



A CLINICAL STUDY ON KATIGRAHA (LOW BACKACHE) AND IT'S MANAGEMENT WITH PATRA PINDA SWEDA

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ABSTRACT

Introduction: Low back ache (LBA) is the most common chronic musculoskeletal disorder. It bears similarities to the Ayurvedic condition Katigraha. It is a condition where pain (Shoola) and stiffness (Stabdhata) affect the lower back (Katipradesha). Katigraha is explained by Shodhala in the Kayachikitsa Khanda, Vataroga Adhikara. In this condition either Shuddha (pure) Vata or Samavata gets lodged at Katipradesha and produces symptoms there. According to modern research, lower back pain is a chronic illness marked by an ongoing dull or severe pain in the lower back. It is a condition that affects a wide range of demographic groups and has numerous potential causes. Ayurveda has mentioned Panchakarma therapies for the treatment of Katigraha. Hence, an effort has been made to evaluate the efficacy of Patrapinda Sweda procedure in the management of the Katigraha.

Aim of the study: To evaluate the therapeutic effect of Patrapinda Sweda in bringing the overall relief in patients of Katigraha and Low Backache.

Materials and Methods: For the present study, 30 patients of Katigraha were randomly selected according to the Inclusion criteria. 30 patients treated with Patrapinda Sweda once daily for 15 days. The assessment was done in every 7th days of intervals. After completion of the study the data was analysed by using suitable statistical parameters.

Discussion and Conclusion: Statistically, Patra Pinda Sweda provided significant results in improving subjective and objective signs and symptoms of Katigraha.

KEYWORDS: Katigraha, Low Back Ache, Patrapinda Sweda

INTRODUCTION

Low back ache affects approximately 60 to 85% of adults during some point of their life¹. As of 2005, lower back pain ranks as the number one cause of disability in individuals under the age of 45². Katigraha is one such condition in which the vitiated Vata is localizing in the Kati Pradesha and produces stiffness and pain there. The term Katigraha is made of two words 'Kati' and 'Graha'. The word 'Kati' is derived from the Dhatu "kat + in" and it is considered as a 'Sharira avayava vishesha', a body part where the dress is tightened³. According to Amarakosha Shroniphala is called as Kati⁴. Vaidyaka Shabda Sindhu also considers Shroni as Kati⁵. According to Monier Williams – Kati is the hollow space above the hip or the loins.⁶ The term 'Graha' is derived from the Dhatu 'Adant-Churam-Atmam-Saka-Set'. The term is explained as 'Graha Grahanam', by Durgadas, which means to collect or catch.⁷ "Graha" means holding. It originated from Dhatu "Graha Upadane" –one which gives support. Thus "Katigraha" is a condition of the lower back region that is associated with pain and stiff movements.

Many treatment regimens are described classically to treat patients suffering from Katigraha. Like Snehana, Swedana, Basti etc. Acharya Charaka has explained, 13 types of Swedana in Swedadhya. Patrapinda Sweda is a form of Swedana which is included under the category of Pindasweda. In this type of Sweda, different medicinal leaves have used for preparation of Pinda. This gives relaxation from stiffness, heaviness and coldness in the body. This treatment eliminates the toxic elements through sweating after the Swedana procedure.



Thus, taking these principles into consideration; *Swedan* therapy were selected for the study. *Patrapinda Sweda* is a treatment which has definite role in *Katigraha*. Hence considering these facts, the current study has been planned to evaluate the efficacy of *Patrapinda Sweda* in the management of *Katigraha* (Low Backache).

AIM OF THE STUDY

- To evaluate the therapeutic effect of *Patrapinda Sweda* in bringing the overall relief in patients of *Katigraha* and Low Backache.

