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RESEARCH ARTICLE

EFFECT OF SWEDISH MASSAGE AND HOT MUD WITH CALOTROPIS GIGANTEA APPLICATION AMONG KNEE JOINT OSTEOARTHRITIS CASES-A RANDOMIZED CONTROL TRIAL

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Abstract

Osteoarthritis of the knee joint is a most common type of degenerative joint disease-causing substantial pain and disability globally. Despite affecting over 20 million individuals in the United States and an anticipated 100 million worldwide by 2030, the molecular mechanisms of KOA initiation and progression remain inadequately understood, with no available interventions to restore degraded cartilage or impede disease advancement. Current treatments, including medications and surgical interventions, exhibit limited efficacy and potential side effects. This study aimed to investigate the effectiveness of a combined treatment comprising Swedish massage, hot mud, and Calotropis gigantea application in reducing pain, disability, and joint stiffness in individuals with KOA. Eighty participants (35 males, 45 females) aged 40 to 75 years with clinical knee osteoarthritis were randomly assigned to either a Study group (Swedish massage with Hot Mud and Calotropis Gigantea leaves) or a Control group (Swedish massage with Hot Mud). Pain intensity was measured using a visual analogue scale (VAS), and the Western Ontario and McMaster Universities Secondary Osteoarthritis index (WOMAC) assessed pain, disability, and joint stiffness. The intervention was applied daily for 10 days, and pre- and post-intervention comparisons were analyzed. Both groups exhibited a significant reduction in pain, disability, and joint stiffness. However, the Study group demonstrated a greater reduction than the Control group, with statistically significant differences in VAS and WOMAC scores. No adverse events were reported. Calotropis gigantea, known for its anti-inflammatory properties, combined with Swedish massage and hot mud, showed a potential synergistic effect. Swedish massage enhances blood circulation and muscle relaxation, while hot mud provides heat therapy. The combination may improve the penetration of therapeutic agents, leading to more profound effects. The study suggests that the combined treatment holds promise for addressing knee-related issues. The combined treatment involving Calotropis gigantea application, Swedish massage, and hot mud demonstrated a

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significant reduction in knee pain, disability, and joint stiffness. The potential synergistic effect of these interventions warrants further investigation to validate their therapeutic benefits, emphasizing the need for caution and additional research to ensure safety and efficacy.

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Introduction:-

Knee osteoarthritis (KOA) is the most common degenerative joint disease and a major cause of pain and disability in adult individuals. More than 20 million people in the US suffer from knee osteoarthritis (OA). By 2030, global statistics reveal over 100 million people worldwide suffer from OA, which is one of the most common causes of disability Pathological changes seen in OA joints include progressive loss and destruction of articular cartilage, thickening of the subchondral bone, formation of osteophytes, variable degrees of inflammation of the synovium, degeneration of ligaments and menisci of the knee. Cartilage is the protective tissue that covers the ends of the bones [1]. With KOA, this cartilage breaks down, causing the bones within the joint to rub together. This can cause knee joint pain, stiffness in the knee joint, loss of flexibility, inflammation, tenderness, crepitus, or grating, crackling and other symptoms. As KOA becomes more advanced, the pain associated with it may become more intense. Over time, swelling in the joint and the surrounding area may also occur.

However, the detailed molecular mechanisms of KOA initiation and progression remain poorly understood, andcurrently there are no interventions available to restore degraded cartilage or decelerate disease progression. But around the world a few different types of medication are used for treating KOA, like oral pain relievers, topical pain relievers, