

AN OBSERVATIONAL STUDY TO EVALUATE THE APATARPANAJA ETIOLOGICAL FACTORS AND RADIOLOGICAL CHANGES IN JANU SANDHIGATAVATA WITH SPECIAL REFERENCE TO OSTEOARTHRITIS

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ABSTRACT

Sandhigatavata is one among the *Vatavyadhi*. Here *Vikruta Vata* enters *Janusandhi* produces *Lakshnas* like *Shoola, Shotha* produces *Janu Sandhigatavata*.^{1,2} *Apatarpanaja Nidana* causes *Vata Prakopa* getting *Sthana Samshraya* in *Janu sandhi* produces *Janu Sandhigatavata*.³ Osteoarthritis clinically manifested as pain, swelling, joint stiffness, restricted range of movement.⁴ The radiological changes like narrow joint space, sclerosis of bone, cortical thickening and osteophytes are to be assessed.⁵ Osteoarthritis is the most common type of arthritis. Its high prevalence, especially in the elderly and the high rate of disability related to disease make it a leading cause of disability in the, because of the aging and obesity, a major risk factor, are increasing prevalence, the occurrence of osteoarthritis is on rise. Osteoarthritis prevalence will increase from 66% to 100% by 2020.⁶ *Nidana, Doshas, Dushya* are the essential factor in the disease process. Based on *Nidana, Chikitsa* is planned for the disease. *Apatarpanaja Nidana* causes *Vata Prakopa* and in turn causes *Vatavikara*. The *Nidana* are explained in *Vatavyadhi* are *Samanya Nidana* and not *Vishesha Nidana* related to *Janu Sandhigatavata*. So the understanding of etiological factor and pathogenesis of *Apatarpanaja Janu Sandhigatavata* is essential. So the study is taken to evaluate the role of *Apatarpanaja* etiological factors in the manifestation of *Janu sandhigatavata* and to assess radiological changes in *Janu Sandhigatavata*.

Keywords: *Apatarpanaja Nidana, Vatavyadhi, Sandhigatavata, Janusandhi.*

INTRODUCTION

A person can be said healthy when he is physically, spiritually and mentally alert when the *Doshas* are in normal state. If the *Doshas* are not in equilibrium and affects the above then it causes diseases. *Apatarpanaja Nidana* causes *Vata Prakopa* and *Dhatukshaya* in turn causes *Vata vikara*. *Vata* plays an important role and is responsible for all the *Chestas*. In

Vrudha Avastha, there will be *Kshaya* of all the *Dhatus* where in *Vata Prakopa* is seen leading to *Vataja* disorders. The disease like *Janu Sandhigatavata* disturbs physical and mental health in such a way that, it finally makes the person feel useless. This is particular so in case of *Janusandhigata Vikrithi*. *Janu Sandhi* is a *Marma* and also a *Madhyama Roga Marga*

Vikara⁷. This also includes all the structures like *Snayu, Sira, Asthi, Peshi, Kandara* etc.⁸ *Janu Sandhigata Vata* is usually a disease of elderly. *Sandhigatavata* is one of the *Vata Vyadhi* characterized by *Vatapurna Druti Sparsha* (swelling), *Prasarana Akunchana Pravrutisha Vedana* (stiffness) and *Shoola* (pain).⁹

MATERIALS AND METHODS

Source of data - A minimum of 60 Patients of *Janu Sandhigatavata* attending OPD and IPD of SDM College of Ayurveda and Hospital, Hassan was selected for the study.

Method of collection of data - A well designed case Proforma was prepared comprising of *Apatarpanotta* etiological factors mentioned in classics in questionnaire format. In this format of questionnaire, classified the *Nidana Sevan* by Regularly means – daily, Occasionally means - 2 to 3 times/week and No means – Not taking and Radiological changes seen in knee joint x-ray was documented in patients suffering from *Janu Sandhigatavata* with special reference to osteoarthritis.

Inclusion criteria

1. Patients fulfilling the diagnostic criteria.
2. Patients aged above 35 years of either sex.

Exclusion criteria

1. Patients with Rheumatoid arthritis, Gout, Fracture, Dislocation were excluded.
2. Patients suffering from other systemic disorders.
3. Osteoarthritis of Secondary disorder.

