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A COMPARATIVE CLINICAL STUDY ON *MAHASALVANA PINDA SWEDA*AND *KOLAKULATHADI CHURNA PINDA* SWEDA IN *JANUSANDHIGATAVATA*

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ABSTRACT

Sandhigata Vata is one among the 80 types of *Vatavyadhi*. *Shula Pradhana Vedana* is the cardinal feature of the disease associated with *Vata Poorna Druti Sparsha Shotha (*Swelling*), Atopa (*Crepitus) and *Prasarana Akumchana Pravruthicha Savedana* (painful flexion and extension of knee joint). This condition closely related with *Janusandhigata Vata* or osteoarthritis of Knee joint, it's a form of articular disorder. In *sandigata vata chikitsa Acharya Charaka* has described *Snehana* and *Swedana* over the affected part which relieving pain, swelling, stiffness and improve flexibility. Among the different *Swedana* modalities, *Pinda Sweda* is one of the most popular and is based on the principles of *Sankara Sweda*, which is one among the thirteen types of *Saagni Sweda.*[1] For the present clinical clinical study, *Mahasalvana Pinda Sweda* and *Kolakulathadi Pinda Sweda* is opted as both are possess *Vatahara, Sulahara, Sothahara* and *Vedanasthapana*[2] properties.

KEYWORDS: *Mahasalvana, Sandigata Vata,* Osteoarthritis, *Swedana, Janu Sandi.*

INTRODUCTION

Swedana is one among the *Shadupakrama*. It is a therapeutic procedure through which perspiration is induced by means of various methods. In *Swedana,* the body is exposed to varying intensities and qualities of heat which results in sweating and it is a prime mode of treatment of *Vataja, Kaphaja* and *Vatkaphaja* disorders. In *Panchakarma* therapy *Swedana* plays a major role as *Purvakarma, Pradhanakarma* and *Paschathkarma*. Among the different *Swedana* modalities, *Pinda Sweda* is one of the most popular and is based on the principles of *Sankara Sweda*. It is one among the thirteen types of *Saagni Sweda*. *Sandhigata Vata* is a *Vata Vyadhi* in which aggravated Vata get localized in *Sandhi* (bony joints) causes destruction of the joints and give rise to pain and swelling. It is characterized by *Sandhi Sula* (joint pain), *Shotha* (swelling), *Atopa* (crepitus), and *Prasarana Akunchanayoh Pravruthischa Sa Vedana* (during flexion and extension).

According to WHO osteoarthritis is the second most common musculoskeletal problem among world population and it is the most frequent joint disease with a prevalence of 22% to 39% in India.[3] Osteoarthritis of knee commonly affects people over 45 years of age but can occur at any age.[1] Studies have proved that Knee osteoarthritis is a common progressive multifactorial joint disease of the adult and elderly. In 2002 it was estimated that 43 million adults suffered from Arthritis. Of those, 26.9 million adults aged 25 years or older had osteoarthritis.[2] Mainly it characterized by chronic pain and functional disability. Pathologically it may be defined as a condition of synovial joints characterized by focal loss of articular hyaline cartilage with proliferation of new bone and remodeling of joint contour. Inflammation is not a prominent feature in it.[4]

In *Sandhigata Vata* and osteoarthritis, joint swelling, pain after over use and restricted range of movement are common features. So *Sandhigata Vata* can be correlated to osteoarthritis due to the resemblance in signs and symptoms. *Snehana, Swedana, Upanaha* and *Sammardana* are considered as prime modality of treatment in case of *Sandhigata Vata.*[4] For the present clinical condition of *Janusandhigata Vata*, *Mahasalvana Pinda Sweda* and *Kolakulathadi Pinda Sweda* is opted as both are possessed *Vatahara, Sulahara, Sothahara* and *Vedanasthapana* properties.

MATERIALS AND METHODS

Patients suffering from *Sandhigata Vata* were selected from OPD and IPD of Panchakarma in Alvas Ayurveda Medical College Hospital, Moodbidri, camps and other referrals.

Diagnostic Criteria

Patients were diagnosed based on the following signs and symptoms of *Janisandhigata Vata.*

- *Sandhi Shoola* (pain in knee joint)
- *Sandhi Atopa* (crepitation) associated with any of the following symptoms like,
- *Sandhi Shotha* (knee joint swelling)
- *Prasarana* and *Akunchanayo Pravruthischa sa Vedana* (pain during flexion and extension).

