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EFFICACY OF STHANIKA BASTI IN MANAGEMENT OF MUSCULOSKELETAL DISORDERS – META-ANALYSIS

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ABSTRACT

Introduction: Musculoskeletal diseases are the most prevailing ailment in India and one of the leading causes of functional impairment and disability affecting the quality of life. The World Health Organization (WHO) recommends boosting the use of Ayurveda medicine's medicinal systems along with the usual mode of treatment. Diminution and regulation of the vata (aggravated principle of kinetic force) is the basis of Ayurvedic treatment comprising individually tailored interventions, including medication, purification measures, lifestyle and nutritional advice, and dietary supplements. *Sthanik Basti* includes both *Snehana,* i.e. oleation and *Swedana*, i.e. sudation, so it is more effective in the acute management of pain and associated symptoms of musculoskeletal disorders. **Material and method:** The study aims to evaluate and compare Ayurveda interventions' efficacy in managing musculoskeletal disorders, i.e *Vatavyadhi,* and to assess the effect of Ayurveda Interventions on pain, stiffness and range of movement. This systemic review was conducted according to the Cochrane Handbook of Systemic Review of Interventions guidelines and is reported following the Preferred Reporting Guideline for Systemic Review and Meta-analysis guidelines (PRISMA). **Result:** All study groups showed significant p values within the group and insignificant p values in the fixed random effect model. Though the p-value is negligible between the groups, one group among the three shows better results in the fixed effect model. In all three outcomes (pain, stiffness and range of movement), group 1, i.e., a group including only *Sthanik Basti,* showed better results than other groups.

Conclusion: Based on this review, few policies or treatment protocols can be hypothesised for managing Musculoskeletal disorders at the national level. The Ayurveda intervention combinations have worked better because they work on multiple etiological factors and biological variations of the individuals.

Keywords: Musculoskeletal, *Sthanik Basti, Panchakarma* therapies, *Vatavyadhi,*

INTRODUCTION

Musculoskeletal diseases are the most prevailing ailment in India and one of the leading causes of functional impairment, disability affecting the quality of life.[1] The risk factors driving the onset of Musculoskeletal disease can be idiopathic or non-idiopathic.[2] Mechanical overload, trauma, age related wear and tear causes degenerative changes in the articular cartilages of different body joints. Deterioration of the bones, joints and their surroundings are associated with inflammatory changes.[3] It is estimated that by 2050, about 40 million people worldwide will have severe disability from chronic osteoarthritic diseases.[4] Standard conventional treatment of Musculoskeletal diseases is primarily symptomatic and ranges from medications, electrical stimulation, assistive devices, intramuscular injections and surgical intervention.[5] Commonly used medicines are non-steroidal anti-inflammatory drugs (NSAIDs), duloxetine, corticoids, and viscose supplements used to improve mobility and reduce pain. But the general line of treatment also has risks of adverse effects and abusive potential, and some are highly expensive to a larger mass of the patient population. Apart from the general treatment, there are evidence-based approaches to traditional medicines and care. Countries such as India and China use their ancient conventional ways of treating most diseases by using medicinal plants, herbs and other therapeutic techniques. The World Health Organization (WHO) recommends boosting the use of Ayurveda medicine's medicinal systems along with the usual mode of treatment.

Ayurveda observes health and disease as a continuum, and maladaptive lifestyle trauma triggers aggravation of the principles of *Vata* and, thereby, causes *Rukshata* (dryness), *Laghutva* (lightness), *Saushirya* (porosity), and *Kharatva(*coarseness) into the body affecting standard articulation during movement and locomotion, producing pain, swelling, stiffness, crepitus etc.[6] Diminution and regulation of the vata (aggravated principle of kinetic force) is the basis of Ayurvedic treatment comprising individually tailored interventions, including medication, purification measures, lifestyle and nutritional advice, dietary supplements. Ayurveda normalises the *Vata* imbalance through *Samana Chikitsa* (palliative care), including oral medications, nutritional supplements, and massages. However, the excessive aggravation of *Vata* in the body required forceful expulsion from the body through *Samshodhana Chikitsa* (purification). *Panchakarma*-based treatment is one of the elements of multimodal Ayurvedic treatment for *Samshodhana*, as well as restoring body homeostasis through several therapeutic techniques appropriate for eradicating imbalances in disease. *Sthanik Basti* includes both *Snehana*, i.e. *oleation*, and *Swedana*, i.e. sudation, so it is more effective in the acute management of pain and associated symptoms of musculoskeletal disorders.

