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RESEARCH ARTICLE

A Comparative Clinical Study on *Agnikarma* Along with *Panchatikta Guggulu* in the Management of *Janu Sandhigatvata* (Osteoarthritis of Knee Joint)

Manisha M. Kapadiya[1*] and T. S. Dudhamal[2]

[1]Department of Shalyatantra, JS Ayurved Mahavidhyalaya, Maganlal Adenwala Mahagujarat University, Nadiad - 387001, Gujarat, India; drmkapadiya@gmail.com

[2]Department of Shalyatantra, Institute of Teaching and Research in Ayurveda (INI), Ministry of Ayurveda, Jamnagar - 361008, Gujarat, India

Abstract

Background: Osteoarthritis is defined as a slow reduction of joint space and continuing degeneration of articular cartilage. This condition involves corrosion of the cartilage of the affected joint bone. **Aim:** To assess the efficiency of *Agnikarma* and *Panchatikta Guggulu* in the management of *Janu Sandhigatavata* or Osteoarthritis (OA) of the knee joint. **Methods:** 61 diagnosed cases of *Janu Sandhigatavata* (OA of knee joint) were randomly assigned into two groups, among them 57 were completed and 4 patients dropped out. In group AG (*Agnikarma* with *Panchatikta Guggulu*)(*n* = 29), patients were managed by *Agnikarma* with *Panchadhatu Shalaka* and *Panchatikta Guggulu* orally by giving lukewarm water after the meal. In group AP (*Agnikarma* with Placebo) (*n* = 28), patients were managed by *Agnikarma* with *Panchadhatu Shalaka* and a placebo capsule was orally given with lukewarm water after the meal. In group AG and group AP, 70.35% and 61.85 % relief were found in pain. **Result**: A total of 5.55% improvement was noted in group AG and 1.92% in group AP. Both groups provided 68.57% relief in stiffness. Statistic results show both treatment protocols were equally effective but clinically the mean of pain shows better results in Group AG than Group AP. **Conclusion:** *Agnikarma* with *Panchatikta Guggulu* is more effective than *Agnikarma* and placebo capsule alone in the management of *Janu Sandhigatavata.*

Keywords: *Agnikarma,* Osteoarthritis*, Panchadhatu Shalaka*, *Panchatikta Guggulu, Sandhigatavata*

1. Introduction

Acharya Sushruta has narrated *Sandhigatavata* under *Vatavyadhi*. *Vata Prakopa* takes place due to *dhatu kshaya* in *vriddhavastha*, which makes every person prone to degenerative disorders. Pain is an undesirable condition which affects individuals in their routine lives. Patients suffer more when vital joints of the lower limbs like knee joints are affected. OA is specified by a gradual reduction of joint space and damage of cartilage of the articular surface. OA is a consequence of systematic factors like genetics, age, environmental factors and local factors like joint deformity, strenuous activity or injury. This causes an ailment with explainable morphological and objective features and leads to pain and stiffness in the affected joints[1]. This degenerative condition involves the progressive destruction of the cartilage of the bones of the joint where two bones meet.

OA is the most common reason for disability reported by over 100 million people globally[2]. 1 out of 10 persons in the world suffer from OA before 60 years of age and 3 out of 4 persons after 60 years of age. Till the age of 55, the incidence of this condition is equal for both sexes. After 55, women experience a higher incidence[3]. By 2020, it is expected that 7 million people will be affected by osteoarthritis. By that time, the population of India is projected to reach 100 million. The incidence of knee osteoarthritis increases with each decade of life, with the highest number of

*Author for correspondence

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cases recorded between the ages of 55 and 64[4]. 53.4% of individuals with OA have a positive family history. There can be considerable genetic and family history components to Osteoarthritis[5]. 80% of the population has radiographic evidence of OA by the age of 65, although only 60% exhibit any symptoms[6]. The global prevalence of OA is 9.6% in males and 18% in females[7]. The available treatment options for OA are analgesics, anti-inflammatory drugs and surgery but none of these treatments can arrest the progression of this disease[8]. In old age, adverse effects like hyperacidity, gastritis and even renal failure may develop due to long-term use of these drugs.