OBSERVATION

In the present study, out of total 60 patients, maximum 24 patients belonged to the Age group of 56-65 years i.e. 40%, followed by 17 (28.3%) patients in the Age group 46 -55 years. In the present

study, out of total 60 patients, maximum 24 patients belonged to the Age group of 56-65 years i.e. 40%, followed by 17 (28.3%) patients in the Age group 46 -55 years. The Gender wise distribution in the table shows that majority of the patients was Females with 48 (80%), followed by Males with 12 (20%). In present study out of 60 patients, 48 are Female, In that 45 patients attained Menopause. The present study contains maximum number of patients i.e., 32(53.4%) patients doing Household work and 17(28.3%) patients doing Field work. The present study, maximum numbers of patients that is 39 patients Working in day time for 6 to 8 hrs and 13 patients Working in day time for 5 to 6 hrs. The observations of 60 patients of *Janu Sandhigatavata* with respect to Nature of Work revealed that 47(78.3%) patients had both Physical and Mental Exertion.

In this study, maximum number of 28 patients knee joint x-ray showing Possible Osteophytic Lipping and 17 patient's knee x- ray showing Definite Osteophyte changes. In this study, maximum number of 26 patient's knee joint x- ray showing joint space mild reduced and 16 patients knee joint x- ray showing Joint Space Moderately Reduced. In this study, maximum number of 60 patient's knee joint x- ray showing Synovial Effusion is absent. In this study, maximum number of 37 patients knee joint x- ray showing Subcondral Sclerosis mild present and 16 patient's knee joint x- ray showing Subcondral Sclerosis moderately present. In this study, maximum number of 43 patients knee joint x- ray showing Reduced Bone Mineral Density. In this study, maximum number of 60 patient's knee joint x- ray showing Baker Cyst is absent. In this study, maximum number of 24 patients, in

that female 18 patient and male 6 patients Bone Mineral Density report lies between -1.1 to -2 and 23 patient that is female 21 and male 2 Bone Mineral Density report lies between -2.1 to -2.5.

Among 60 patients, 56(93.3%) of patients consumed *Katu Rasa*, maximum number of patients 36 i.e. 60% were consumed regularly followed by 20 patients i.e. 33.3% occasionally. Among 60 patients, 39 (65%) patients consumed *Tiktha Rasa*, maximum number of 37 patients i.e. 61.7% was consumed occasionally followed by 2 (3.3%) patients regularly. Among 60 patients, 29 (48.4%) patients consumed *Kashaya rasa*, maximum number of patients i.e. 46.7% was consumed occasionally followed by 1 (1.7%) patient regularly. Among 60 patients, in this study 45 (75%) patients did *Vishamashana*, maximum number of 44 patient's i.e.73.3% was done occasionally followed by 1 (1.7%) patient regularly. Among 60 patients, 30 (50%) patients Taken Minimum Quantity of Food, maximum numbers of 30 patients i.e. 50% were taken occasionally. Among 60 patients, In this study (39) 65% patients did Fasting; maximum number of 39 patients i.e. 65% were did Occasionally. Among 60 patients, 8 (13.3%) patients consumed *Shamaka*, maximum number of 8 patients i.e. 13.3% were consumed occasionally. Among 60 patients, 14 (23.4%) patients consumed *Yava*, maximum number of 10 patients i.e. 16.6% were consumed occasionally followed by 4 (6.7%) patients regularly. Among 60 patients, 58 (96.6%) patients consumed *Mudga*, maximum number of 41 patients i.e. 68.3% were consumed regularly followed by 17 (28.3%) patients occasionally. Among 60 patients, 50 (83.3%) patients consumed *Masoora*, maximum number of 34 patients i.e. 56.7% were

