dravya,* which is *Artava vridhikara.* The patients were given treatment for 90 days and observed for 60 days. The clinical follow-up inferred that cardinal symptoms like scanty menstrual flow, prolonged intermenstrual period, and lower abdominal pain were markedly reduced. The administration of *Trikatu Churna* improved the condition of *Artavakshaya,* i.e., 87.71% relief was noticed based on subjective parameters, and 75% relief was noticed based on objective parameters. The women between the age of 20 to 45 yrs, having irregular menstrual cycles with cycle interval of more than 35 days, menstrual abnormalities like– oligomenorrhoea, hypomenorrhea, pre-obesity (over weight): (BMI=25.0-29.9) and obesity class I (BMI= 30.0-34.9) are selected for study.

Pertaining to socio-economic status, 37.5% of the sample size belongs to the upper class as they are under stress and found more prone to menstrual abnormalities. 40% excellent response was observed, 30% are of good response, 25% moderate and 5% are of mild response.

Further scope of study

Though the results obtained in both the groups are statistically significant, the efficacy of the drugs were studied on a small sample with 20 in each group. To substantiate the results, a large sample study should be conducted. The study needs to be carried out with more parameters and considering the systemic effect of the drug.

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