This disease develops in *Janu Sandhi* (knee joint). It is considered as *Marma* (vital part). Diseases which develop in joints and other vital parts are categorised as a diseases of the *Madhyama Rogamarga.* Thus, the condition of *Madhyama Roga Marga, Vata Dosha* and *Dhatukshaya* like OA can be considered a *Yapya* (palliative disease)[9]. Acharya Charaka also mentions that the diseases which need *Agnikarma* are considered *Kashta Sadhya* (difficult to cure)[10]. For the last 3000 years, *Agnikarma* has had a local analgesic effect that has been adopted and recorded. *Agnikarma* procedure needs to be introduced as a new pain management tool. *Agnikarma* is the best treatment for *Vata-Kapha Janya Rogas*[11].

According to Acharya Charaka, in *Asthidhatu Dushti, Basti* made of *Tikta Dravya, Ghrita* and *Kshira* should be given and *Panchatikta Guggulu* is indicated for *Sandhigatavata* and *Ashthigatavata*[12,13]. It consists of 33 ingredients, most of which contain *Tikta-Madhura Rasa, Ushna Virya* and *Katu Vipaka.* This prospective open-labelled comparative clinical trial was conducted to assess the effectiveness of *Agnikarma* with *Panchatikta Guggulu* in the management of *Janu Sandhigatavata* (osteoarthritis of the knee joint).

2. Materials and Methods

2.1 Collection of Samples

Individuals of *Sandhigatavata* (OA) were collected from the outdoor patient department of the hospital irrespective of demographic data. Patients were diagnosed based on clinical features as per specially prepared proforma. Informed written consent was taken from each patient before the inclusion in the study. The clinical trial was permitted by the Institutional Ethics Committee (IEC), vide letter no PGT/7/-A/Ethics/2017-18/2134 dated 29/11/2017. This clinical trial is registered under the Clinical Trial Register of India (CTRI) vide registration number: CTRI/2018/01/011603.

2.2 Diagnostic Criteria

The patients were analysed based on the classical features of *Sandhigatavata* that is *Shandhishula* (Pain), *Sandhigraha* (Stiffness), *Sandhisphutana* (Crepitus), *Shotha* (Swelling), *Akunjanaprasarana Vedana* (Decreased Range of Movement (ROM))[14-16] and osteoarthritic changes noted in the knee joint X-ray.

2.3 Inclusion Criteria:

The diagnosed cases of *Janu Sandhigatavata* (O.A. of knee joint) with a duration of up to 7 years were mostly in the age group of 35-70 years of both sexes were included in the study. Relapse cases of previously done *Agnikarma* on the knee joints were also included in the study.

2.4 Exclusion Criteria

Patients below 35 years and above 70 years of age were excluded from the study. Patients having diabetes mellitus, Rheumatoid Arthritis (RA) positive, gross knee joint effusion and traumatic knee joint pain were excluded. Other diseases like paralysis, Parkinson's disease, anaemia, malignancy and pregnant and lactating females were excluded. Known cases of secondary OA due to Tuberculosis (TB), Syphilis, Acquired Immune Deficiency Syndrome (AIDS), Leprosy etc. were excluded.

2.5 Laboratory and Radiological Investigation

In this study, RA factor qualitative to rule out rheumatoid arthritis, Random Blood Sugar (RBS) and C- eactive protein (CRP) were done in both groups before treatment only for screening purposes. Hb%, Total Leucocyte Count (TLC), Differential Leucocyte Count (DLC), Erythrocyte Sedimentation Rate (ESR), serum uric acid, serum creatinine, Serum Glutamic Pyruvic Transaminase (SGPT), Serum Glutamic

Oxaloacetic Transaminase (SGOT), Alkaline Phosphatase (ALP), urine routine and microscopic investigations were carried out before the treatment in both the groups. To rule out the significance of the different values (which may be due to internal medication) in group A, all investigations before and after the treatment were conducted except RA factor and CRP. X-ray of the knee joint (A/P and lateral view), was carried out before and after the treatment for both the groups.