Inclusion Criteria

- Patient fulfilling the diagnostic criteria (*Sandhi Sula* and *Sandhi Atopa* with any of the associated complaints)
- Patients age group between 25-70 years of either sex were considered.
- Patient who are fit for *Choorna Pinda Sweda.*

Exclusion Criteria

- Patients with congenital bony deformity of knee joint.
- Patient having Rheumatoid Arthritis, Gouty Arthritis.
- Patient with acute traumatic injury to the knee.

OBSERVATION

40 participants were enrolled in this study, regardless of their sex, religion, etc. They were randomly split into two groups.

1. *Mahasalvana Pinda Sweda* (Group MSPS)
2. *Kolakulathadi Choorna Pinda Sweda* (Group KKPS)

The following observations were made after the patients were divided into various groups.

In the present study age group was selected between 25 -70 years. Out of 40 patients 27.5% belonged to the age between 25-40 years, 32.5% belonged to 41-55 years and 40% of patients werein the age between 56-70 years. 65% of patients were female and 35% were male, 80% of the patients in the current study identified as Hindu, where as 17.5% and 2.5% identified

as Christian and Muslim, respectively. 84.1% of patients belonged to middle class, 13.6% were in poor and 2.3% of patients belonged to upper class. Out of 40 patients, 30% were housewives, 22.5% were Daily wage workers, 12.5% were doctors, 10% were drivers, teachers, business and nurses. In thepresent study 37.5% had disease onset within the past six months, 32.5% within the past two years,7.5% within the past three to four years, 15% within the past five to six years and 7.5% within the past seven to eight years. Out of 40 patients 25% of the patients were in the group of 171-180cm height, 35% were in 161-170cm, 32.5% were in 151-160cm and 7.5% were in 140-150 cm in height. As per observation 5% of the patients were in the group of 30-40 kg weight, 10% were in the group of 41-50kg, 7.5 were in 5-60kg, 30% were in 61-70kg, 45% were in the group of 71- 80kg and 2.5% were in 81-90 kg. Out of 40 patients 2.5% of the patients were in the group of under weight, 30% were in normal weight and 67.5% were in the group of over weight.

In the present study 85% of the patients were getting aggravation of symptoms after prolonged standing, 82.5% patients by excessive walking, 77.5% patients by Kneeling, 72.5% patients were getting aggravation of symptoms during winter season, 67.5% patients by climbing stairs, 62.5% patients by rainy season, 55% patients by squatting and 27.5% patients by carrying heavy load. Out of 40 patients 77.5% were getting relief in symptoms after taking rest, 57.5% patients by taking hot water bath, 52.5% patients by oil Application and 17.5% patients by wearing knee braces.

RESULT

Statistical analysis of *Mahasalvana Pinda Sweda* and *Kolakulathadi Choorna Pinda Sweda* was done based on the observation derived under various clinical parameters. Here the Sigma Stat Version 3.1 Statistical Package was used. Comparative analysis of the overall effect of the treatments with in the group was done statistically with **Wilcoxon Signed Rank Test** and **Pairedt- Test** and between the group comparison with **Mann-Whitney Rank Sum Test** and **Unpaired t- Test**. Total 40 subjects were enrolled in this study. 20 subjects were in each group assigned randomly as MSPS and KKPS. Each patient was observed thoroughly and clinical findings documented.

Table No. 1: Effect of Treatment of MSPS on Swelling.

Symptoms	BT		Mean score				%			
	Mean	SD		Mean AT	SD	BT-AT		Median	WSRT value	P Value
Swelling	37.89	2.654	AT	37.35	2.55	0.54	1.43	37.750	-66.000	<0.001
			Day 15	37.125	2.316	0.765	2.02	37.500	-78.000	<0.001
			Day 30	37.15	2.306	0.74	1.95	37.750	-78.000	<0.001
			Day 45	37.325	2.232	0.565	1.49	38.000	-66.000	<0.001
			Day 60	37.6	2.479	0.29	0.76	38.000	-45.000	P= 0.004

Table No. 2: Effect of Treatment of KKPS on Swelling.

