A Clinical Study on the Role of Aswagandhadi Yoga in the Management of Sandhivata [Osteoarthritis]

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Abstract

Disorders of the vata dosa are prevalent throughout the world, affecting all ages and ethnic groups. The principal manifestations are pain and impairment of locomotor function affecting a quarter of all general practitioner consultations. In later life, vata roga are the single most important factor including disability and so have a major impact on health and social service resources. As there is growing participation of the population in sports, it is important to note that there is an increasing trend of Osteoarthritis at a young age. According to Ayurveda the vatakara aharas and viharas causes triggering of vata dosa. Due to being overweight of the body, weight-bearing joints especially knee joints, face a great problem. Being overweight causes wear and tear of the articular cartilage thereby causing Sandhivata. Sandhivata is correlated with Osteoarthritis, the most common cause of disability of the locomotor system in the elderly. The prevalence of this disorder in certain elderly groups is as high as 85% with an increasing trend, especially among the Asian community having a high occurrence of osteoarthritis of the knee. Therefore, after proper ethical clearance from the institutional ethics committee an oral medicine was prepared. The aswagandhadi yoga was given at two grams twice daily for two months and follow-up was done every 7 days. The statistical analysis was found to be highly significant with a p-value <0.001 for Joint pain and Joint Swelling, while the p-value for Limitation of Movement and Nocturnal aching was found at <0.05 denoting significant results while deformity was not significant. Taking all this into consideration, the oral medicine of Aswagandhadi yoga can be used as an alternative medicine to reduce the cost-effectiveness and out-of-pocket expenditure of the patient.

Keywords: Osteoarthritis, Sandhivata, Ayurveda, Ashwagandha Yoga, Vatavyadhi.

Introduction

Disorders of the vata dosa are prevalent throughout the world, affecting all ages and ethnic groups. The primary symptoms include pain and difficulty in movement, affecting one-quarter of all consultations with general practitioners. In later life, vata roga is a significant factor that contributes to disability, significantly impacting health and social service resources. The lifestyle of man has become mechanical. Time and more desire have made the man unable to follow the swastha niyamas, thereby becoming victims of diseases. Today, even in young adulthood, man is suffering from degenerative diseases like Sandhivata (Osteoarthritis), Vata rakta (Gouty arthritis), Siragranthi (Atherosclerosis), etc. Sandhivata is by far the most common form of vatavyadhi. Aging is deeply intertwined with this issue, making it a leading source of pain and disability for many seniors.

The prevalence of this disorder among certain elderly groups reaches up to 85%, with a particularly significant impact on the Asian community, where knee osteoarthritis is notably prevalent. Osteoarthritis commonly affects individuals over 65 worldwide, making awareness and effective management vital for maintaining their quality of life. There is a steady rise in overall prevalence from age 30. The knee and hip are the principal large joints affected and the principal sites of significant disability. In the age group of 65 years and older, 10-25% of individuals suffer more from Knee osteoarthritis than hip osteoarthritis. The prevalence of osteoarthritis in both rural and urban areas of India is significant, with community surveys showing rates that range from 17% to an alarming 60.6%.

The current study evaluates the effectiveness of a compound drug called Aswagandhadi yoga in managing Sandhivata. Before the study commenced, Institutional Ethical approval was obtained.

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< 111 >

Materials & Methods
Study Design: Interventional Clinical Study
Sample Size: 30
Site: OPD of Kaya Chikitsa from I.P.G.A.E & R at S.V.S.P, Kolkata
Total Cases Completed the Study: 24
Drop-out case: 6

Inclusion Criteria-
i). Age of onset-more than 50 years.
ii). Sex-patient of both sexes
iii). Presence of symptoms of osteoarthritis with an emphasis on the affection of knee joint only
iv). The patient was not taking any other medicine for osteoarthritis.
v). The patient consented to participate in the clinical trial.

Exclusion Criteria
i). Rheumatoid arthritis
ii). Gouty arthritis
iii). Psoriatic arthritis
iv). Hypothyroidism
v). Diabetes mellitus
vi). Haemophilic osteoarthritis
vii). Generalised osteoarthritis
viii). Patients with severe deformity and severe organic disorders

Laboratory Investigation
i). Routine haematology
ii). Biochemical examination
   a) Estimation of fasting blood sugar
   b) Estimation of serum uric acid
iii). Radiological examination-
   a) X-ray of the Knee Joint-Anterior-Posterior view

Drug Formulation
Aswagandhadi Yoga was formulated with the intention of Vata Hara, Vedana Sthapana, Sopha Hara, and Asthipurana agents.

Method of Preparation
i). The four drugs were identified and procured from the market by the apothecary (pharmacy) department of the Institute of Post Graduate Ayurvedic Education and Research at SVSP Hospital Kolkata.
ii). The raw drugs were procured from the market after identification and were thoroughly cleaned in water, dried under sunlight, and pulverized separately.
iii). Similarly, Praval was identified and purchased from the market, cleaned with warm water, dried in sunlight, and purified according to the methods described in Ayurvedic texts.
iv). The Praval was boiled with the juice of the Jayanti leaves in Dola yantra for three hours.
v). After boiling, the Praval was again collected and washed with warm water followed by sun-drying.
vi). The dried Praval was ground in a mortar and pestle with rose water until fine powder was achieved.
vii). All four ingredients were made to powder form, it was assembled in appropriate quantities (As shown in Table 1) in a tray and the medicine was prepared. The powder was packed in poly packs of 28 grams per pack.