ETHICAL CLEARANCE

- The study was approved by IEC(Institutional Ethical Committee), Govt. Ayurvedic College and Hospital, Balangir vide Letter no: 596 /G.A.C & H of dated 29.08.2022 and registered in Clinical Trial Registry of India (CTRI; www.ctri.nic.in)vide Registration No: CTRI/2023/08/056935 .The study had been conducted among the patients registered for the purpose. Written consent was obtained from each patient participated in the study with prior information.

MATERIAL AND METHODS

30 numbers of patients suffering from *Katigraha* were selected randomly from OPD and IPD of Govt. Ayurvedic College and Hospital, Balangir and Saradeswari Govt. Ayurvedic Hospital, Balangir. They were screened by a special Proforma which includes details history taking, physical sign and symptoms and pathological investigation mentioned in Ayurveda classics and modern sciences. The consent of patient was also taken before clinical trial. The following inclusion and exclusion criteria had been followed for this study.

INCLUSION CRITERIA

- Fulfilling the diagnostic criteria.
- Patients of both sexes aged between 20-70 years.
- The patients, who are fit for *Patrapinda Sweda*.
- Patients with completely healed injury.

EXCLUSION CRITERIA

- Patients who were having low backache due to any infection, cancerous, congenital, viscerogenic, vascular causes.
- Patient associated with any other systemic disorder.
- Patients with the recent history of trauma (*Abhighata Janya Katigraha*).
- Low backache caused by any treatment for other ailments (iatrogenic).
- Post-surgical backache.
- Patients with chronic UTI.
- Contraindicated for *Swedana*.

DIAGNOSTIC CRITERIA-

All the patients with the below mentioned signs and symptoms were chosen for the study.

- *Katishoola*: Low Backache
- *Katistambha*: Stiffness of the lower back
- *Kriyahani*: Diminution of activities
- *Sparshasahatva*: Tenderness / Inability to tolerate touch

Also, a thorough blood examination like- DC, TLC, Hb%, ESR, FBS, Serum Cholesterol, Urine examination (Routine & Microscopic) and X-Ray was done to eliminate other causes of infections, systemic disease & trauma.

STUDY DESIGN AND GROUPING

Methodology- Randomized Open Label Clinical Trial.

a) Grouping

Single group design

Trial Gr BT... Vs... Trial Gr AT	Effectiveness of therapy (Trial group) was assessed.
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(Gr = Group, BT= Before Treatment, AT = After Treatment)

Duration of procedure: 15 days for each patient.



SELECTION OF PROCEDURE AND PREPARATION METHOD

PATRAPINDA SWEDA

Patra Pinda Sweda is an important external therapeutic measure for rheumatological conditions like Low Backache and here it was adopted for the study. The ingredients taken in *Patrapinda Sweda* are *Nirgundi Patra* (*Vitex negundo*), *Eraṇḍa Patra* (*Ricinus communis*), *Arka Patra* (*Calatropis procera*), *Karanja Patra* (*Pongamia pinnata*), *Shigru Patra* (*Moringa oliefera*), *Chincha Patra* (*Tamarindus indica*), Lemon (*Citrus medica*), *Saindhava Lavaṇa* (*Sodii chloridum*) and *Eraṇḍa taila* (*Ricinus communis*).

Procedure of Swedana

The procedure of *Patra Pinda Sweda* can be explained under three heading:

1. *Poorva Karma*
2. *Pradhana Karma*
3. *Pashchat Karma*

MATERIALS REQUIRED

- *Nirgundi Patra* (*Vitex negundo*), *Eraṇḍa Patra* (*Ricinus communis*), *Arka Patra* (*Calatropis procera*), *Karanja Patra* (*Pongamia pinnata*), *Shigru Patra* (*Moringa oliefera*) and *Chincha Patra* (*Tamarindus indica*) etc. (chopped into pieces- 100gm each).
- Sliced lemon- 2
- *Saindhava Lavaṇa*- 5-10 gm.
- *Eraṇḍa taila* - For frying leaves – sufficient quantity, For heating *Pottali*- sufficient quantity, For *Abhyanga*- sufficient quantity
- Cotton cloth (45cm×45cm): 4 pieces
- Tags- 4
- Vessels- 2 (for frying Leaves and for heating *Pottali*).
- *Panchakarma Droni*-1
- Gas stove-1