2.6 Materials

A total of 61 diagnosed cases of group AG patients with OA in the knee joints (n=29) were managed with *Agnikarma* and *Panchatikta Guggulu* orally and group AP (n=28) patients having *Sandhigatavata* were managed with *Agnikarma* and placebo capsule orally (Figure 1).

Panchadhatu Shalaka contains *Tamra* (copper) 40%, *Loha* (iron) 30%, *Yashada* (zinc) 10%, *Rajata* (silver) 10%, *Vanga*(tin) 10%[17].

2.7 Methodology

- Group AG: 31 patients of *Janu Sandhigatvata* were treated by *Agnikarma* as well as *Panchatikta Guggulu*[18] for oral use with a dosage of 1gm three times a day.
- Group AP: 30 patients of *Janu Sandhigatavata* were treated with *Agnikarma* as well as Placebo capsule filled with wheat powder for oral use with a dosage of 500mg, 1 capsule three times a day.

2.8 Procedure of *Agnikarma*

Agnikarma was performed once a week for four times. Acharya Sushruta has categorised it into three

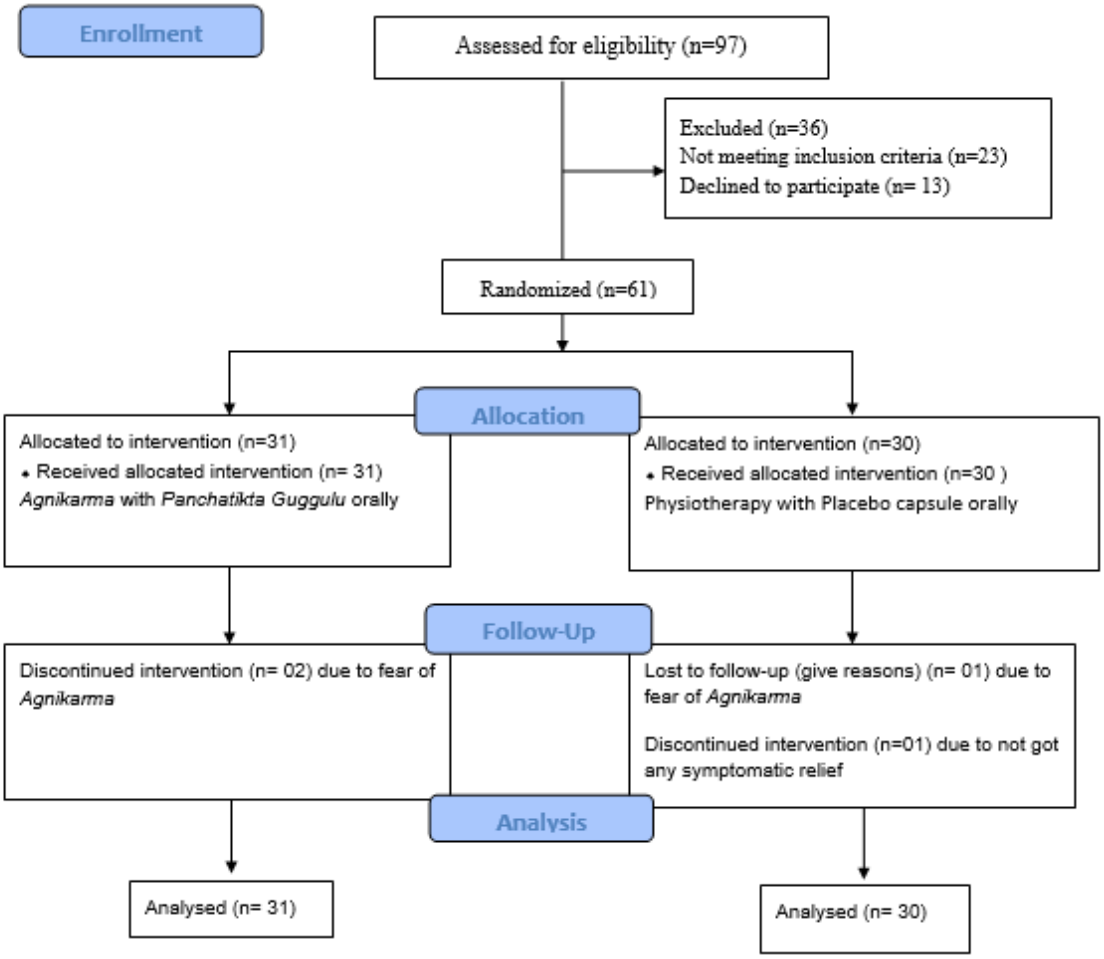


Figure 1. Consort flow chart.

parts, *Purva Karma* (pre-operative), *Pradhana Karma* (operative) and *Paschata Karma* (post-operative).

2.8.1 Purvakarma

The procedure was explained to the patient prior to enrolment and written consent was also obtained. An information sheet was provided to all the patients at the time of registration. Tetanus toxoid 0.5ml IM was administered. *Snigdha Picchila Annapana sevana* (khichadi/rice and curd) was advised before the procedure. *Kumari Patra Majja* (pulp of *Aloe Vera*) was prepared and *Panchadhatu Shalaka* was heated on high heat. The local part was wiped up with sterilised gauze and covered with a cut sheet. All the vitals i.e. pulse rate, blood pressure, consciousness and temperature were recorded before the procedure.

2.8.2 Pradhana Karma