Drug Administration
Dosage: Powder form orally in the dose of two grams twice a day in the morning and evening
Anupan: Water
Duration: 2 months
Follow-up: At an interval of 7 days, a total of 8 visits

Criteria for Assessment of Result
The completion of the treatment was done based on the Oxford Knee Evaluation Scoring form in each follow-up. The patients were included in the excellent group which scored between 40-48; under good response group which scored between 30-39 and the poor response group which scored between 20-29. Patients scoring below 20 were considered to have no response.

The Total Oxford Knee Score is 60 which was Graded as Follows:
- A score of 0-19 may indicate severe knee arthritis. Likely, you may well require some form of surgical intervention,
- A score of 20-29 may indicate moderate to severe knee arthritis.
- A score of 30-39 may indicate mild to moderate knee arthritis. Benefit from non-surgical treatment, such as exercise, weight loss, and/or anti-inflammatory medication
- A score of 40-48 may indicate satisfactory joint function. These Patients may not require any formal treatment.

All scores were recorded as grades: 0-19 as grade 4, 20-29 as grade 3, 30-39 as grade 2, and 40-48 as grade 1.

Observation and Results
All patients who met the diagnostic criteria were included in the study. Out of these, 6 patients discontinued the treatment for unknown reasons. Ultimately, 24 patients completed the treatment, and follow-up assessments were conducted. The clinical patterns in patients with sandhivata (osteoarthritis) were evaluated and documented. The observations are as follows:

Age Incidence: 23 cases were between 51 and 60 years of age, 5 cases were between 61 and 70 years of age, and only one patient was more than 70 years of age. The numbers of patients in various age groups with percentages are presented in Table 2 and Figure 1.
Sex Incidence: In the present study, 23 cases were female whereas only 6 cases were male. The incidences of sex are given in Table 3 and Figure 2 below with percentages.
Religion Incidence: In the present series, 26 cases were Hindus while only 3 cases were Muslim. The incidences of religion are given in Table 4 and Figure 3 below with percentages.
Rural and Urban Incidence: The present study included urban and rural populations, where 20 patients were from urban areas and 9 were from rural areas. The number of patients with percentages in each group is given in Table 5 and Figure 4.
Incidence of Educational Qualification: In the present study, 27 patients belonged to the literate group (coming from various educational statuses) while the remaining 2 were illiterate. The incidences of educational status as found in different patients with percentages are given in Table 6 and Figure 5.

< 112 >

Occupation Incidence: The incidence of occupation in all patients was recorded in Table 7 and Figure 6. It has been observed that a maximum number of patients were housewives i.e. 19. They all worked hard in their field of work.

The Incidence of Social Status: Among these 30 patients, 20 were married, 2 were unmarried and the other 7 were widows. The demographics are presented in Table 8 and Figure 7.

Economic Status Incidence: In the present study, Out of 30 patients, 12 were from the higher-income group, 9 were from the middle-income group, and 8 patients were from the lower-income group. The incidences of income status with percentage are given in Table 9 and Figure 8.

Food Habit Incidence: Among 30 patients, only 3 patients were vegetarian. The remaining 26 cases were non-vegetarian. The incidences of Food Habits with percentages are given in Table 10 and Figure 9.

Incidence of Bowel Habit: In the study, 17 patients have regular bowel habits. The rest of the patients had irregular bowel habits. The different bowel habits are shown in Table 11 and Figure 10.

Addiction Incidence: The different types of addiction have a role in the manifestation of the disease. Many addictive substances may cause aggravation of vayu. They presented a study with percentages in the following Table 12 and Figure 11.

Incidence of Deha Prakriti: In the present study, the Deha Prakriti of the patients were recorded. 17 patients belonged to the Vata-Pitta variety; 10 belonged to the Vata-Kapha variety and rest 2 were of the Pitta-Kapha variety. The incidences of Deha prakriti as found in different patients with percentages are given in Table 13 and Figure 12.

Incidence of Satwa: A description of three types of satwa patients in the Ayurvedic text has been mentioned. There is no Pravara satwa patient in this study. The present study only included Madhyam and Avara satwa, where 19 patients were of Madhyam satwa and 10 were of Avara satwa. The number of patients with percentages in each group is given in Table 14 and Figure 13.

Incidence of Duration of Illness: Patients suffering from Sandhivata were found to suffer from the disease. The age of the patients was classified into three groups, i.e. up to 1 year, 1 to 5 years, and above 5 years. The incidences of duration of illness in the case of Sandhivata are shown in Table 15 and Figure 14.

Incidence of Signs and Symptoms: In this study, patients suffering from Sandhivata (osteoarthritis) have complained of joint pain, nocturnal aching, joint swelling, deformity, and limitation of movement. The number of patients with a percentage of particular symptoms is presented in Table 16 and Figure 15.

Incidence of Radiological Findings: X-rays of all patients were done. Out of the total patients, 22 patients had reduced joint space, 17 patients had formation of osteophytes and 10 patients had subchondral sclerosis. Loose bodies were found in only one patient. The incidences of Radiology with percentages are given in Table 17 and Figure 16.

Response of the Treatment

The response to the treatment in 24 patients registered in this study was based on the status before and after treatment, particularly on the subjective criteria, and was found to improve to various degrees. The criteria are discussed as follows.

On Relief of Joint Pain: The complaint of joint pain was present in 24 patients before treatment. 23 patients showed relief at the end of treatment. The percentage of relief in joint pain is 95.83%.

On Relief of Joint Swelling: The complaint of joint swelling was present in 22 patients before treatment. 14 patients showed relief at the end of treatment. The percentage of relief of joint swelling is 63.63%.