POORVA KARMA

Preparation of Pottali

Fresh leaves were cleaned and chopped finely. First, a sufficient quantity of *Eraṇḍa taila* was added into pan, to this, sliced lemon & *Saindhava Lavaṇa* were added and fried till it turned to light tinged brown. Add chopped leaves one by one; first add drugs which had thick leaves followed by thin. Then mixed thoroughly and fried together. After the mixture was fried, it was tied in a clean cotton cloth to form a bolus of *Patra Pinda*. It had divided into two equal parts and made into 2 *Pottalis* (the average weight of a standard *Pottali* is 300-350 gms).

Preparation of Patient

- Patient was advised to evacuate feces and urine, prior to the procedure and to expose the area desired for *Swedana*.
- The patient was laid in prone position with the head rested upon a pillow & the hands placed on the side of the body. *Abhyanga* was performed with *Eraṇḍa taila* all over the affected parts of the body for about 10 minutes.

PRADHANA KARMA

- The prepared *Pottali* were heated with *Eraṇḍa taila* in a vessel on a gas stove up to 42-46°C.
- The therapists before applying the boluses on the body of the patient ensured that the heat of the boluses is bearable to the patient by checking the temperature of the boluses over the dorsum of their own hand.
- The *Patra Pottali* was gently rubbed with mild pressure over the part to be sudated in a synchronized manner by two therapists positioned on each side of the patient.
- Heat of the boluses was maintained throughout the procedure by dipping it in the warm oil repeatedly.
- The procedure of *Patrapinda Sweda* had been done till the patient gets of the *Samyak Swiṇṇa Lakshana*.
- The *Patra Pinda* were changed every 3 days.

DURATION OF THE PROCEDURE

Time duration of the treatment ranges from 30- 45 minutes. The therapy was done once every day for 15days depending on the severity/intensity of the disease.



PASHCHAT KARMA

After completion of the procedure, oil was wiped off from the body using a clean dry towel. The body was covered with a thin blanket for 10-15 minutes. Patient was advised to take a warm water bath after 1 *Muhurta* (48 minutes). Patient was advised to take a light diet and drink lukewarm water after the procedure.

FOLLOW UP

Follow up was done in every 7days / 1 week interval i.e. 7th and 15th day of the clinical trial.

ASSESSMENT CRITERIA

The effects of the treatments were assessed by examining Clinical signs and symptoms before and after treatment. For the purpose of the assessment of result, severity of the signs and symptoms were graded as 3,2,1,0 grade, for severe (3), moderate (2), mild (1) and normal (0) accordingly.

Table No. 1- Showing the assessment of subjective parameters

ILLNESS	SEVERITY	GRADE
<i>Katishoola</i> (Low backache)	No pain while walking	0
	Mild pain while walking	1
	Moderate pain while walking	2
	Severe pain while walking	3
<i>Katistambha</i> (Stiffness of lower back)	No stiffness	0
	Stiffness for 10-30 min	1
	Stiffness for 30-60 min	2
	Stiffness for more than 1hr.	3
<i>Sparshasahatva</i> (Tenderness/Inability to tolerate touch)	No tenderness	0
	Patient says the area is tender	1
	Patient winces due to pain	2
	Patient winces and withdraws the affected part	3
<i>Kriyahani</i> (Diminution of activities)	No restriction of movement	0
	Mildly restriction of movement	1
	Moderately restriction of movement	2
	Severely restriction of movement	3

OBSERVATIONS AND RESULTS

The Maximum number of patients were Males (60%), Hindu (100%), Literate (83.33%), Married (93.33%), Mixed diet (93.33%), Tea addiction (83.33%) and *Vatakaphaja deha prakriti* (46.67%).