consumed occasionally followed by 16 (26.6%) patients regularly. Among 60 patients, in this study 52 (86.6%) patients consumed *Chanaka* with frequency of regularly by 23(38.3%) patients and occasionally by 29 (48.3%) patients. Among 60 patients, in this study 56 (93.3%) patients consumed *Adhaki* with frequency of regularly by 33 (55%) patients and Occasionally by 23 (38.3%) patients. Among 60 patients, 33 (55%) patients consumed *Karavellaka*, maximum number of 31 patients i.e. 51.7% were consumed occasionally followed by 2 (3.3%) patients regularly. Among 60 patients, 31 (51.7%) patients consumed *Patola*, maximum numbers of 28 patients i.e. 46.7% were consumed occasionally followed by 3 (5%) patients regularly. Among 60 patients, 42 (70%) patients consumed *Kembhuka*, maximum number of 36 patients i.e. 60% were consumed occasionally followed by 6 (10%) patients regularly. Among 60 patients, 15 (25%) patients consumed *Kalaya*, maximum number of 14 patients i.e. 23.3% was consumed occasionally followed by 1(1.7%) patient regularly. Among 60 patients, 45 (75%) patients consumed *Varthaka*, maximum number of 44 patients i.e. 73.3% were consumed occasionally followed by 1 (1.7%) patient regularly. Among 60 patients, 12 (20%) patients consumed *Parpataka*, maximum number of 12 patients i.e. 20% were consumed occasionally. Among 60 patients, 51 (85%) patients consumed *Takra*, maximum number of 41 patients i.e. 68.3% were consumed occasionally followed by 10 (16.7%) patients regularly. Among 60 patients, 40 (66.7%) patients consumed *Kapitta*, maximum number of 39 patients i.e. 65% were consumed occasionally followed by 1 (1.7%) patient regularly. Among 60 patients, 45 (75%) patients con-

sumed *Jambhu*, maximum number of 43 patients i.e. 71.7% were consumed occasionally followed by 2 (3.3%) patients regularly. Among 60 patients, 44 (73.4%) patients consumed *Ervaruka*, maximum number of 40 patients i.e. 66.7% were consumed occasionally followed by 4 (6.7%) patients regularly. Among 60 patients, 41 (68.3%) patients consumed *Virudha Dhanya*, maximum numbers of 39 patients i.e. 65% were consumed occasionally followed by 2 (3.3%) patients Regularly. Among 60 patients, 10 (16.7%) patients did Work during at night time, maximum number of 10 patients i.e. 16.7% did occasionally. Among 60 patients, 55 (91.7%) patients did Forcefully initiates natural urges, maximum number of 54 patients i.e. 91.7% were did Occasionally followed by 1 (1.7%) patient Regularly. Among 60 patients, 53 (88.3%) patients did Suppressed natural urges, maximum number of 53 patients i.e. 88.3% were done occasionally. Among 60 patients, 26 (43.4%) patients did *Nidana* like Carrying Heavy Load, maximum number of 22 patients i.e. 36.7% were done occasionally followed by 4 (6.7%) patients regularly. Among 60 patients, 13 (21.7%) patients did *Nidana* like Ride vehicle on uneven surface, maximum number of 10 patients i.e. 16.7% did occasionally followed by 3 (5%) patients regularly. Among 60 patients, 18 (30%) patients did *Nidana* like Sit in uncomfortable position, maximum number of 17 patients i.e. 28.3% did occasionally followed by 1 (1.7%) patient regularly. Among 60 patients, 16 (26.7%) patients did *Nidana* like Sleeping in uncomfortable position, maximum number of 16 patients i.e. 26.7% did occasionally. Among 60 patients, 20 (33.4%) patients did *Nidana* like Excess walking, maximum number of

19 patients i.e. 31.7% was did Occasionally followed by 1 (1.7%) patient Regularly. Among 60 patients, in this study 25 (41.6%) patients did *Nidana* like Laughing loudly with frequency of Occasionally by 23 (38.3%) patients followed Regularly by 2 (3.3%) patients. Among 60 patients, 21 (35%) patients did *Nidana* like Talk continuously, maximum number of 21 patients i.e. 35% were did occasionally. In this study of 60 patients, 60 patients does not Fall from height. Among 60 patients, 2 (3.3%) patients doing *Nidana* like Swimming, maximum number of 2 patients i.e. 3.3% were did occasionally. Among 60 patients, 49 (81.7%) patients did *Nidana* like Work until you get over exhausted, maximum number of 48 patients i.e. 80% were did Occasionally followed by 1 (1.7%) patient Regularly. Among 60 patients, 55 (91.7%) patients doing *Nidana* like Stand for long time, maximum number of 49 patients i.e. 81.7% was consumed occasionally followed by 6 (10%) patients regularly. Among 60 patients, 40 (66.7%) patients did *Nidana* like Sit for long time, maximum number of 37 patients i.e. 61.7% were did Occasionally followed by 3 (5%) patients Regularly. In this study of 60 patients, 60 patients do not have any Injury to vital organs. In this study of 60 patients, 60 patients do not have Bleeding or Loss of Blood. Among 60 patients, 10 (16.7%) patients had Trauma, maximum number of 10 patients i.e. 16.7% were had occasionally. Among 60 patients, 31 (51.7%) patients doing *Nidana* like Expose to sun, maximum number of 17 patients i.e. 28.3% were did Occasionally followed by 14 (23.4%) patients Regularly. Among 60 patients, 57 (95%) patients did *Nidana* like *Chinta*, maximum number of 56 patients i.e. 93.3% were done occa-