In a supine position and semi-flexed knees, the *Agnikarma* with *Panchadhatu Shalaka* was done at the most painful/tender area of the knee joints. Each tender point was touched with the tip of the *Panchadhatu Shalaka* for less than 1 second. *Samyaka Bindu Vishesh Twaka Dagdha* (micro second-degree burn) was produced. Each burn mark was 1-2mm in diameter with a depth of less than 1mm and the gap between two *Agnikarma* marks was 0.5cm. After the removal of the hot *Shalaka*, *Ghrita Kumari Majja (Aloe Vera* pulp*)* was applied to the burn points to relieve the burning sensation (Figure 2).

2.8.3 Paschata Karma

Haridra Churna (powder of *Curcuma longa* Linn) was sprinkled on the *Samyaka Dagdha Vrana* (burn wound). The patient was recommended to apply *Madhu* (honey) and *Sarpi* (ghee) once daily for 5 days. A normal diet was advised 2 hours after the procedure. The patient was recommended to prevent water from coming into contact with *Dagdha Vrana* for at least 24 hours.

2.9 Assessment Criteria

2.9.1 Subjective Parameters

The evaluation of relief in clinical features was done after the accomplishment of the treatment protocol by gradation of subjective parameters like pain, crepitus and stiffness which were recorded before and after treatment.

2.9.2 Pain: VAS (Visual Analogue Scale)

Table 1. Crepitus

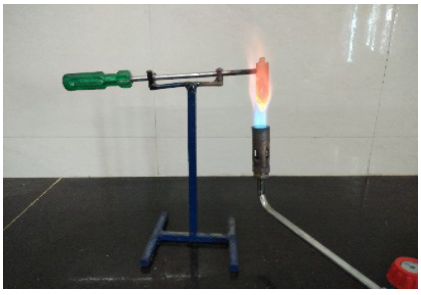
0	No Crepitus
1	Palpable Crepitus
2	Audible Crepitus

The above table (Table 1) depicts the gradation pattern of knee joint crepitus. Crepitus was recorded as grade 0 = none, grade 1 = palpable crepitus and grade 2 =audible crepitus.

Table 2. Stiffness

0	No Stiffness
1	Mild Stiffness (for a few minutes, relieved by mild movements).
2	Moderate Stiffness (for more than 1 hour, once a day).
3	Severe Stiffness (more than 1 hour, many times a day affecting daily routine.