Table No. 2 – Incidence of *Doshavidha Parikshya* of registered patients. (n=30)

Sl.No.	Criteria	Maximum Percentage	Category
01	<i>Prakriti</i>	46.67%	<i>Vatakaphaja</i>
02	<i>Vikriti</i>	43.33%	<i>Madhyam vala vyadhi</i>
03	<i>Sara</i>	96.67%	<i>Madhyam sara</i>
04	<i>Samhanana</i>	50.00%	<i>Pravara</i>
05	<i>Pramana</i>	60.00%	<i>Sama sarira</i>
06	<i>Satwa</i>	56.67%	<i>Pravara</i>
07	<i>Satmya</i>	53.33%	<i>Pravara</i>
08	<i>Ahara Shakti</i>	53.33%	<i>Madhyam</i>
09	<i>Vyayama Shakti</i>	40.00%	<i>Madhyam</i>
10	<i>Vaya</i>	70.00%	<i>Madhyamavasta</i>



Table No. 3 – Showing the statistical analysis of subjective parameters (n=30)

Subjective parameters		Mean	Median	SD	SE	Wilcoxon W	P-Value	% Effect	Result
<i>Katishoola</i>	BT	2.57	3.00	0.50	0.09	-5.324 ^b	0.00000010	80.52	Sig
	AT	0.50	0.50	0.51	0.09				
<i>Katistambha</i>	BT	1.23	1.00	0.43	0.08	-5.203 ^b	0.00000020	91.89	Sig
	AT	0.10	0.00	0.31	0.06				
<i>Sparshasahatva</i>	BT	1.07	1.00	1.11	0.20	-3.602 ^b	0.00031566	90.63	Sig
	AT	0.10	0.00	0.31	0.06				
<i>Kriyahani</i>	BT	0.83	0.00	0.95	0.17	-3.448 ^b	0.00056533	96.00	Sig
	AT	0.03	0.00	0.18	0.03				

DISCUSSION

EFFECT ON SIGN AND SYMPTOMS

It is very clear from the observation test procedure had excellent effect in reducing and relieving sign and symptoms.

Katishoola - On the symptom *Katishoola*, improvement was observed with 80.52%, P-Value is less than 0.05 which was significant. *Patrapinda Sweda* was proved better in pain relieving might be due to better pain relieving effect of *Swedana*. Leaves used in *Patrapinda Sweda* are *Ushna Veerya* and bears *Vatahara* and *Kaphahara* properties. Oil has been said as best *Vatashamaka* and *Swedana* has been said for alleviation of *Vata* and *Kapha Dosha*. They produce analgesic effect. According to pain gate control mechanism, non-painful stimuli like heat and touch closes the gate for painful stimulus, subsiding pain.

Katistambha -On the symptom *Katistambha*, improvement was observed with 91.89% and P-Value is less than 0.05 which was significant. This reveals the fact that hyperthermia and massage together during *Patrapinda Sweda* provides better muscle relaxant effect and reduces stiffness. As per *Ayurvedic* view *Stambhaghna* is also action of *Swedana Karma*.

Sparshasahatva -On the symptom *Sparshasahatva*, improvement was observed with 90.63% and P-Value is less than 0.05. Hence, we can conclude that, effect observed in *Sparshasahatva* is significant. Far better improvement was found in the *Patrapinda Sweda* due to *Shulahara* effect of *Swedana Karma*. Moreover, *Nirgundi* might have reduced tenderness owing to its analgesic and anti-inflammatory property.

Kriyahani - On the symptom *Kriyahani*, improvement was observed with 96.00% and P-Value is less than 0.05. Hence, we can conclude that, effect observed in *Kriyahani* is significant. Diminution of activities occurs due to the muscle's spasm. Application of *Patrapinda Sweda* on those particular muscles involved exerts beneficial effect. The mechanism behind this is improvement in blood circulation and muscle relaxation due to massage and hyperthermia.