On Relief of Joint Deformity: The complaint of joint deformity was present in 5 patients before treatment. Only 1 patient showed relief at the end of treatment. The percentage of relief of joint deformity is 20%.

On Relief in Limitation of Movement: The complaint of limitation of movement was present in 20 patients before treatment. 13 patients showed relief at the end of treatment. The percentage of relief in limitation of movement is 65%.

On Relief in Nocturnal Aching: The complaint of nocturnal aching was present in 17 patients before treatment. 15 patients showed relief at the end of treatment. The percentage of relief in nocturnal aching is 88.24%.

The results revealed an interesting variation in how effective the treatment was for these signs and symptoms. To ensure a thorough evaluation of the response, we implemented the Oxford Knee Scoring method in all cases, as previously discussed. This approach allowed us to gather insightful data and truly understand the impact on each individual. The observations are presented statistically in Table 19.

Responses to treatment in 24 patients on subjective criteria were also assessed based on scoring as mentioned earlier and are presented below statistically in Table 20

All the statistical analysis will be shown here in three significant levels i.e., significant, moderately significant, and highly significant as follows:-

Significant = <0.05

Moderately Significant = <0.01

Highly Significant = <0.001

The statistical analysis shows that the improvement in joint pain after treatment is highly significant at a 1% level i.e. the difference is real in 99% of cases. Hence, the effect of treatment on joint pain is highly significant. Statistical analysis in joint swelling after treatment is highly significant at a 1% level i.e. the difference is real in 99% of cases. The effect of treatment on joint swelling is highly significant. The effect on deformity is not significant. The improvement in limitation of movement and nocturnal acting is at a 5% level i.e. the difference is real in 95% of cases. Hence, the effect of treatment on those two symptoms is significant.

Total Effect of the Treatment

The total effect of the treatment, on the patients of Sandhivata in this study was assessed in terms of excellent, good, poor, and no response as per criteria mentioned earlier. The results of the treatment as found are given in the Table 21 and Figure 17

Discussion

Sandhivata is correlated with Osteoarthritis, the most common cause of disability of the locomotor system in the elderly. In Ayurvedic science, all the Acharyas mentioned the disease under vatavyadhi. Vatavyadhis are first among the mahagadas told by Acharyas.

As the population is growing in participation in sports, it is important to note that there is an increasing trend of osteoarthritis at a young age. According to Ayurveda the vatakara aharas and viharas causes triggering of vata dosa.

< 113 >

Due to being overweight of the body, weight-bearing joints especially knee joints, face a great problem. Being overweight causes wear and tear of the articular cartilage thereby causing Sandhivata. There is a formation of reactive new bone at the margins and subchondral area of the joints. Clinically the condition is characterized by pain in the joints, tenderness, limitation of movement, crepitus, occasional effusion, and variable degree of local inflammation.

With the advancement of modern medical science, several drugs and orthopedic surgical measures have been developed for patients with gross involvement of joints in Osteoarthritis. No specific disease-modifying therapy is available in the modern medicine. Moreover, the drugs are not free from toxicity and surgical measures have their limitations.

On the other hand, Ayurvedic scholars have suggested several drugs for the treatment of sandhivata in different Ayurvedic texts. After going through such a description, we are encouraged to see the effect of Aswagandhadi yoga, a drug of herbs-marine origin in this disease clinically.

Clinical Patterns: 30 patients of Sandhivata (Osteoarthritis) in total were studied for a clinical pattern of the disease. For this purpose, the incidence of age, sex, religion, rural-urban, education, social status, economic status, food habit, bowel habit, addiction, deha prakriti, satwa, duration of illness, etc. were studied.

Age Incidence: In the present study, a total of 30 patients of Sandhivata were selected out of which maximum patients i.e. 79.31% were belonging to the age group of 51-60 years. Ayurvedic scholars had divided vaya or age into three groups i.e. balya (early age – 16 years), Madhya (16-60 years), and vriddha vaya or old age (61 years and above). Some scholars have concluded that the disease Osteoarthritis is common in middle and old age [3].

Sex Incidence: In the present study, most of the cases i.e. 79.31% were females. Osteoarthritis is said to be more prevalent and more commonly associated with symptoms in women [4]. In another study, it was found that incidence rates in women had higher rates than men, especially after age 50 [5].

Religion Incidence: Maximum number of patients belonging to the Hindu religion. Generally, the religion has no specific significance for producing Sandhivata. However, some scholars believe that Muslims had a lower prevalence of Osteoarthritis as their way of praying since childhood, forcing the knees into deep flexion may stretch the soft tissue surrounding the knee and decrease stiffness and contact pressure of the articular cartilage which might have to prevent the onset of Osteoarthritis [6].

Rural-Urban Incidence: In this study, patients from both the rural and urban areas were registered out of which 69%, the maximum patients were from urban areas. As our site of study, area was under urban location, any comment on the higher prevalence of urban patients in this study can't be made. Even though there is a study in Japan; it was observed that urban Hawaii women are more prone to joint pain than rural Japanese (Kiyoshi Aoyagi).

Incidence of Educational Qualification: In the present study, 93.10% of patients were literate. But out of the literate's maximum i.e. 48.14% of patients had only primary education.

Occupation Incidence: In this study patients of various occupations were included out of which a maximum i.e. 65.52% patients were housewives. Housewives are usually sedentary habits. Other patients from the occupation of service and business also belong to the same category. In a study organized by WHO it was observed that in the US only 24% of people with arthritis report and achieve levels of physical activity. The remainder are essentially inactive or insufficiently active [3].