Symptoms	BT		Mean score				%			
	Mean	SD		Mean AT	SD	BT-AT		Median	WSRT value	P Value
Swelling	40.355	2.606	AT	39.815	2.586	0.54	1.34	39.900	-55.000	P= 0.002
			Day 15	39.8	2.572	0.555	1.38	39.500	-66.000	P<0.001
			Day 30	39.9	2.532	0.455	1.13	39.500	-36.000	P = 0.008
			Day 45	40.125	2.518	0.23	0.57	39.750	-22.000	P=0.078
			Day 60	40.2	2.562	0.155	0.38	40.000	-15.000	P= 0.063

Table No. 3: Effect of Treatment of MSPS on Tenderness.

symptoms	BT		Mean score				%			
	Mean	SD		Mean AT	SD	BT-AT		Median (AT)	WSRT value	P Value
Tenderness	2.25	0.639	AT	0.5	0.513	1.75	77.78	0.500	-190.000	P = <0.001
			Day 15	0.75	0.639	1.5	66.67	1.000	-190.000	P = <0.001
			Day 30	0.8	0.768	1.45	64.4	1.000	-171.000	P = <0.001
			Day 45	0.9	0.788	1.35	60	1.000	-190.000	P = <0.001
			Day 60	1.25	0.639	1	44.44	1.000	-136.000	P = <0.001

Table No. 4: Effect of Treatment of KKPS on Tenderness.

symptoms	BT		Mean score				%			
	Mean	SD		Mean AT	SD	BT-AT		Median	WSRT value	P Value
Tenderness	2.55	0.51	AT	1	0.918	1.55	60.78	1.000	-153.000	P = <0.001
			Day 15	1.1	0.641	1.45	56.86	1.000	-190.000	P = <0.001
			Day 30	1.05	0.686	1.5	58.82	1.000	-190.000	P = <0.001
			Day 45	1.05	0.826	1.5	58.82	1.000	-171.000	P = <0.001
			Day 60	1.2	0.834	1.35	52.94	1.000	-153.00	P = <0.001

Table No. 5: Effect of Treatment of MSPS on Crepitus.

symptoms	BT		Mean score				%			
	Mean	SD		Mean AT	SD	BT-AT		Median(AT)	WSRT value	P Value
Crepitus	1.95	0.605	AT	0.75	0.639	1.2	61.53%	1.000	-210.000	P = <0.001
			Day 15	0.6	0.598	1.35	69.23	1.000	-210.000	P = <0.001
			Day 30	0.9	0.447	1.05	53.84	1.000	-153.000	P = <0.001
			Day 45	0.9	0.553	1.05	53.84	1.000	-153.000	P = <0.001
			Day 60	1.55	0.686	0.4	20.51	2.000	-36.000	P = 0.008

Table No. 6: Effect of Treatment of KKPS on Crepitus.

symptoms	BT		Mean score				%			
	Mean	SD		Mean AT	SD	BT-AT		Median (AT)	WSRT value	P Value
Crepitus	2.05	0.394	AT	0.85	0.933	1.2	58.54%	1.000	-143.000	P = <0.001
			Day 15	1.2	0.696	0.85	41.46	1.000	-120.000	P = <0.001
			Day 30	1.35	0.489	0.7	31.14	1.000	-91.000	P = <0.001
			Day 45	1.45	0.605	0.6	29.27	1.500	-55.000	P = 0.002
			Day 60	1.5	0.688	0.55	26.83	2.000	-45.000	P = 0.004

Table No. 7: Effect of Treatment of MSPS on WOMAC Score.

symptoms	BT		Mean score				%			
	Mean	SD		Mean AT	SD	BT-AT		Mean (AT)	T value	P Value
WOMAC Score	66.247	19.178	AT	45.091	17.662	21.156	31.94%	45.091	10.022	P = <0.001
			Day 15	31.371	13.12	34.876	52.65	31.371	10.764	P = <0.001
			Day 30	27.102	12.143	39.145	59.09	27.102	11.514	P = <0.001
			Day 45	22.571	12.744	43.676	65.93	22.571	11.361	P = <0.001
			Day 60	22.846	10.823	43.401	65.51	22.846	9.652	P = <0.001

Table No. 8: Effect of Treatment of KKPS on WOMAC Score.

symptoms	BT		Mean score				%			
	Mean	SD		Mean AT	SD	BT-AT		Mean (AT)	T value	P Value
WOMAC Score	66.859	17.038	AT	47.022	17.199	19.837	29.67%	47.022	10.242	P = <0.001
			Day 15	38.079	14.867	28.78	43.05	38.079	10.836	P = <0.001
			Day 30	32.549	10.143	34.31	51.32	32.549	11.241	P = <0.001
			Day 45	29.815	9.955	37.044	55.41	29.815	11.800	P = <0.001
			Day 60	29.673	10.632	37.186	55.62	29.673	10.760	P = <0.001

Table No. 9: Effect of Treatment of MSPS on Flexion.

symptoms	BT		Mean score				%		
	Mean	SD		Mean AT	SD	AT-BT		T value	P Value
Flexion	99.75	8.955	AT	114	9.119	14.25	14.29	-9.190	P = <0.001
			Day 15	110.75	7.482	11	11.03	-6.525	P = <0.001
			Day 30	111.25	7.587	11.5	11.53	-7.071	P = <0.001
			Day 45	108.75	8.565	9	9.02	-5.914	P = <0.001
			Day 60	108	8.944	8.25	8.27	-5.320	P = <0.001

Table No. 10: Effect of Treatment of KKPS on Flexion.

symptoms	BT		Mean score				%		
	Mean	SD		Mean AT	SD	AT-BT		T value	P Value
Flexion	101	10.834	AT	115.75	13.502	14.75	14.60	-5.613	P = <0.001
			Day 15	113.25	8.156	12.25	12.13	-6.563	P = <0.001
			Day 30	112.5	8.351	11.5	11.39	-5.685	P = <0.001
			Day 45	109.75	9.101	8.75	8.66	-5.044	P = <0.001
			Day 60	110.5	7.931	9.5	9.41	-4.311	P = <0.001

Table No. 11: Effect of Treatment of MSPS on Extension.

symptoms	BT		Mean score				%		
	Mean	SD		Mean AT	SD	BT-AT		T value	P Value
Extension	1.175	0.936	AT	0.6	0.598	0.575	48.93	2.930	P = <0.009
			Day 15	0.425	0.591	0.75	63.82	4.177	P = <0.001
			Day 30	0.475	0.595	0.7	59.57	3.559	P = 0.002
			Day 45	0.5	0.513	0.675	57.45	3.090	P = 0.006
			Day 60	0.35	0.489	0.825	70.21	3.629	P = 0.002

Table No. 12: Effect of Treatment of KKPS on Extension.

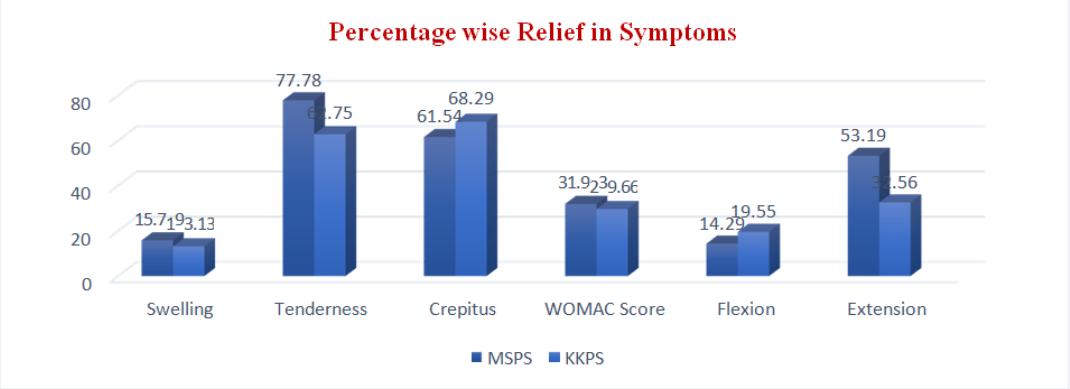
symptoms	BT		Mean score				%		
	Mean	SD		Mean AT	SD	BT-AT		T value	P Value
Extension	1.075	1.004	AT	0.725	0.752	0.35	32.55	2.333	P = 0.031
			Day 15	0.85	0.671	0.225	20.93	2.139	P = 0.046
			Day 30	0.875	0.686	0.2	18.60	0.954	P = 0.352
			Day 45	0.6	0.681	0.475	44.18	1.308	P = 0.206
			Day 60	0.65	0.813	0.425	39.53	1.669	P = 0.111

Table No. 13: Comparative Result of Group MSPS and Group KKPS.

Parameters	Group MSPS (Median)	Group KKPS (Median)	Mann – Whitney Test	
			T Value	P Value
Swelling	0.5	0.5	419.000	0.818
Tenderness	2	2	428.500	0.626
Crepitus	1	1	376.000	0.363

Table No. 14: Comparative Result of Group MSPS and Group KKPS.