TOTAL EFFECT OF TRAIL

The clinical assessment was done basing on the sign and symptoms both subjective and objective parameters.

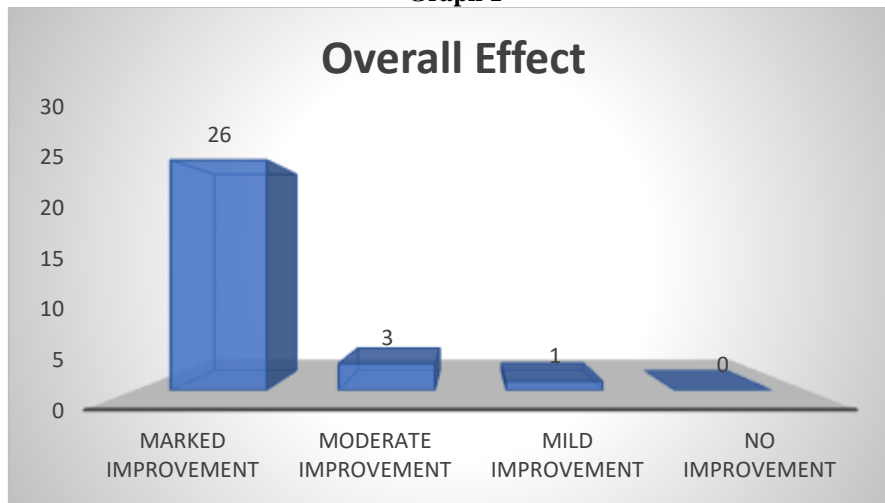
After 15 days of treatment 1 patient 3.33% got mild improvement, 10% patients got Moderate improvement and 86.67% patients got Remarkable improvement.

Table No. 4- Showing Overall improvement in patients (n=30)

Overall Effect	Total no. of cases	Percentage
Marked Improvement	26	86.67%
Moderate Improvement	3	10.00%
Mild Improvement	1	3.33%
No Improvement	0	0.00%
TOTAL	30	100.00%



Graph 1



BRIEF DISCUSSION ON MODE OF ACTION OF THEREPY

PROBABLE MODE OF ACTION OF SWEDANA

The main and direct reference available on the mode of action of *Bahirparimarjana* is from *Sushruta Samhita: (Su.Sa.9/9)*. It explains that “The branch of body’s peripheral conduction network with their portals in the skin is concerned with perspiration, perception of cutaneous pleasure and pain sensations, as well as circulation of tissue fluid. Conduction of the activity or potency of the therapeutic regimen or agent into the body, after conversion (transduction) in the skin, also forms their attribute”.

The probable mode of action of *Patrapinda Sweda* can be explained under the following headings:

1. Thermal effect
2. Procedural effect
3. Drug effect

1. Thermal Effect

Diffusion through the skin is a temperature-dependent process (According to *Swedana Guna*), so raising the skin temperature will enhance the Transdermal delivery of various drugs by increasing skin permeability, body fluid circulation, blood vessel wall permeability and drug solubility. External heating will dilate the penetration pathways in the skin, increase kinetic energy & movement of particles in the treated area & facilitate drug absorption.

Heat is having an indirect effect on:

- ❖ Muscle tissue: Increase in temperature - Muscle relaxation - increased muscle action efficiency.
- ❖ Increased activity of Sweat glands - Reflex stimulation of Sweat glands resulting from the effect of heat on the sensory nerve endings.

2. Procedural Effect

Swedana is a procedure where stimulates the body temperature by contact with the external heat source, thereby producing *Sweda*. The *Ushna Guna* of *Swedana Karma* leads to stimulate the sympathetic nervous system & produces vasodilatation, also increasing the circulation of *Rasa & Rakta* in the body, because of *Sara & Sukshma Guna* the *Leena Dosha* are liquefied and come out through micropores presenting over the skin resulting in more excretion of liquefied Vitiated *Dosha* from the body.