Incidence of Social Status: In the present study, most of the cases i.e. 68.97% were married, 2 were unmarried and 7 patients were widows.

Incidence of Economic Status: In this study, patients of various economic statuses were included out of which maximum i.e. 41.38% of patients were of higher income group. People of higher income groups usually of sedentary habits. 31.03% of patients belonged to the middle-income group and the rest of the patients belonged to lower income group.

Incidence of Food Habit: The diet habit of each patient was enquired and recorded. It was found that 89.66% of cases were non-vegetarian and the rest were vegetarian. Though there is a relation between rasa predominant diet and vata, it is necessary to take care of the food habits of the patients. Antioxidants are thought to confer protection against the progression of osteoarthritis and other age-related diseases [7]. Results from the Framingham Study indicate that a high intake of vitamin C may be associated with a lower risk of knee osteoarthritis progression, but does not appear to prevent the onset of disease [8]. Vitamin D obtained from dietary sources or sun exposure is required for normal bone metabolism; low levels may affect bone repair and muscle strength, predisposing to the progression of osteoarthritis [9]. There is evidence from longitudinal studies that low dietary and serum levels of vitamin D may be associated with the development of hip osteoarthritis [10], and with the progression of knee osteoarthritis [11].

Incidence of Bowel Habit: There is a relation between Bowel habit and vata. If the bowel is not clear then there will be a rise of vata. Vata will produce pain in the body, which is the more common feature of Sandhivata. Therefore, it is necessary to control bowel habits and make them regular. In this present study, 58.62% of patients have been told that they have regular bowel habits. The rest of the patients had irregular bowel habits.

Addiction Incidence: The different types of addiction have a role in the manifestation of the disease. Many addicting substances may cause aggravation of vayu. 68.96% i.e. a maximum number of patients were addicted to tea.

Incidence of Deha Prakriti: In this study majority of the patients have Vata predominance. This Prakriti is more prone to disease.

Incidence of Satwa: Satwa is important to diagnose a disease as well as to understand the condition of the patients. If patients are avara satwa then proper diagnosis or situation of the patients cannot be measured. In this study, the maximum number of patients i.e. 65.52% patients were of Madhyam Satwa.

Incidence of Duration of Illness: In the present study, patients of Osteoarthritis were found to have suffered from the disease in various durations 51.73% i.e. maximum patients were found to have symptoms of Osteoarthritis for more than 5 years.

Incidence of Signs and Symptoms: In this present study, it was observed that a maximum number of patients have pain in the knee joint. In a previous study, we have seen that pain is the most common symptom of Osteoarthritis [12, 13]. In our study also 100% of patients have pain in the knee joint. Other symptoms i.e. swelling, limitation of movement, nocturnal

< 114 >

aching, and deformity have a percentage of 75.86, 68, 67, 58.62, and 17.24 respectively.

Incidence of Radiological Findings: In Osteoarthritis X-rays may show loss of joint space resulting from cartilage damage. Osteophytes, altered bone contour, subchondral sclerosis, and cystic formation result from bony remodeling. In this study out of the total patients, 22 patients showed radiological symptoms. In a study, it was found that 1/3rd to 2/3rd patients with Osteoarthritis were linked to radiological symptoms [14].

Response of the Treatment: In the present study, 30 patients were registered but not all cases could be followed up. Out of 30 cases, 24 cases had completed the total tenure of the study and could be followed up properly. The effect of the treatment i.e. the response of Aswagandhadi yoga in all the 24 cases was assessed based on subjective criteria. The response of treatment on subjective criteria was assessed following the Oxford Knee Scoring method. The total effect of the treatment was assessed and 37.5% of cases had shown excellent response; 37.5% had shown good response and 16.67% had shown poor response. Others had shown no response to the treatment. During the present study, none of the cases had shown any side effects or toxicity.

Tables & Graphs

Table 1: Showing composition & Effects of the trial drugs:

Ingredient	Scientific Name	Parts used	Quantity	Effect
Ashwagandha	*Withania somnifera*	Root	1kg	Balya, Vrisya and Vata Hara [1]
Methika	*Trigonella foenumgraecum*	Seed	1kg	Vata Hara, Vedana Sthapana (Analgesic) and Sopha Nasaka (Anti-Inflammatory) [2, 3]
Haridra	*Curcuma longa*	Rhizome	1kg	
Praval	*Dendrogyra cylindricus*	Pisti	250gm	Dipan, Pachan, Virya Vardhak, Varnya, Balya, Kanti Kara [4]

Table 2: Showing the various age group incidence with the percentage

Sl. No.	Age Group (in years)	No. of Patients	Percentage
1.	51-60	23	79.31%
2.	61-70	5	17.24%
3.	70 and above	1	3.45%

Table 3: Showing the various sex incidence with percentages:

Sl. No.	Sex Group	No. of Patients	Percentage
1.	Male	6	20.69%
2.	Female	23	79.31%

Table 4: Showing the various religious incidents with a percentage

Sl. No.	Religion	No. of Patients	Percentage
1.	Hindu	26	89.66%
2.	Muslim	3	10.34%

Table 5: Showing the Rural and urban incidences with the percentage

Sl. No.	Area group	No. of patients	Percentage
1.	Urban	20	68.97%
2.	Rural	9	31.03%

Table 6: Showing the Incidence of Educational qualification with percentage

Sl. No	Educational Qualification	No. of patients	Percentage
1.	Illiterate	2	6.90%
2.	Literate	27	93.10%
3.	Primary	13	48.14%
4.	Secondary	7	25.93%
5.	Graduate	7	25.93%