2. Methods: This systemic review was conducted according to the guidelines of the Cochrane Handbook of Systemic Review of Interventions and is reported following the Preferred Reporting Guideline for Systemic Review and Meta-analyzation guidelines (PRISMA).

2.1 Eligibility criteria: Studies fulfilling the criteria of- 1. Study design: All comparative trials, including randomised clinical trials (RCTs), controlled clinical trials (CCTs), parallel-group trials, multiple-arms clinical trials, Postgraduate and PhD dissertations and other unpublished clinical data if they contain sufficient data for critical evaluation. 2. Population: Studies with participants of both sexes between 14 years and 75 years having classical signs and symptoms of *Vatavyadhi*, such as pain, stiffness, tenderness, crepi-

tus, range of movement, tingling sensation, vertigo, twitching, etc. were included in the study. 3. Intervention: The study included the study of Ayurveda treatment advised by *Vatavyadhi* as per the classical text of Ayurveda, precisely including *Sthanika Basti* with or without oral medicines or other types of *Panchakarma* Procedures. 4. Comparator: Ayurveda treatment with any form of drug, respective dosage form, dose, schedule, treatment other than Ayurvedic interventions, or combination of both, i.e., Ayurvedic and non-Ayurvedic interventions, conservative treatment, placebo/ sham therapy, waitlist controls, no treatment.

2.2 Outcomes of interest: 1. Primary outcomes: therapy's effect on pain management. 2. Secondary outcome: Improvement in other associated parameters like stiffness and range of movement.

2.3. Information Sources: Many different databases were searched, such as PubMed (Central), Cochrane central register of controlled trials (CENTRAL), AYUSH research portal(Govt. of India), DHARA portal, Google Scholar and online clinical trials registers (CTRI, clinicaltrials.gov) and WHO-ICTRP. There were no language restrictions for unpublished postgraduate (P.G.) and doctoral (Ph.D.) dissertation works, *Shodhaganga* portal, university/ institutional website, and other potential sources. More information was obtained from some studies' contact person (authors) through e-mail or telephone.

2.4. Search: The key terms searched relating to or describing the intervention “Ayurved,” “Ayurveda” in combination with the search term describing the condition of the disease “Vatavyadhi”,
“Musculoskeletal Diseases”, “Cervical spondylosis”, “Lumbar spondylosis”, “Ankylosing spondylosis”, “Sciatica”, “Spinal stenosis”, “Disc Bulge”, “Frozen shoulder”, “Avabahuka”, “Sandhi vaat”, “Osteo arthritis”, “ACL tear”, “Ligament fracture”, “Gridhrasi”, “Pakshaghat”, “Rotator cuff injuries”, “Tendinitis”, “Fibromyalgia”, “Avascular Necrosis”, “Osteonecrosis” Specific filters were used to search terms in database search by adaptation. The following search algorithm was adopted [“AYUSH” or “Ayurvedic medicine” or “Medicine, Ayurveda” or “Ayurved” or “Ayurveda” or “Ayurvedic” or “Ayurveda therapy” or “Ayurveda intervention” or “Ayurvedic drugs” or “Ayurveda Herbs” or “Ayurveda Plants” or “Ayurvedic Formulation” or “Ayurveda Panchakarma” or “ Basti” or “Santarpana” or “ Brimhana” or “Rasayana” or “CCRAS” or “INDIAN TRADITIONAL MEDICINE”, or “Panchakarma” or “Kayachikitsa” and [“Musculoskeletal diseases” or “pain management” or “Sthanika Basti”] as title/abstract/keyword.

2.5: Study selection and data extraction: Two review authors were earmarked to assess titles and/or abstracts of studies reanalyzed using the search strategy and those collected from other additional sources. After excluding duplicates from eligible articles, full-text articles were screened thoroughly to determine whether they fit the abovementioned inclusion and exclusion criteria. Any contradictions faced in deciding the eligibility of particular studies were resolved through discussion with another reviewer. The study's selection process details are shown in the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) flow diagram. (Figure 1)

All the reviewers individually screened for eligibility for the searched studies based on inclusion and exclusion criteria. PICO format was followed to extract data from the included studies. (Table1)