Abyanga is exceedingly beneficial to the skin as it works directly on the lymphatic system. This system is supplementary to the blood vascular system and offers an alternative route for the return of tissue fluid to the bloodstream. By stimulating lymphatic flow and generating heat through friction (rubbing) and application of the oils, massage cleanses and vitalizes the body without causing the build-up of toxins. Thus, oil massage quickens the circulation of blood and lymph and dislodges the toxins and increases the vitality of the tissues.

3. Drug Effect: *Eranda Taila* has properties like *Madhura, Kashaya Rasa, Guru, Snigdha, Tikshna, Sukshma Guna* and *Ushna Veerya* and *Madhura* in *Vipaka*, so naturally this is the best curator of *Vata*. *Taila* being the type of *Sneha* and *Agrya* for *Vata Shamana*, due to its therapeutic and procedural effect acts best in combating *Dosha s* and this aspect is made use in this study to relieve symptoms of *Katigraha*.



Saindhav Lavan has *Vata Pitta Kapha Shamaka* properties and *Kaphavilayan-chedana* properties. *Nimbu* (sliced lemon) acts as *Vata-Kaphahara* and *Shula Prashamana*.

For *Patra Pinda Sweda*, *Eranda Patra* is used which possess *Kapha-vatahara* action and *Shigru* is known to reduce sever pain. Leaves of *Nirgundi* plant have analgesic, anti-bacterial and anti-inflammatory properties, also possess anti-histaminic property and is a muscle relaxant. *Karanja Patra* is having the properties of *Vata-Kaphahara*, *Shothahara* and is anti-bacterial. Leaves of *Arka* acts as *Vatahara* and are known to reduce *Shopha*. *Chincha Patra* is *Kapha- Vata Dosha hara* and *Shophahara*.

Table No. 5 - Showing the pharmacodynamics of drugs of *Patra pinda Sweda*

Name	Rasa	Guna	Virya	Vipaka	Karma	Doshakarmata
<i>Nirgundi</i>	<i>Katu, Tikta</i>	<i>Laghu, Ruksha</i>	<i>Ushna</i>	<i>Katu</i>	<i>Vatakapha shamaka, Vedanasthapaka, Vataghna, Shothahara</i>	<i>Tridosha shamaka</i>
<i>Eranda</i>	<i>Madhura, Katu, Kashaya</i>	<i>Snigdha, Teekshna, Sookshma</i>	<i>Ushna</i>	<i>Madhura</i>	<i>Vedanasthapana, Shulahara, Angamarda prashamana, Balya</i>	<i>Vata Kapha shamak</i>
<i>Arka</i>	<i>Katu, Tikta</i>	<i>Laghu, Ruksha, Tikshna</i>	<i>Ushna</i>	<i>Katu</i>	<i>Vedanasthapaka Shot hahara Vranashodhana</i>	<i>Vata Kapha Shamaka</i>
<i>Karanja</i>	<i>Katu, Kshaya</i>	<i>Laghu, Tikshna</i>	<i>Ushna</i>	<i>Katu</i>	<i>Vatakapha shamaka, Vedanasthapaka, Shothahara</i>	<i>Vatakapha shamaka</i>
<i>Shigru</i>	<i>Katu, Tikta</i>	<i>Laghu, Ruksha, Tikshna</i>	<i>Ushna</i>	<i>Katu</i>	<i>Shulahara, Deepana, Pachana</i>	<i>Vata Kapha shamak</i>
<i>Chincha</i>	<i>Madhura, Amla</i>	<i>Guru, Ruksha</i>	<i>Ushna</i>	<i>Amla</i>	<i>Vatakaphahara Deepana</i>	<i>Vata Kapha Shamaka</i>
<i>Lemon</i>	<i>Amla, Katu</i>	<i>Laghu, Teekshna</i>	<i>Ushna</i>	<i>Amla</i>	<i>Vatakaphahara, Depana, Pachana</i>	<i>Vata Kapha Shamaka</i>
<i>Saindhava lavana</i>	<i>Lavana</i>	<i>Laghu, Snigdha, Sukshma</i>	<i>Anushnash eeta</i>	<i>Madhura</i>	<i>Ruchya, Depana, Pachana</i>	<i>Tridosha Shamaka</i>
<i>Eranda taila</i>	<i>Madhura, Kashaya</i>	<i>Guru, Snigdha, Tikshna, Sukshma</i>	<i>Ushna</i>	<i>Madhura</i>	<i>Vatakaphahara, Rechana, Vrusya</i>	<i>Vata Kapha Shamaka</i>