Table 7: Showing the various occupation incidence with the percentage

Sl. No.	Occupation	No. of patients	Percentage
1.	Housewife	19	65.52%
2.	Business	2	6.90%
3.	Service	4	13.79%
4.	Labor	1	3.45%
5.	Retired	3	10.34%

Table 8: Showing the various social status incidents with the percentage

Sl. No.	Social status	No. of patients	Percentage
1.	Married	20	68.97%
2.	Unmarried	2	6.90%
3.	Widow	7	24.13%

Table 9: Showing the various Economic status incidents with the percentage

Sl. No.	Economic Status	No. of patients	Percentage
1.	Higher	12	41.38%
2.	Middle	9	31.03%
3.	Lower	8	27.59%

Table 10: Showing the various Food habit incidence with percentage

Sl. No.	Food Habit	No. of Patients	Percentage
1.	Vegetarian	3	10.34%
2.	Non-Vegetarian	26	89.66%

Table 11: Showing the Incidence of Bowel habits with percentage

Sl. No	Bowel Habit	No. of Patients	Percentage
1.	Regular	17	58.62%
2.	Irregular	12	41.38%

Table 12: Showing the various Addiction incidences with the percentage

Sl. No.	Addiction	No. of patients	Percentage
1.	Tea	20	68.96%
2.	Tobacco	2	6.90%
3.	Tea & Tobacco	3	10.34%
4.	Nothing	4	13.80%

< 115 >

Table 13: Showing the Incidence of Deha Prakriti with percentage

Sl. No	Deha Prakriti	No. of Patients	Percentage
1.	Vata-Pitta	17	58.62%
2.	Vata-Kapha	10	34.48%
3.	Pitta-Kapha	2	6.90%

Table 14: Showing the Incidence of Satwa with percentage

Sl. No	Satwa	No. of patients	Percentage
1.	Madhyam	19	65.52%
2.	Avara	10	34.48%

Table 15: Showing the Incidence of Duration of illness with percentage

Sl. No	Duration of Illness	No. of Patients	Percentage
1.	Up to 1 year	5	17.24%
2.	1 year – 5 years	9	31.03%
3.	Above 5 years	15	51.73%

Table 16: Showing the Incidence of Signs and Symptoms with percentage

Sl. No	Clinical feature	No. of patients	Percentage
1.	Joint pain	30	100%
2.	Joint swelling	22	75.86%
3.	Limitation of movement	20	68.67%
4.	Nocturnal aching	17	58.62%
5.	Deformity	5	17.24%

Table 17: Showing the Incidence of Radiology with percentage

Sl. No	Radiological Symptoms	No. of Patients	Percentage
1.	Joint space reduced	22	75.86%
2.	Osteophyte formation	17	58.62%
3.	Subchondral sclerosis	10	34.48%
4.	Loose bodies	1	3.45%

Table 18: Showing the response of treatment on signs and symptoms of Sandhivata (OA) in trial patients

Sl. No.	Signs and Symptoms	No. of Patients BT	No. of Patients Relieved AT	Percentage of relief
1.	Joint pain	24	23	95.83%
2.	Joint swelling	22	14	63.63%
3.	Deformity	5	1	20%
4.	Limitation of movement	20	13	65%
5.	Nocturnal aching	17	15	88.24%

Table 19: Showing statistical analysis of the response of treatment-based Oxford Knee Scoring in trial patients

Mean BT	Mean AT	SD BT	SD AT	SE BT	SE AT	"t" value	"p" value
29.27	35.68	6.71	7.98	1.26	1.48	2.059	<0.05

Table 20: Showing the statistical analysis of the response to the treatment on Subjective criteria

Sl. No.	Subjective criteria	Mean BT	Mean AT	SD BT	SD AT	SE BT	SE AT	"t" value	"p" value
1	Joint pain	3.44	1.58	0.63	0.73	0.12	0.14	3.84	<0.001
2	Joint swelling	2.20	1.48	0.86	0.68	0.16	0.13	3.72	<0.001
3	Deformity	1.34	1.31	0.81	0.76	0.19	0.14	0.33	Not significant
4	Limitation of movement	2.62	1.51	1.20	0.91	0.22	0.17	2.39	<0.05
5	Nocturnal aching	2.41	1.20	1.29	0.61	0.24	0.11	2.56	<0.05

Table 21: Showing the total effect of the treatment in patients of Sandhivata

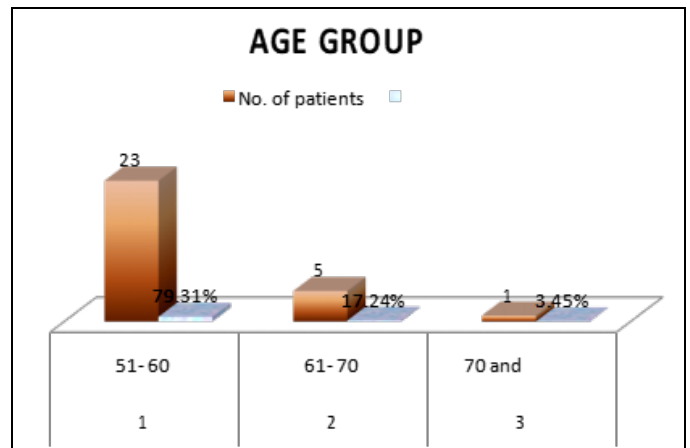| Sl. No.	Response	No. of Patients	Percentage
1.	Excellent	9	37.50
2.	Good	9	37.50
3.	Poor	4	16.67
4.	No response	2	8.33