The above table (Table 2) shows the gradation of knee joint stiffness. Knee joint stiffness recorded as grade 0 = No stiffness, grade 1 = Mild stiffness (for few minutes,



Red hot *Panchadhatu Shalaka*

Agnikarma with *Panchadhatu Shalaka*

Samyak Dagdha

Figure 2. *Agnikarma* procedure.

relieved by mild movements), grade 2 = Moderate stiffness (for more than 1 hour, once a day), grade 3 = Severe stiffness (more than 1 hour, many times a day affecting daily routine).

2.9.3 Objective Parameter

Swelling of the knee joint was measured by a measuring tape in centimetres at three sites, the midpoint of the patella, 2 inches above and below the patella. ROM was noted by goniometer in the flexion and extension position of the knee joint. Changes in knee joint X-ray (AP/lateral view) were assessed before and after the treatment.

2.10 Statistical Analysis

For non-parametric data like pain, crepitus and swelling, the Wilcoxon-signed rank test was applied within the groups and the Whitney rank sum test was applied between the two groups. For parametric data like the ROM and swelling at the knee joint, the paired 't' test was applied within the group and the Unpaired 't' test was applied between the groups.

3. Observations

Out of the total of 61 diagnosed cases of OA, 57 patients completed the therapy (29 in group AG and 28 in group AP) and 4 patients discontinued the treatment due to fear of *Agnikarma*. The demographic parameters of the trial are mentioned in Table 3. Clinical features of OA such as joint pain, crepitus and stiffness were noted in all the screened samples.

Table 3. Demographic data

S. No.	Observations	Maximum Percentage
1	Age:35-55years	50.82
2	Sex: Female	63.93
3	Menstrual History: Menopause	48.72
4	Socioeconomic Status: Middle Class	88.52
5	Occupation: Laborer	40.98
6	Nature of Work: Hard	44.26
7	Dwelling Status: Urban	70.49
8	Dietic Habits: *Adhyasana*	60.65
9	Addiction: Tea/ Coffee	57.37
10	Prakriti: *Vata-Kapha*	50.81
11	Vyayam Shakti: *Avara*	62.29
12	Overweight	77.05
13	Duration of disease: 1-3 years	34.42
14	Gradual onset of disease	95.08
15	Pain on walking	96.72
16	*Sandhishula* (joint pain)	100
17	*Sandhisphutana* (crepitus)	100
18	*Sandhigraha* (joint stiffness)	100
19	*Sandhishotha* (knee joint swelling)	100
20	*Akunjana Prasarana Vedana* (decreased range of movement)	62.29

4. Results

The evaluation was made based on improvement in *Sandhishula w*(joint pain), *Sandhisphutana* (crepitus), *Sandhigraha* (joint stiffness), *Sandhishotha* (knee joint swelling) and *Akunchana Prasarana Vedana* (decreased range of movement).

Group AG experienced a 70.35% improvement in pain whereas Group AP recorded a 61.85% improvement and was found highly significant ($P < 0.001$). In Group AG, 5.55% improvement was found in crepitus while in Group AP 1.92% relief was found. Statistically both the groups showed non-significant ($P > 0.999$) results in crepitus as there are no anatomical changes in the knee joint after *Agnikarma*. In both the groups 68.57% relief was found in stiffness and found highly significant ($P < 0.001$) (Tables 4 and 7). Statistically non-significant difference was found between the groups (Table 10).

In group AG, relief in swelling at the mid-point of the patella was 1.19%, at two inches above the mid-point of the patella 1.09%, and two inches below the mid-point of the patella 1.24%. which was statistically not significant (Table 5). In group AP, relief in swelling at the mid-point of the patella was 0.94%, at two inches above the mid-point of the patella at 1.04%

Table 4. Effect of therapy on chief complaints in Group AG, n=29

Symptoms	Mean Score		% Relief	SD	SE	W	t+	P	Significance
	BT	AT							
Sandhishula (Pain)	6.86	2.03	70.35	2.054	0.381	406	406	<0.001	HS
Sandhisphutana (Crepitus)	1.86	1.83	05.55	0.185	0.034	1	1	>0.999	NS
Sandhigraha (Stiffness)	1.21	0.38	68.57	0.468	0.086	276	276	<0.001	HS