sionally followed by 1 (1.7%) patient regularly. Among 60 patients, 7 (11.7%) patients did *Nidana* like *Bhaya*, maximum number of 7 patients i.e. 11.7% were done occasionally. Among 60 patients, 27 (45%) patients did *Nidana* like *Kroda*, **RESULT:** Chi Square significance (P value) more than 0.05 indicates Not Significant, ranging from 0.05 to 0.01 indicates

maximum number of 27 patients i.e. 45% were did Occasionally. Among 60 patients, 39 (65%) patients did *Nidana* like *Shoka*, maximum number of 39 patients i.e. 65% were did Occasionally.

Significant and less than 0.01 indicates Highly Significant.

NIDANA	P Value	Significance
Aharaja Nidana		
<i>Katu</i> (spicy), <i>Tikta</i> (astringent) <i>Rasa</i> , <i>Kashaya</i> (pungent) <i>Rasa</i> , Taking minimum quantity of food,Taking food during improper time, <i>Shyamaka</i> (Nevanakki), <i>Yava</i> (Barlly), <i>Mudga</i> (Hesaru), <i>Masoor</i> (Masoor), <i>Adakhi</i> (Thogaribele), <i>Karavellaka</i> (Hagalakayi), <i>Patola</i> (Padavalakayi), <i>embhuka</i> (Elekosu), <i>Varthaka</i> (Badanekayi), <i>Parpataka</i> (Parpatahullu), <i>Takra</i> , <i>Kapitta</i> (Balavalakayi), <i>Jambhu</i> (Neralehannu), <i>Ervaruka</i> (Thondekayi), <i>Virudadhanya</i> , <i>Kalaya</i> (Batgadle)	.000	HS
Fasting	.020	S
<i>Chana</i> (Bangal)	.003	S
Viharaja Nidana		
Forcefully initiate natural urges. Forcefully suppress natural urges, Carrying heavy load, Ride vehicles on uneven surface, Sit in uncomfortable position, Sleep in uncomfortable position, Laugh loudly, Jumping from height, Work until you get over exhausted, Sit for long time, Excessive walking, Injury to vital organs, Bleeding /loss of blood, Fall from certain height.	0.000	HS
Talk continuously	.020	S
Excessive swimming	.003	HS
Trauma	.003	HS
Excessive exposure to sun	.043	S
Mahasika Nidana		
<i>Chinta</i> , <i>Bhaya</i>	.000	HS
<i>Krodha</i>	.439	NS
<i>Shoka</i>	.020	S

DISCUSSION ON OBERVATION

Age - In this study, 40% of patients of age occur between 55 yrs. to 65 yrs. and 28% of patient's age occurs between 66 yrs to 75 yrs. The prevalence of Osteoarthritis of

knee is more common in age group of 45 – 65 years.¹⁰

Sex - In the study out of 60 samples, Females are 80% and Males are 20%. Female are more suffers than Male. The universal

data also says prevalence of Osteoarthritis is more in older women.¹¹

Menopause - In this study 75% female's attained Menopause. This is the important factor for the production of osteoarthritis. As mentioned in texts same has been found in this study.¹²

Occupation - In this study 53.3% of patients doing Household work and Field workers are 28.3%. In these two occupations they work in standing or sitting posture for longer duration so they more prone to develop *Janu sandhigata vata*. It was also evidenced that, excessive hard and continuous work usually seen in Housewives and field workers group is more prevalence to *Janu sandhigata vata*.¹³

Working hours during day time - In this study 65% of peoples work for 6 to 8 hrs those are field workers and house hold females. Specific excess prevalence osteoarthritis was found in women among housekeepers. Agriculture male and female workers are more prone to develop osteoarthritis.¹⁴

Nature of work - In this study 78.3% of patients having both Mental and Physical Exertion are present in his working occupation. The Physical and Mental exertion occurs in field work and household work. So prone to develop osteoarthritis.¹⁵

Osteoarthritic Radiological changes - Osteoarthritic Radiological changes seen in patients knee joint in x – ray are like Possible Osteophytic lipping present in 46.7% patients knee joint x -ray, Definite osteophyte present in 28.3% patients knee joint x -ray, Reduced Bone density present in 71.7% patients knee joint x -ray, Joint Space is Mild Reduced present in 43.3% patients knee joint x -ray, Mild Subcondral Sclerosis present in 61.7% patients knee joint x -ray and Moderately

Subcondral Sclerosis present in 26.7% patients knee joint x -ray.