Fig 1: Showing the various Age group's incidences with the percentage

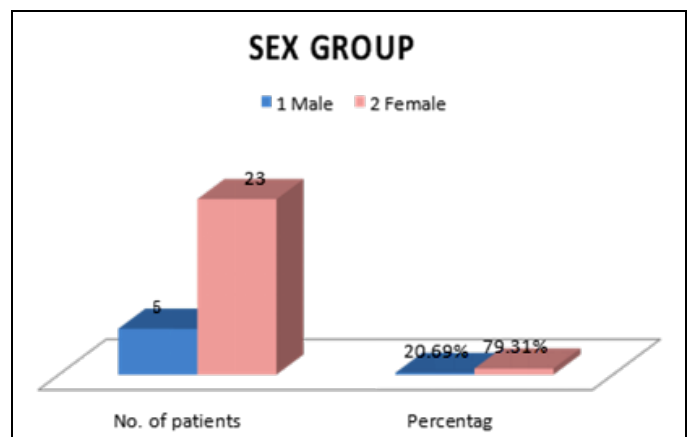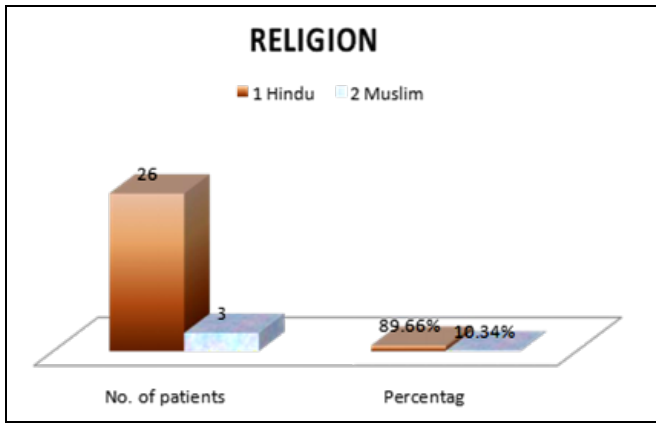**Fig 2:** Showing sex incidences with percentage

< 116 >

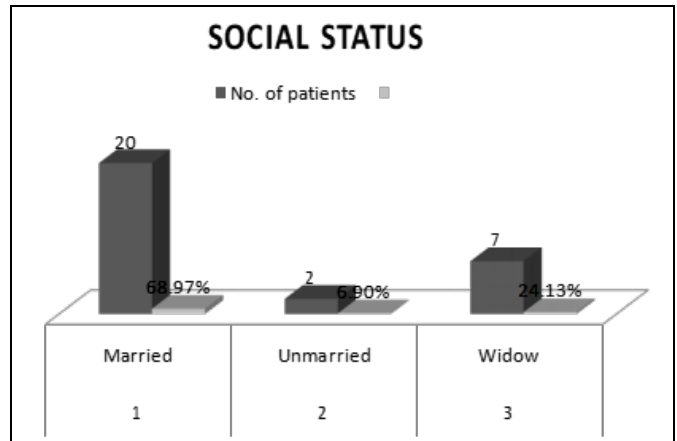**Fig 3:** Shows the various religious incidents with a percentage.

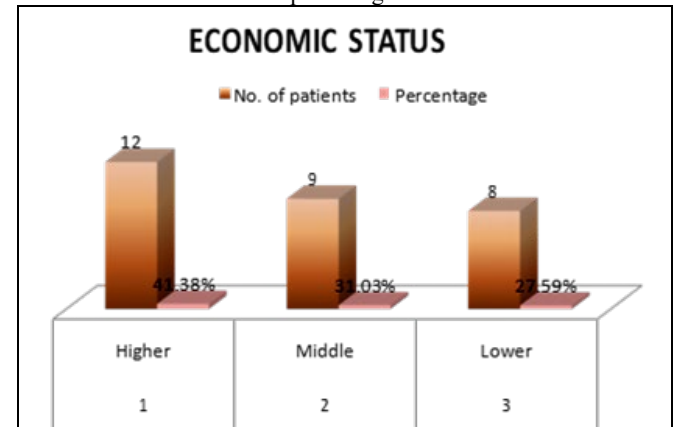**Fig 4:** Showing the Rural and urban incidences with the percentage

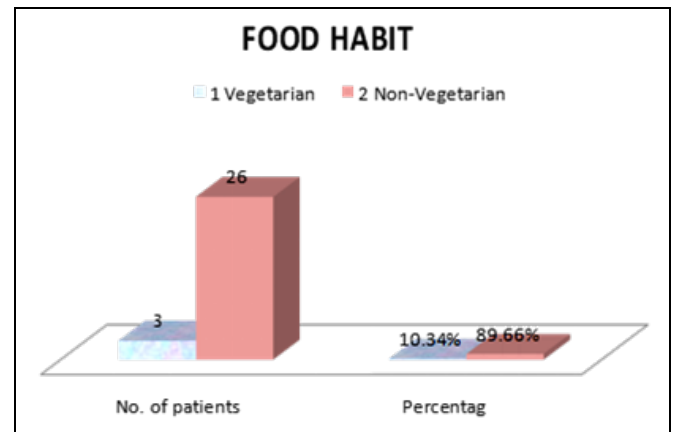**Fig 5:** Showing the Incidence of Educational qualification with percentage

Housewife	Businessman	Service	Labour	Retired
1	2	3	4	5
65.52%	26.90%	13.79%	1	10.34%