Figure 1: PRISMA flow diagram

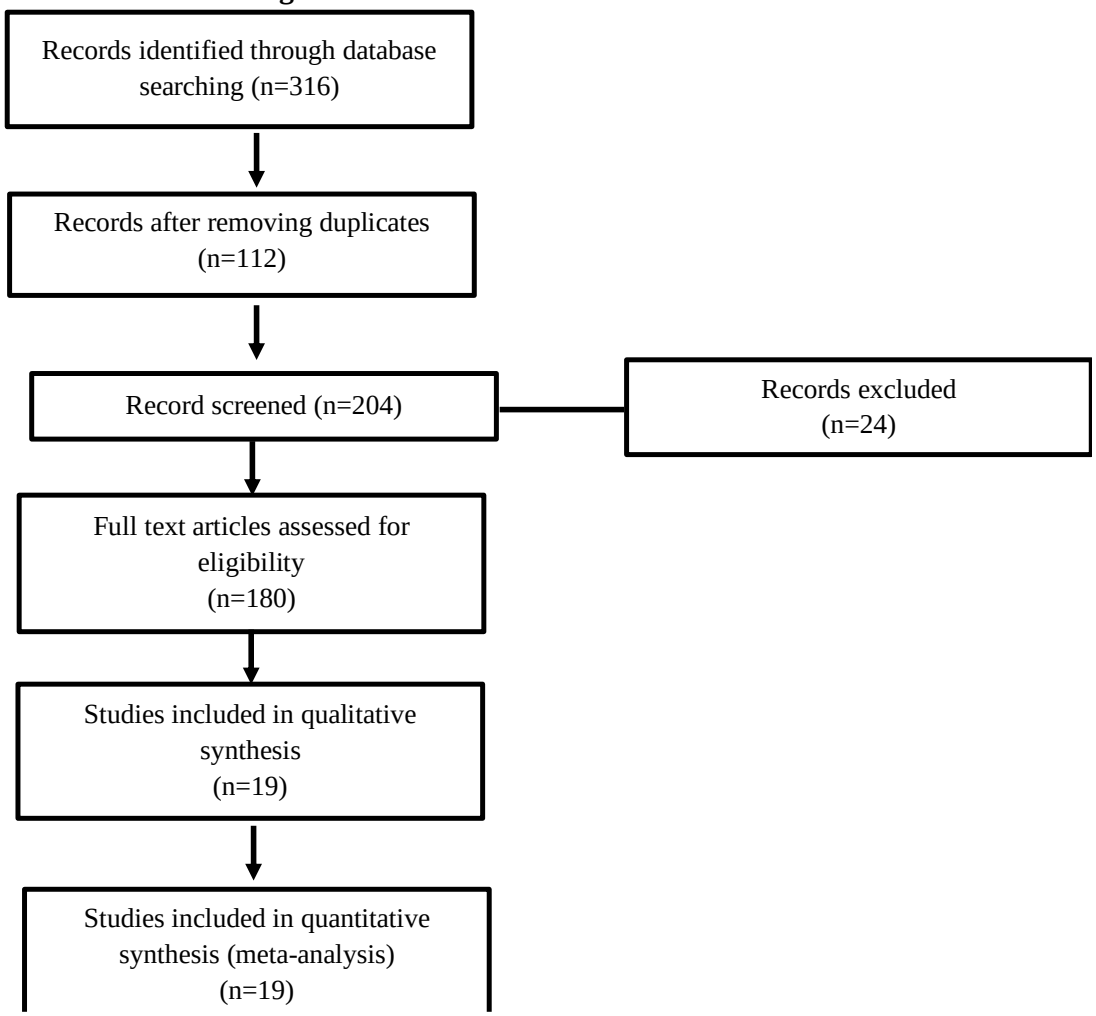


Table 1: Key data points of included trails.

Study Id/ Author	Year	n	Groups	Group A	Group B	Group C
Dr. Rakesh1 , Dr. Gopala Krishna G2 , Dr. Sowmyashree U.P3 , Dr. Umesh C	2020	40	A & B	Janubasti with Mahavishagarbha Taila and Tab. Glucosamine sulfate 500mg 1 T.I.D after food	Janubasti with Mahavishagarbha Taila and Tab. Asthishrinkhala 500mg 1 T.I.D after food	
Dr. PARESH RAOSAHEB CHOUGULE	2017	435	A, B, C	Sahcharadi Taila and Erandamoola Kwatha	Sahcharadi Taila	Aceclofenac 100 mg + Thiocolchicoside 08 mg
Alka Mishra1* , Vandana Shrivastava	2020	20	A	(Ksheerbala Taila	-	
Anil Kumar Singh	2019	30	A, B, C	Pathyadi Guggul 500mg	Brihat Panchamool Tail(100ml) Katibasti	Pathyadi Guggul 500mg twice a day with