BMD Report - In Bone Mineral Density study shows from -1.1 to -2 range 18 patients are female and males are 6 and total is 24 patients present and Range from -2.1 to - 2.5 - 21 patients are female and male 2 patients are present and total is 23 patients.

DISCUSSION ON RESULT

Katu Rasa, Tiktha Rasa - Excess use of *Katu, Tiktha Rasa Yuktha Ahara* is responsible in the causation of *Janu sandhigata vata*. Excess intake of *Katu Rasa Ahara* produces *Shareera Shoshana, Krushata and Balaksheenata* and produces *Vata Vyadhi*. **Upavasa (Fasting), Pramitashana (Taking minimum quantity of food)** - Continuously doing *Upavasa, Pramitashana* for a long period of time it will affect the sequence of *Dhatu Poshana* resulting in *Dhatu Shoshana* further leading to *Vata Vyadhi*. **Vishamashana (Taking food at improper time)** - long duration if we do *Vishamashana* it is responsible in the causation of *Janu sandhigata vata*. Here *Vishama* refers to *Vishama* in *Kala, Matra* of intake of food which leads to *Vikruti* of *Vata Dosha*.

• **Aharaja Nidana**

Mudga - Excess use of *Mudga* is responsible in the causation of *Janu sandhigata vata*. It is having *Rasa-Kashaya, Madhura, Guna- Ruksha, Karma- Sleshma Pittagna and Vatavardhaka*. (Ch.Su.27/23).

Chanaka - Excess use of *Chanaka* is responsible in the causation of *Janu sandhigata vata*. *Chanaka*- having *Guna-Laghu, Veery-Sheeta, Rasa – Kashaya and Madhura, Karma- Rukshana, Kaphahara*. (Ch.Su.27/28). **Masoora** -Excess use of *Masoora* is responsible in the causation of *Janu sandhigata vata*. *Masoora* having *Guna-Laghu, Veerya- Sheet, Rasa –*

Kashaya And *Madhura, Karma-Rukshana, Kaphahara.* (Ch.Su.27/28). **Adhaki** - Excess use of *Adhaki* is responsible in the causation of *Janu sandhigata vata*. *Adhaki* is *Kapha Pittagna* and *Vatala* in nature. (Ch.Su.27/62). **Patola** - Excess use of *Patola* is responsible in the causation of *Janusandhigatavata*. *Patola* having *Rasa -Tikta, Guna - Laghu, Ruksha, Veerya- Ushna, Vipaka-Katu (BhavaprakashaNighantu).* (Ch.Su.27/96). **Karavellaka** - Excess use of *Karavellaka* is responsible in the causation of *Janusandhigatavata*. *Karavellaka*- having *Guna- Laghu, Rasa- Tiktha* and *Vatala* in nature. (*Madanapala Niganthu*). **Kembuka** - Excess use of *Kembuka* is responsible in the causation of *Janusandhigatavata*. *Kembuka* having *Guna- Laghu, Rasa-Tiktha, Veerya- Sheeta, Vipaka- Katu Paka, and Doshagnata- Kaphapittahara.* (Ch.Su.27/97). **Varthaka** -Excess use of *Varthaka* is responsible in the causation of *Janusandhigatavata*. *Varthaka* Having *Guna- Laghu, Rasa- Tiktha, Veerya-Sheeta, Vipaka- Katu Paka, And DoshagnataKaphapittahara.* (Ch.Su.27/97). **Viruda Dhanya** - Hence excess use of *Virudha dhanya* is responsible in the causation of *Janusandhigatavat*. *Viruda Dhanya: Vidahi, Guru, Vishtambi, Anila-Pittala, Utkleshajana, Ruksha.* (Su.Su.46). **Jambhu**-Hence excess use of *Jambhu* is responsible in the causation of *Janusandhigatavata*. *Jambhu* having *Rasa-Kashaya* and *Madhura, Veerya- Sheeta, Doshagnata- Kaphapitta Hara and Vata Vardhaka.* (Ch.Su.27/140). **Ervaruka**-Excess use of *Ervaruka* is responsible in the causation of *Janusandhigatavata*. *Ervaruka* having *Rasa: Madhura, Tikta, Guna: Guru, Ruksha, Veerya: Seeta, Karma: Beda, Kaphahara, Vatakara.* (Ch.Su.27/110). **Takra** - Excess use of