Parameters	Group MSPS (Mean)	Group KKPS (Mean)	T – Test	
			T Value	P Value
WOMAC SCORE	**21.155**	**19.833**	0.462	P = 0.647
Flexion	14.250	19.750	-1.067	P = 0.292
Extension	0.625	0.350	1.170	P = 0.249



Graph No. 1: Percentage wise relief in symptoms.

DISCUSSION

1. Effect on Swelling

After doing MSPS 15.79% and KKPS 13.3% reduction in swelling was observed after treatment (8th day). With in the group comparison The P value (P=<0.001) shows reduction in swelling is statistically significant in group MSPS and KKPS. Reduction of swelling in group MSPS and KKPS was observed after treatment and till second follow up (30th day). It may be due to anti- inflammatory effect of drug combination. *Dhanyamla* due to its *Ushna Guna* and *Ushna Veerya* destroys the vitiated *Vata.* Flavanoids & Tannin present in *Dhanyamla* produces Anti- inflammatory actions.

2. Effect on Tenderness

After doing MSPS 77.77% relief and KKPS 60.78 % relief was observed after treatment (8th day).The P value (P=<0.001) shows reduction in tenderness is statistically highly significant in group MSPS and KKPS. The improvement was maintained during follow up also. The

mean rank of tenderness was reduced from 2.25 to 0.5 and 2.55 to 1 in group MSPS and KKPS respectively. During follow up obtained result was maintained with P value < 0.001 in both the groups. This may be due to analgesic and anti-inflammatory properties of drugs belonging to both groups. Low level of Superficial heat activates thermoreceptors, in turn, initiates signal that block the processing of pain signals (nociception). The pressure applied during the procedure activates the proprioceptors, which when activated blocks the transmission of pain signals to spinal cord and brain.[5]

3. Effect of Treatment on Crepitus

After doing MSPS 61.53% relief and KKPS 58.53% relief was recorded after treatment (8^{th} day). The P value (P=<0.001) shows that reduction in crepitus is statistically significant in both the group. The changes in the mean rank was observed from 1.95 to 0.75 and 2.05 to 0.85 in group MSPS and KKPS respectively. During follow up also the significant reduction was maintained with p value <0.001 in both the groups. It may be due to the properties of *Ghrutha* which is used for *Stahnika Abhyanga* and also due to the *Churna* Combination which is having *Snigdha* property. *Ghritha* possess *Guru*, *Snigdha*, *Pichila Guna*, and *Vata, pitta hara* properties, which may have acted on crepitus. *Ghritha* being one among *Chathu Sneha* acts on *Rukshata, Laghutva* and *Kharatva* brought by aggravated *Vata.*

4. Effect on WOMAC Score

After doing MSPS 31.94% improvement and KKPS 29.66% improvement in WOMAC Score was recorded after the treatment. There is statistically highly significant change observed in both the group with P value<0.001.

5. Effect on Flexion

After doing MSPS 14.29% improvement and KKPS 19.55% improvement was recorded after treatment (8^{th} day). The P value (P=< 0.001) shows highly statistically significant improvement inflexion of Knee joint in both the groups.

6. Effect on Extension

After doing MSPS and KKPS, 53.19% and 32.56% of improvement was noted respectively in boththe groups. Statistically significant result was observed with p value <0.001.

7. Effect on Range of Motion

Group MSPS and Group KKPS showed statistically significant improvement in range of

movement. Following the treatment there is reduction of *Vata* and increase of *Shleshaka Kapha,* There by increasing mobility. It reduces inflammation, relaxes local musculature by the physical effect of heat, thereby reduces pain and increases the joint flexibility. Localized, repeated heat therapy may promote an angiogenic environment and enhance muscle strength.[6]

8. Effect on Pain

Pain, Stiffness and physical function were evaluated by WOMAC Score CRD Pune version and high score on WOMAC Score indicates that worse pain, stiffness and limitations in Physical functions. Reduction in pain and improvement in physical function was observed in both the group and the improvement was highly significant in both the group with $p < 0.001$.

After treatment marked improvement was observed in symptoms like pain on going up and down stairs, while sitting cross legged on floor, rising from cross legged position, walking on flat surface, prolonged standing, while squatting and rising from kneeling position. It might be due to the effect of *Swedana* and *vedanasthapana* property of drug combination.

In both group *Mahasalvana* and *Kolakulathadi Choorna* all the drug posses the qualities like *Sulahara, Sothahara,* etc. and also studies have proven the analgesic and anti-inflammatory action of these drugs.