						Brihat Pan-chamool Tail(100ml) Katibast
KM Shailja Singh,1 Arun Kumar Singh,2 Chandra Prakash Verma3	2017	30	A & B	Prabhanjana Taila Kati Basti.	Moorchita Tila Taila Kati Basti.	
Dr. Akhilanath Parida,1 Dr. Satyasmita Jena	2019	30	A & B	Ajmodadi Churna with Ushna Jala	Ajmodadi Churna with dose - 4 gms thrice a day for 21 days along with Kati Basti	
Dr. Avneesh Kr. Dwivedi, Prof. Ajay Kr. Sharma	2013	30	A, B, C	Parijat ghansatva pow-der- 500 mg	Dashmoola Taila Kati Basti	Parijat Ghansatva and Dashmoola taila
Sharda Kanwar Chauhan1	2020	40	A & B	Shiva Guggulu in the dose of 1 gm	Dashmool Tail Kati Basti for 15 days.	
*, Brahmanand Sharma2	2019	30	A & B	Punarnavadi Guggulu	Mahamasadi Taila Kati Basti	
and Vinod Kumar Gau-tam3	2022	10	A	Karpasasthyadi Taila	-	
Neelam Kaalia, Santosh Kumar Bhatted, S. H. Acharya	2021	15	A	8-day Ksheera Basti, 7-day Parihar Kala fol-lowed by 8-day Kati Basti and 1 month ad-ministration of Tray-odashanga Guggulu	-	
Dwivedi Amarprakash1*, Pathrikar Anaya2	2017	50	A	Panchtikta Ghrit Gug-gulu'- internally adju-vant to Kati Basti with Til Oil	-	
Sandhya Shenoy1*, Gau-tham Shetty M	2022	30	A	Vishatinduka Taila Katibasti.	-	
Dr. Pallavi Sharma, Dr. Jeet Chand Kaushal, Dr. Pushpinder Singh	2015	27	A	Murcchita Til Taila Kati Basti along with Ba-laadi Kala Bast	-	
Achala R. Kumawat1 * and Gopesh Mangal2	2019	30	A		-	
1 *Surbhi Bansal, 2Vd. Ketan Mahajan and 3Vd. Piyush Gupta	2020	30	A & B	Nasya with Prasarani Taila once daily in the dosage of 8 bindus in each nostril for 7 days	Greeva Basti of Prasa-rani Taila	
Prathibha M 1 * , Vijaya-kumaraswamy G. Hiremath 2 , G. S Badri-nath 3 , Drakshayini S Hiremath 4	2019	30	A & B	Patra Pinda Sweda	Upanaha	

2.6: Risk of bias in individual studies: The study methodology of included randomised controlled trials (RCTs) was assessed using a revised tool available online (Ro B 2) to determine the risk of bias of randomised trials[7]. A pre-defined algorithms were followed to assess five domains of each study, i.e., randomisation process, deviations from specified interventions, deleted outcome data, measurement of the primary and secondary outcome, and selection of the enlisted results. In case of any disagreement, it was resolved by discussion.

Table 2: Assessment of Risk of Bias in the RCTs using the Cochrane Risk of Bias Tool