Fig 6: Showing the various occupation incidence with the percentage

Fig 7: Showing the various incidences of social status with percentage
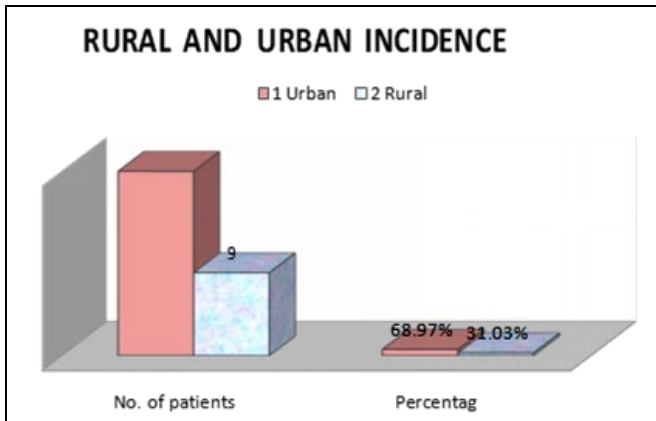
Fig 8: Showing the various Economic status incidence with the percentage
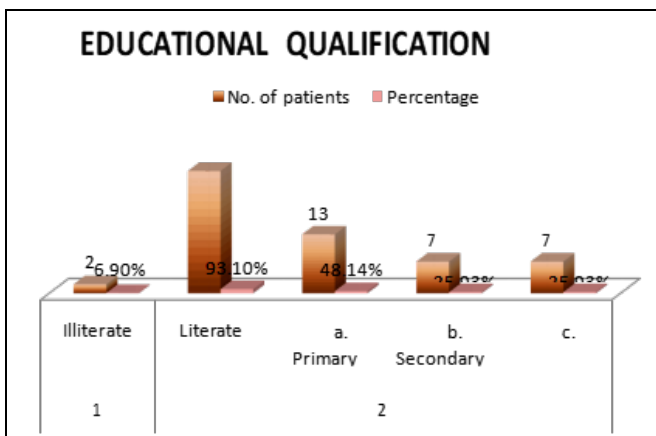
Fig 9: Showing the various Food habit incidence with the percentage
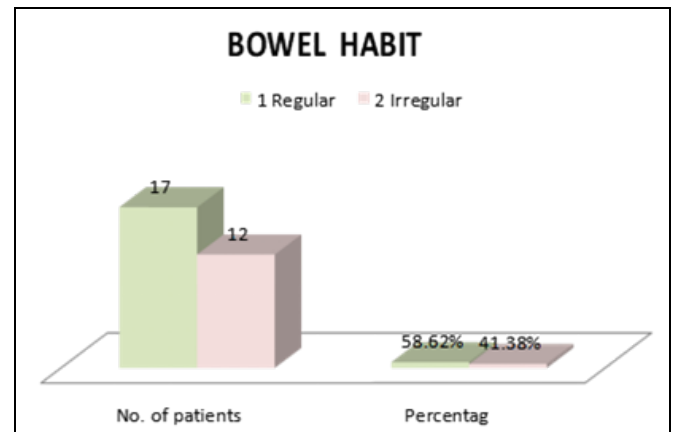
Fig 10: Showing the Incidence of Bowel habit with percentage

< 117 >
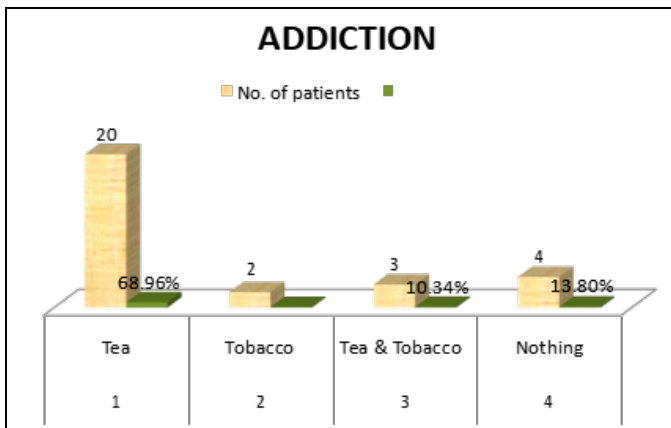
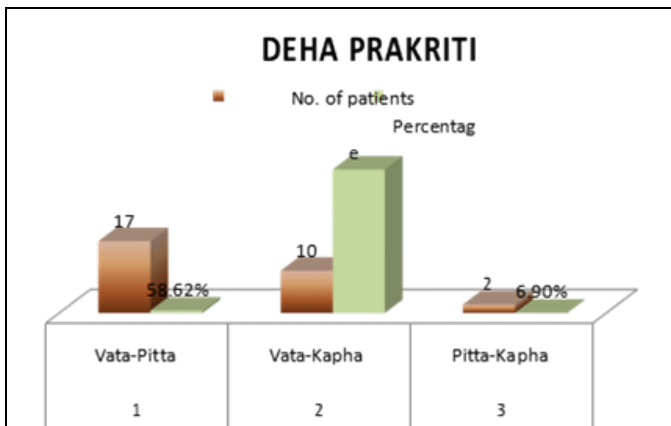**Fig 11:** Shows the various Addiction incidence with the percentage
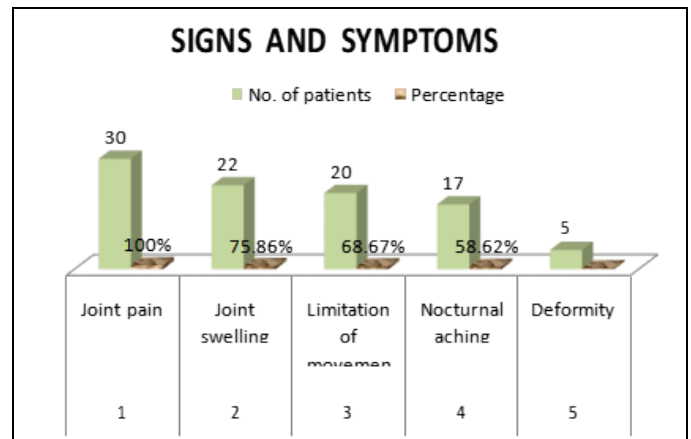
Fig 12: Showing the Incidence of Deha Prakriti with percentage