Takra is responsible in the causation of *Janusandhigatavata*. *Takra* having *Rasa: Madura, Amla and Kashaya Anurasa, Veerya- Ushna, Guna- Laghu, Ruksha.* (Ch.Su.27), (Su.Su 46). **Kapitta** - Excess use of *Kapitta* is responsible in the causation of *Janusandhigatavat*. *Kapitta* having *Rasa- Amla, Kashaya, Guna- Laghu, Veerya- Seeta, Karma: Kaphaghna, Lekhana, Vatala.*(Ch.Su.27/136).

• **Viharaja Nidana**

Vegadharana (Suppressing the natural urges) - For long duration if we does *Vegadharana* it will produce the disease. Suppression of urges of *purisha* can produce *Prakopa* of *Vata Dosha* especially *Apana Vata*. **Vegaudirna (Forcefully initiates natural urges)**- For long duration if we do *Vegaudirna* it will produce the disease. *Vegaudirna* of *Purisha* can produce *Prakopa* of *Vata Dosha* especially *Apana Vata*. **Ati Vyayama (Work until you get over exhausted)** - For long duration if we do this *Nidana* it will produce the disease. If we work until over exhausted produces *Vata Prakopa* leads *Shareera Soshana* and *Dhatu Kshaya* then produces *Vata Vyadhi*. **Sit for long duration** - For long duration if we do this *Nidana* it will produce the disease. Every part in our body should be actively move if not does proper activity its loss its strength and become emaciated if does for long duration this happens in knee joint also. For long time if we sit for long duration it directly produces pressure over knee joint and produces the disease. **Stand for long duration**- For long duration if do this *Nidana* it will produce the disease. Mainly knee joint are weight bearing joint if does long standing will produce more weight on knee joint then there will be degeneration occurs if continues for long duration. **Exposure to sun**- For long duration if do this *Nidana* it will produce

the disease. It is *Vatapitta vardhaka*. Increased sunlight exposure stimulates melanocytes to produce more and more melanin pigment which prevent UV rays from entering into skin and skin becomes dark, produce burning sensation, erythematous rashes. **Manasika Nidana** - All the *Manasika Bhavas* are responsible in *Vata Prakopa*. *Mana* controls the function of all the *Indriyas* with the help of *Vata*. It may not be able to produce the disease directly but it may aggravate the condition. *Vata* is said to be the controller of mind. So affliction by *Manasika Karana* may cause aggravation of *Vata Dosha*.

CONCLUSION

Old age and Female above 45 yrs are risk factors for occurrence of Osteoarthritis. Menopause in females is a major risk factor for occurrence of Osteoarthritis. Among Occupation Household and Field works are major risk factor for occurrence of osteoarthritis. Among *Rasa – Katu and Tiktha* become Highly Significant. *Upavasa* becomes Significant. *Vishamashana* and *Pramitashana* are become highly significant. Among *Aharaja Nidana* like *Mudga, Kapitta, Jambhu, Karavellaka, Virudha dhanya, Kembhuka, Ervaruka, Takra, Adhaki, Varthaka, Patola and Masoora* these are become Highly Significant and *Chanaka* become Significant. Among *Viharaja – Vegadharana, Vegaudirana, Ati vyayama, Sit for long duration, Stand for long duration* become Highly Significance and Exposure to Sun become Significant. Among *Manasika Nidana* like *Chinta* become Highly Significance and *Shoka* become Significant. Osteoarthritic Radiological changes. Osteoarthritic Radiological changes seen in patients knee joint in x – ray are like Possible Osteophytic lipping present in 46.7% of patients knee joint x -ray, Definite osteo-

phyte present in 28.3% of patients knee joint x -ray, Reduced Bone density present in 71.7% of patients knee joint x -ray, Joint Space is Mild Reduced present in 43.3% of patients knee joint x -ray, Mild Subcondral Sclerosis present in 61.7% of patients knee joint x -ray and Moderately Subcondral Sclerosis present in 26.7% of patients knee joint x -ray. The BMD result shows 47 patients are osteopenic and 7 patients are osteoporosis so it shows *Apatarpana* is occurred in patients so now we can say *Apatarpanaja nidanas* mentioned in classics are responsible for the causation of *Apatarpanaja Janusandhigatavata*.

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