Study id/ author	Randomization process	Deviations from specified interventions	Deleted outcome data	Measurement of the primary and secondary outcome	Selection of the enlisted results.
Dr. Rakesh1 , dr. Gopala krishna g2 , dr. Sowmyashree u.p3 , dr. Umesh c	Low risk	Low risk	Some concerns	Low risk	Low risk
Dr. PARESH RAOSAHEB CHOUGULE	Low risk	Some concerns	Low risk	Low risk	Low risk
Alka mishra1* , vandana shrivastava	Low risk	Low risk	Some concerns	Low risk	Some concerns
Anil kumar singh	Low risk	Low risk	Low risk	High risk	Some concerns
Km shailja singh,1 arun kumar singh,2 chandra prakash verma3	Low risk	Low risk	Low risk	Low risk	Low risk
Dr. Akhilanath parida,1 dr. Satyasmita jena	Low risk	Low risk	Low risk	Low risk	Low risk
Dr. Avneesh kr. Dwivedi, prof. Ajay kr. Sharma	Low risk	Some concerns	Low risk	Low risk	Some concerns
Sharda kanwar chauhan1	Low risk	Low risk	Low risk	High risk	Some concerns
***, Brahmanand sharma2**	Low risk	Low risk	Low risk	Low risk	Low risk
And vinod kumar gautam3	Low risk	Some concerns	Low risk	Low risk	Low risk
Neelam kaalia, santosh kumar bhatted, s. H. Acharya	Low risk	Low risk	Low risk	Some concerns	Low risk
Dwivedi amarprakash1*, pathrikar anaya2	Low risk	Low risk	Low risk	Low risk	High risk
Sandhya shenoy1*, gautham shetty m	Low risk	Low risk	Some concerns	Low risk	Low risk
Dr. Pallavi sharma, Dr. Jeet chand kaushal, Dr. Pushpinder singh	Low risk	Low risk	Low risk	Some concerns	Low risk
Achala R. Kumawat1 * and Gopesh Mangal2	Low risk	Some concerns	Low risk	Low risk	Low risk
1 *Surbhi Bansal, 2Vd. Ketan Mahajan and 3Vd. Piyush Gupta	Low risk	Low risk	Low risk	Low risk	Low risk

Prathibha M 1 * , Vijayakumaraswamy G. Hiremath 2 , G. S Badrinath 3 ,Drakshayini S Hiremath 4	High risk	Some concerns	Some concerns	Some concerns	Low risk

2.7: Statistical analysis- The risk ratio was used with a 95% confidence interval for dichotomous data. The treatment effect was calculated by calculating the mean difference for continuous outcomes measure. The fixed-effects model was used as the data showed insignificant statistical heterogeneity. Meta-analysis was conducted using (Rev Man) software tools to minimise the errors.

3. Results

3.1. Study selection

A total of 316 studies were identified from various databases. After removing duplicate records (n=112), 204 were screened based on title and abstract, from which 24 were excluded, and 180 full-text articles were assessed for eligibility. Based on eligibility criteria, studies included in qualitative and quantitative synthesis were [19]

3.2. Study characteristics:

All 19 selected comparative clinical trials were RCTs and included in quantitative analysis. Three trials had three arms, 10 had two arms, and six had one arm. All studies were conducted in India's outpatient department (OPD) and inpatient department (IPD) of various Ayurveda college hospitals and research institutes.

Some studies reported pain, stiffness, tenderness, crepitus, range of movement, tingling sensation, vertigo, tingling sensation, twitching, anorexia, drowsiness, and heaviness. The maximum number of studies reported parameters like pain, stiffness, and range of movement. Among all the studies included, three studies reported the third arm, i.e. group C. All these trials reported partial or complete relief of symptoms at specific time points. Almost all studies didn't have any reporting on adverse events.

3.3. Interventions:

Among the included studies, six studies included only *Sthanika Bastis* (i.e. *Kati, Janu, Greeva Bastis*) with different forms of oils, six studies included *Sthanika Basti* along with oral medication, seven studies included Clinical trials including *Sthanika basti* along with oral or along with other panchakarma procedures or along with *Abhayantar Basti.*

3.4. Risk of Bias in included studies:

The summary of 'Risk of bias' Randomized trials is shown in Table 2. In the randomisation process, only one study had high risk, whereas others showed low-risk bias. Five studies showed some concerns in Deviations from specified interventions, whereas others showed low-risk bias. In deleted outcomes, four studies showed some concerns, whereas the rest had low-risk bias; in Measurement of the primary and secondary outcome, three studies showed some concerns, two studies showed high-risk bias, and the rest showed low-risk. In the Selection of the enlisted results, four studies showed some concerns; one study showed high-risk bias, and the rest of all studies showed low risk

3.5. Effects of intervention:

Primary outcomes: The data for the RCT is homogeneous. We considered it appropriate to pool data according to the principles of interventions into three groups. Group 1- included only *Sthanika Bastis* (i.e. *Kati, Janu, Greeva Bastis*) with different forms of oils, Group2- studies including *Sthanika Basti* along with oral medication, Group 3- included *Sthanika basti* along with oral or along with other panchakarma procedures or along with *Abhayantar Basti.* The primary outcome of the treatment was Pain management, and other assessed parameters were stiffness and range of movement. Though there are multiple other parameters to determine musculoskeletal impairment, many assessment points were missing in many studies. Only the parameters assessed and available in all studies were included to minimise the error and risk of bias. P-value computed within the groups using Wilcoxon signed rank test, p-value computed through fixed effects model with group 3

as the reference category where groups are fixed.