Fig 13: Showing the Incidence of Satwa with percentage

Fig 14: Showing the Incidence of Duration of illness with percentage.

Fig 15: Showing the Incidence of Signs and Symptoms with percentage

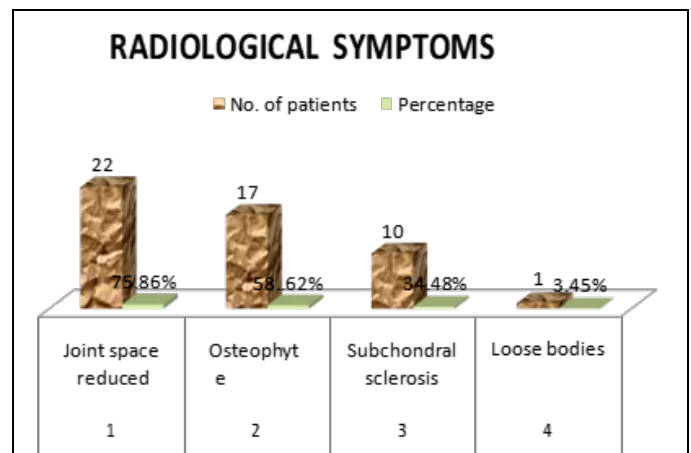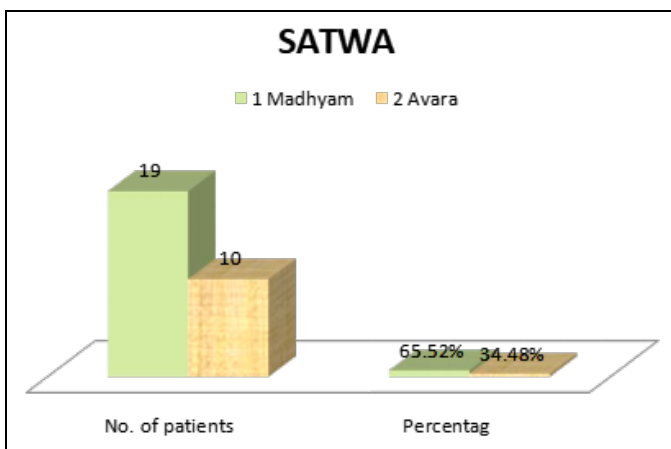**Fig 16:** Showing the Incidence of Radiology with percentage
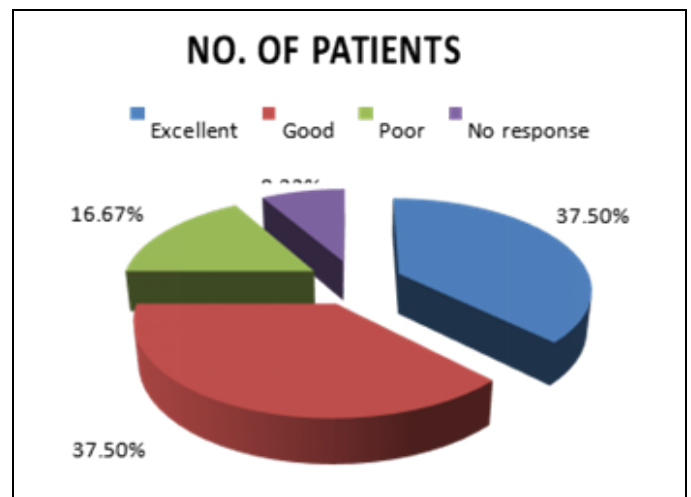
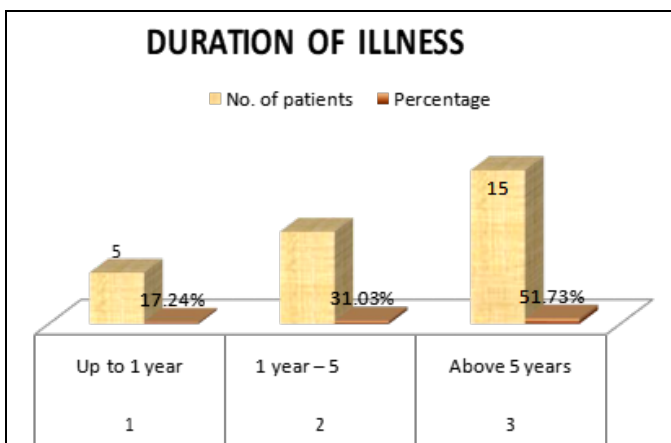**Fig 17:** Showing the Total effect of the treatment with percentage

Conclusion
The oral medicine of Aswagandhadi yoga formulation can be used as an alternative medicine to Sandhivata or Osteoarthritis to reduce the cost-effectiveness, ready availability, and out-of-pocket expenditure of the patient.

Acknowledgments

< 118 >

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< 119 >