(n- sample size, BT- Before Treatment, AT- After Treatment, SD- Standard Deviation, SE- Standard Error, W- Sum of all signed ranks, t+- Sum of positive ranks, P- Probability Value, HS-Highly Significant, NS-Non Significant)

Table 5. Effect of therapy on the girth of the knee joint (swelling) in group AG, n=29

Swelling of knee	Mean Score		% Relief	SD	SE	df	t	P	Significance
	BT	AT							
Middle point of the patella	40.27	39.79	1.19	0.037	0.006	56	0.394	= 0.695	NS
2 inch above the middle of the patella	42.03	41.57	1.09	0.006	0.001	56	0.324	= 0.747	NS
2 inch below the middle of the patella	37.41	36.94	1.24	0.006	0.001	56	0.324	= 0.747	NS

(df- Degrees of freedom, t- Paired t-test value)

Table 6. Effect of therapy on ROM in Group AG (Paired t Test), n=19

Angle of the knee joint (ROM)	Mean Score		% Relief	SD	SE	df	T	P	Significance
	BT	AT							
Flexion	147.15	131.05	10.87	3.356	0.77	36	9.707	<0.001	HS
Extension	165.78	180.00	9.52	0.399	0.092	36	8.009	<0.001	HS

(ROM- Range of Movement)

Table 7. Effect of therapy on chief complaints in Group AP, n=28

Symptoms	Mean Score		% Relief	SD	SE	W	T+	P	Significance
	BT	AT							
Sandhishula (Pain)	6.92	2.46	61.85	2.099	0.396	351	351	<0.001	HS
Sandhisphutana (Crepitus)	1.85	1.82	1.92	0.189	0.035	1	1	>0.999	NS
Sandhigraha (Stiffness)	1.25	0.39	68.57	0.448	0.084	276	276	<0.001	HS

and two inches below the mid-point of the patella at 1.05%. which was statistically not significant (Table 8). Statistically, a non-significant difference was found between the groups in crepitus (Table 11). No marked improvement was noted after the treatment, but the skin's shine due to underlying inflammation was resolved and rumples were noted.

ROM of the knee joint was measured in degrees by a goniometer for extension and flexion. The angle of extension increased by 9.52% in group AG (Table 6) and 10.87% of the angle of flexion was found to be reduced. In group AP angle of extension was found increased by 8.70% and the angle of flexion was found reduced by 7.34% (Table 9). A statically highly significant ($p<0.001$) result was noted in extension in both the groups while in flexion highly significant result was found in group AG and a significant result was found in group AP. A statistically non-significant difference was found between the groups in ROM (Table 12). Out of the total 57 patients, 19 in each group had a restricted ROM and the remaining patients had a painful ROM of knee joints. No changes were noted in osteophytes, joint space reduction or osteoporotic changes in the knee joint X-ray after completion of the treatment.

Table 8. Effect of therapy on the girth of the knee joint (swelling) in Group AP, n=28

Swelling of the knee	Mean Score		% Relief	SD	SE	df	T	P	Significance
	BT	AT							
Middle of the patella	41.51	41.12	0.94	0.044	0.008	54	0.369	=0.714	NS
2 inch above the patella	42.91	42.46	1.04	0.148	0.028	54	0.351	=0.727	NS
2 inch below the patella	39.05	38.73	1.05	0.084	0.016	54	0.297	=0.768	NS

Table 9. Effect of therapy on ROM in Group AP (Paired t Test), n=19

Angle of the knee joint	Mean Score		% Relief	SD	SE	df	T	P	Significance
	BT	AT							
Flexion	138.94	130.84	7.34	5.133	1.178	36	3.437	=0.001	S
Extension	163.15	176.84	8.70	1.934	0.443	36	7.242	<0.001	HS
2 inch below the patella	39.05	38.73	1.05	0.084	0.016	54	0.297	=0.768	NS

(S= Significant)

Table 10. Comparative effect of therapy on subjective parameters of both groups, n=57