Table 3: Difference in groups on outcome-pain

Parameter	N= available data points	Mean - Baseline	Mean - Endpoint	P value within Group[a]	P value between the Groups [b]	Estimate	Inference
Pain	6	4.29	1.66	0.03*	0.52	-0.3	Group 1 is doing better but not statistically significant
	6	2.60	1.50	0.049*	0.8	0.13	
	6	5.44	2.40	0.03*	-	-	

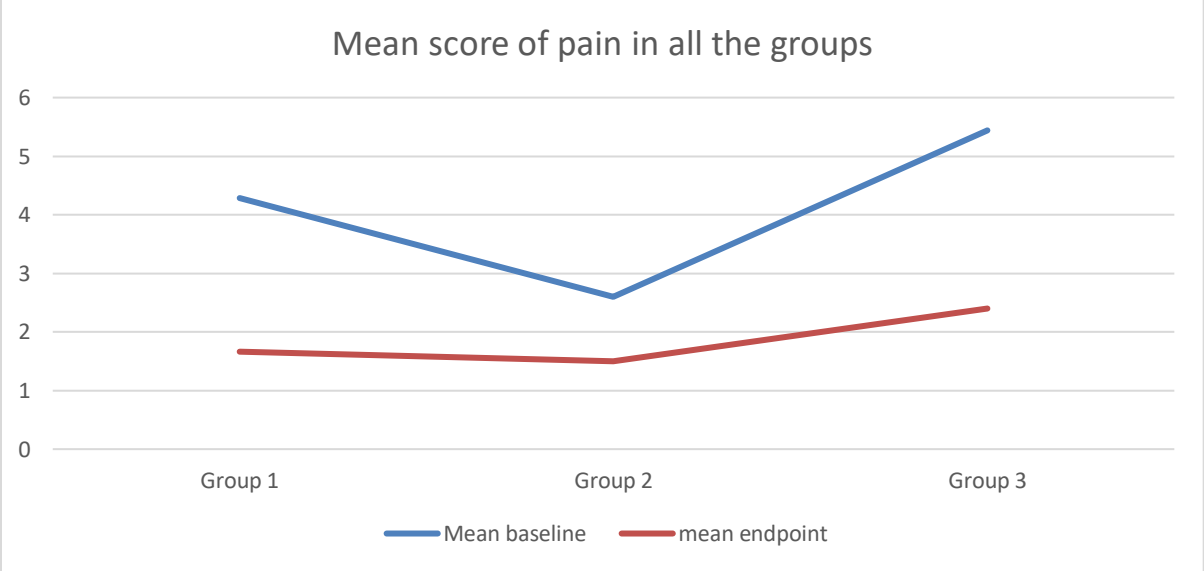


Table 4: Difference in groups on outcome-Stiffness

Parameter	N= available data points	Mean - Baseline	Mean - Endpoint	P value within Group[a]	P value between the Groups [b]	Estimate	Inference
Stiffness	6	2.06	0.55	0.06	0.62	-0.11	Group 1 is doing better but not statistically significant
	6	1.50	0.70	0.09	0.33	0.21	
	6	2.10	0.60	0.03*	-	-	