Here all selected leaves have *Vata* and *Kapha Shamaka* properties (relieves from stiffness, numbness) and *Vedanahara* (analgesic and anti-inflammatory properties) in nature.

Probable mode of action of *Patrapinda Sweda* can be understood as

- Improves blood circulation and metabolism locally.
- Relieves para-vertebral muscular spasm & pain.
- Strengthens para vertebral muscles.
- Helps repair damaged myelin sheath.
- Improves proprioception status.
- Local anti-inflammatory effect.

CONCLUSION

Statistically, the trial procedure *Patrapinda Sweda* showed high significance in decreasing pain, stiffness, tenderness and diminution of activities, which was noted completely after follow up (P<0.05). After the follow up period, it is found that the trial Procedure was more efficient in relieving the signs and symptoms of *Katigraha*.



The sizes of sample and time period were small to draw a generalized conclusion. Therefore, the procedure can be tried in a large sample for appropriate duration to observe its proper efficacy. The procedure of *Patrapinda Sweda* was a long-standing procedure, which needed admission in hospital and specialized care.

CONFLICT OF INTERESTS- None

FUNDING- None

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REFERENCES

1. Frymoyer JW. Back pain and sciatica. *N Engl J Med* 1988; 318: 291-300.
2. Van Geen JW, Edelaar MJ, Janssen M, van Eijk JT. The long-term effect of multidisciplinary back training: A systematic review. *Spine (Phila Pa 1976)* 2007; 32: 249-55.
3. Raja Radhakantadeva, *Shabdakalpadruma 2nd Part*; Edited by Shivaradaprasadoasuna and Sriharicharanavasuna; Naga publishers; Delhi; Reprint; 1987. p. 926.
4. Amaramishra, *Amarakosha with Ramashrami commentary of Bhanuji Dikshitha*; Edited by Pandit Haragovinda Shastri; Chaukhambha Sanskrit Sansthan; Varanasi; Reprint; 2006. p. 294.
5. *Vaidyaka Shabdasindhu compiled by Kaviraja Umeshchandra Gupta*; Revised and enlarged second edition by Kaviraj Nagendranath Sena, Chaukhambha Orientalia, Print; 1999. p. 1077.
6. Monier Williams: *Sanskrit English Dictionary*, Motilal Banarasidas Publishers Pot Ltd, Delhi; p. 243.
7. Raja Radhakantadeva, *Shabdakalpadruma 2nd Part*; Edited by Shivaradaprasadoasuna and Sriharicharanavasuna; Naga publishers; Delhi; Reprint; 1987. p. 348-349.
8. *Gadanigraha 'vidyotinitika' vol-2, Kaya Chikitsa Khanda 19/160*, Chaukhamba Sanskrit Sansthan.
9. *API Textbook of Medicine, 9th EDITION* By Yash Pal Munjal, Low Backache, p-1813.
10. *Essential Orthopaedics, FIFTH EDITION*, By J. Maheshwari, Approach to a Patient with Back Pain, p-258,259,260.
11. Internet-en.wikipedia.org & labtestsonline.org