Symptoms	Mean Score		% relief		U	P	Significance
	Group AG	Group AP	Group AG	Group AP			
Sandhishula	4.82	4.46	70.35	61.85	471	=0.296	NS
Sandhisphutana	0.035	0.003	05.55	01.92	420	=0.578	NS
Sandhigraha	0.83	0.86	68.57	68.57	394.5	=0.810	NS

(U- Mann-Whitney U Value)

Table 11. Comparative effect of therapy on the swelling of the knee joint of both groups (Unpaired t Test), n=57

Swelling of Knee	Mean Score		% Relief		t	P	Significance
	Group AG	Group AP	Group AG	Group AP			
Middle point of the patella	0.48	0.39	1.19	0.94	0.867	=0.390	NS
2 inches above the middle of the patella	0.46	0.45	1.09	1.04	0.145	=0.885	NS
2 inches below the middle of the patella	0.47	0.32	1.24	1.05	0.526	=0.601	NS

Table 12. Comparative effect on ROM of the knee joint in both groups (Unpaired t Test) n=57

Angle of the knee joint	Mean Score		% Relief		t	P	Significance
	Group AG	Group AP	Group AG	Group AP			
Flexion	16.1	8.1	10.87	7.34	2.896	=0.006	S
Extension	15.27	13.69	9.52	8.70	0.540	=0.593	S
2 inches below the middle of the patella	0.47	0.32	1.24	1.05	0.526	=0.601	NS

5. Discussion

In this trial, 50.82% of the individuals fell into the age group of 35-55 years of age. OA changes commence from 40-50 years of age[19]. This is the phase of *Madhyam Vaya* (middle age) (>30 years of age) after which the symptoms become more severe as per ageing due to the progressive nature of the disease. In this age group, not all patients who had joint symptoms recorded radiographic changes[20]. 63.93% were females which supports the fact that females are at risk of OA due to the deficiency of estrogen in the peri-menopausal period. Several experimental studies have shown that oestrogens are implicated in the regulation of cartilage metabolism which suggests a potential role of oestrogen in OA. Diminished strength of quadricep muscle in women unlike men leads to knee OA more commonly in females[21]. Maximum numbers of patients (40.98%) were housewives. The justified reason could be that household work is performed for long periods on standing and bending postures. 70.49% of patients belonged to the urban habitat and 88.52% belonged to the middle class which sufferers due to excess load of work with improper and untimely food habits. 44.26% were performing hard work. This is mainly because most of the patients were middle-aged females performing household work. Their routine work included postural stress like prolonged standing in the kitchen, bending, lifting while cleaning and putting spontaneous stress on joints which are already in the degenerative stage. 62.30% of the patients were having *Avara Vyayama Shakti (*power to carry out physical work*). Vyayama Shakti* of patients suffering from OA is very less because the disease progresses with increasing age and due to the disability and painful nature of the disease, the patient is unable to perform even routine work. *Dhatukshaya* and *Strotorodha* are the frontline reasons for the development of OA in old age which is the ultimate result of *Agni Vaishamya* and *Vataprakopa* due to *Adhyashana* (eating before the digestion of previous food) which was found in 60.65% of patients. Impediment of the *Srotas* results in vitiation of *Vata* and affects the *Sandhi* of the knee resulting in Janu *Sandhigatavata*. 48.71% of women had undergone menopause which is the main factor responsible for OA. In menopause, the deficiency of oestrogen (female hormone) leads to different types

of bone and joint problems. Hormonal variation in postmenopausal age is responsible for osteoporosis due to bone demineralisation and eventually results in OA[22,23]. 42.62% of patients were having a relevant family history of OA. As far as OA of the knee joints is concerned, the family disposition is one of the risk factors mentioned in the classics[24]. Many clinical trials revealed a greater prevalence of the disease among relatives indicating genetic involvement. Even though no specific reason is justified to cause the disease, about half of the dissimilarity in liability has been allocated to genetic factors. *Vata-Kapha prakriti* predominance was found in 50.81% of patients. 77.05% of the patients were overweight. *Meda Dhatu Vridhi* leads to *Srotas (*channels of body*)* obstruction which further decreases the nutrition to *Asthi* and *Majja Dhatu. Sthaulya* (obesity*)* leads to excess weight burden on the knee joint resulting in *Sandhigatavata*.