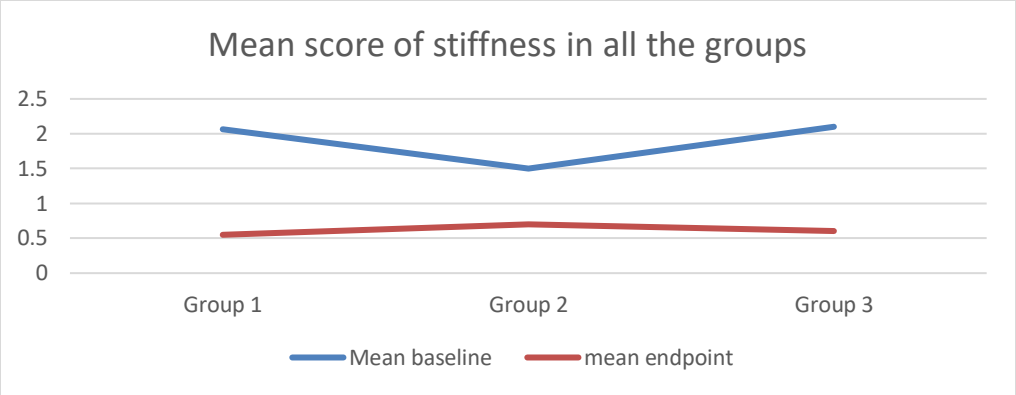
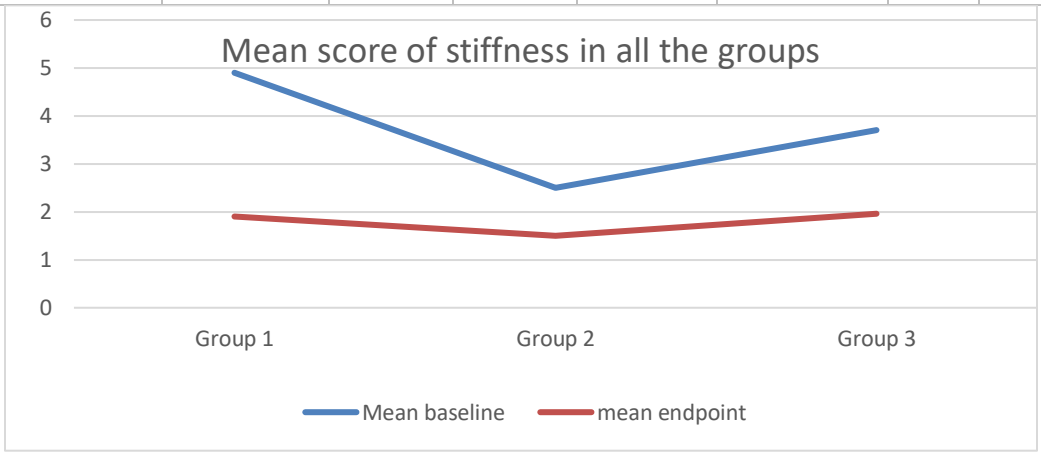


Table 5: Difference in groups on outcome-range of movement

Parameter	N= available data points	Mean - Baseline	Mean - Endpoint	P value within Group[a]	P value between the Groups [b]	Estimate	Inference
Range of movement	6	4.90	1.90	0.03*	0.22	-0.6	Group 1 is doing better but not statistically significant
	6	2.50	1.50	0.03*	0.75	0.15	
	6	3.70	1.96	0.03*	-	-	



DISCUSSION

4.1. Summary of the main results

All the study groups showed significant p values within the group and insignificant p values in the fixed random effect model. Though the p-value is negligible between the groups, one group among the three shows better results in the fixed effect model. The primary outcome of pain group 1, i.e. studies including only *Sthanika Bastis* (i.e. *Kati, Janu, Greeva Bastis*) with different forms of oils, show better results than the other two groups of studies in the fixed effect model. In the outcome of stiffness, group 1, i.e. studies including only *Sthanika Bastis* (i.e. *Kati, Janu, Greeva Bastis*) with different forms of oils, show better results than the other two groups of studies in the fixed effect model. In the outcome of a range of movements, group 1, i.e. studies including only *Sthanika Bastis* (i.e. *Kati, Janu, Greeva Bastis*) with different forms of oils, show better results than the other two groups of studies in the fixed effect model. Ayurveda diagnosis on pathological manifestation in the bones and joints in different I-related disorders mainly recommends *Snehana, Swedana, Basti, and Virechana* to reduce the accumulation of

excessive *Vata* to regular or forceful expulsion from the body. *Sthanika Basti* includes both oleation and sudation at the same time. So, the results in the management of the acute condition of pain are best achieved when *Sthanika Basti* is administered.

4.2. Quality of the evidence

The quality of the evidence was intense, as all 19 trials selected were RCTs with highly homogeneous data.

4.3. Limitations of this review

According to Ayurveda, there are different causative factors for *Vatavyadhi*. Based on aetiology in conservative medicine, the appropriate group intervention can give good results. Also, the number of subjects included in each trial was less and unequal, which may be the reason for the statistically insignificant results in the fixed effect model.

CONCLUSION

Although different trials are being carried out to manage *Vatavyadhi* through Ayurveda interventions, a systematic review does not help us conclude which intervention combination is better because of multiple aetiological factors and biological variations. The study also had a high risk in measuring the primary and secondary and selecting the enlisted results. Thus, there is a need for high-quality studies in Ayurveda.

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