Probable Mode of Action of *Choorna Pinda Sweda*

Swedana is a procedure which stimulates the body temperature by direct contact with the external heat source, hence it producing *Sweda.* Pinda *Sweda* is a form of *Sankara Sweda* and also it is a *Bahya Sthanika* or *Sarvanga Snehana* and *Swedana* Procedure. *Snehana* mainy act against the *Ruksha Guna* produced by *Vata* and *Swedana* act against the *Sheeta Guna*. Due to this property it reduces the *Sthanbha* (stiffness), *Gourava* (heaviness) and *sheeta* (Coldness) caused by *Vata* and *Kapha Dosha*. The drugs used for *Choorna Pinda Sweda* has *sulahara, shothahara* and *Vedhanasthapana* properties and also it possess *Teekshna, Ushna Guna* and *Kapha Vatahara* properties. All these properties act directly or indirectly by means of *Swedana* procedure and bring the desired effect.

On modern point of view all these drugs have analgesic, anti inflammatory and anti-degenerative properties. For getting desired *swedana* effect these drugs are made into *Pottali* and are rubbed over the affected part after heating it to the tolerable temperature. Studies

have proven that skin permeability increases with rise in temperatue.[7]

Swedana inhibits the inflammatory activity by enhancing the activity of glucocorticoid via heat shock proteins and reduces swelling and pain.[8] On exposure to heat via various means the cells releases protein called heat shock proteins. These proteins have various health benefits such as protein synthesis, improved circulation, metabolic health and anti-inflammatory effect in chronicinflammation.[9]

MODE OF ACTION OF DRUG

Mahasalvana yoga

Tila possess *Guru, Snigdha, Teekshna, Sukshma Guna Ushna Veerya, Vata Kaphahara* and *Balya Karma*. Studies have proven that the pharmacological properties like vaxo relaxant activity and analgesic activity of Sesamum indicum. *Atasi* possess *Guru, Snigdha, Pichila Guna Ushna Veerya* and *Vatahara* properties. Pharmacological actions like Anti-inflammatory and analgesic properties of Linum usitatissimum is also proven. *Atasi* have potential anti- inflammatory analgesic and anti-bradykinin activities due to the presence of Omega 3 fatty acids and alpha – linolenic acidin *Atasi. Ashwaganda* also have the analgesic and anti-inflammatory property. Studies have proven that the aqueous extract of Withania containing preparation *Withania somnifera* has demonstrated analgesic activity in the experimentally induced mechanical pain in healthy human volunteers.[159] *Dasamoola* also have anti-inflammatory, analgesic property. As per Ayurveda it possess *vatahara, Shulahara* and *Vedanasthapana* properties. Due to the combined effect of *choorna* combination ithelp to reduce the pain, stiffness and swelling in Osteoarthritis conditions.

Kolakulathadi Choorna

It is a combination of 11 drugs posses *Ushna, Teekshna, vatahara, Sulahara, Shothahara* and *Vedanasthapana* properties. *Kola* Z.jujuba has showed marked anti-inflammatory and anti-spasmodic effect. Studies have proven that anti -inflammatory and analgesic activity of *Kulatha*. *Rasna* is an effective anti rheumatic and anti- arthritis drug. The ethanolic extract of P. lanceolata exhibited significant anti-inflammatory activity. It has been proven that the different bioactive compounds isolated from *Saussurea lappa* also have inhibitory effect on inflammation. Anti- inflammatory effect of methanolic extract is also proven. Essential oil extracted from the wood of *Devadaru* (Cedrus deodara) showed significant anti-inflammatory activity. The analgesic activityof essential oil also proven. The studies also revealed that the analgesic and ant- inflammatory properties of A. calamus.

CONCLUSION

Both *Mahasalavana Pinda Sweda* and *Kolakulathadi Choorna Pinda Sweda* showed highly significant (p<0.001) effect on Tenderness, Crepitus, WOMAC Score and Flexion. Highly Significant (P<0.001) effect on swelling was seen till 45th Day in Group MSPS and till 30th Day in Group KKPS. In group MSPS Highly significant (P<0.001) effect was seen in Extension of knee and in KKPS it was significant with p value <0.05). On comparing the groups, no significant difference was observed all the parameters except crepitus in first follow up. On between the group comparison on first follow up there was statistically significant difference observed (P<0.05). Group MSPS showed more improvement. In group MSPS out of 20 patients 45 % has got marked improvement, 30 % has got moderate improvement and 25 % has got mild improvement. In group KKPS 35 % has got marked and moderate improvement, 25 % has got mild improvement and 5 % has got no improvement.

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