34.43% of patients had chronicity of 1-3 years signifying that OA is a gradually advancing disease and related with lifestyle disorders. All the *Yapya Vyadhis* (diseases which are difficult to cure) can be considered as chronic. The prognosis of the disease is affected by its chronicity, if the condition is acute, the prognosis will be good. Pain during ambulation and day-to-day activity in flexion and extension of the knee joints was reported in 96.72% of the patients. During walking, ligaments and osteophytes rub with each other which aggravates the pain. Gradual progression of the disease was noted in 95.08% of patients (Table 3). Disease recurrence was found in 5 patients. *Sandhigatavata* is a *Marma Sandhigata* (vital parts) disease which is palliative and cannot be cured completely. This type of disorder is considered a *Yapya Vyadhi.*

Agnikarma cures all the *Vataj* and *Kaphaj* diseases because the *Ushna* quality of *Agni* works in contradiction to the quality of *Vata* and *Kaphaja Dosha. Vata* is a prime *Dosha* which can produce pain anywhere in the body. Such pain is relieved immediately after *Agnikarma*. In consideration of *Dhatukshya Janya Samprapti* of *Sandhigatavata*, the *Ushna, Tiksna, Suksma* and *Ashukari Guna* of *Agnikarma* are applied to *Asthi Sandhi* through *Twaka Dhatu*. This may have a direct impact on *Marmasthi Sandhi Gata Mahabhutagni* to control the *Dhatu Kshaya* process by establishing *Agni Samatva*, ultimately leading to *Prakruta Vata Dosha* functions and elimination of *Stambhadi Lakshana* by *Ushnadi Guna*[25].

Agnikarma removes the accumulated toxins and enhances the nourishment of *Asthi* and *Majja dhatu. Agnikarma* procedure provides symptomatic relief of pain. Relief in pain by *Agnikarma* depends upon endorphin production. It varies from person to person. This proves that the production of endorphins varies in each individual who has the same pain intensity[26]. That's why perception of pain is different from patient to patient in the routine life also. Relief from pain is more when endorphin production is more. Heat may stimulate the lateral spino-thelamic tract which leads to the stimulating of descending pain inhibitory fibres which release endogenous opioid peptides which bind with the opioid receptor at substantia gelatinosa rolandi which inhibits the release of a substance (presynaptic inhibition) and blocks the transmission of the pain sensation[27]. *Agnikarma* reduces muscle spasms with inflammation, achieves muscle relaxation and provides relief from clinical symptoms making patients more active[28].

6. Mode of Action of *Panchatikta Guggulu*

Panchatikta Guggulu is dominated by *Tikta Rasa* and *Ushna Virya Dravyas* which increase *Dhatvagni* as well as improve the nutrition so that it stabilises the *Asthi* and *Majja Dhatu*[29.] *Akasha* and *Vayu Mahabhuta* of *Panchatikta Guggulu* maintain the normal well-being of the *Asthi Dhatu. Ghrita* increases the bioavailability of the other drugs due to *Yogavahi Guna.* It helps to improve well-being and supports bones and joints. It also acts as an anti-inflammatory agent. *Tikta Rasa* has *Lekhana* as well as *Kleda, Meda, Pitta* and *Shleshma Shoshana* properties[30]. *Guggulu* has *Lekhana* and anti-hyperlipidaemic properties that help in the control of the weight of the patients and might help in symptomatic pain relief in OA.

7. Conclusion

This clinical trial revealed that *Agnikarma* has an analgesic effect on pain management in patients of *Sandhigatavata*. *Agnikarma* can be performed at the OPD level with minimum equipment and a very safe, day care procedure. It is non-pharmacological and can be used for pain management in *Sandhigatavata*.

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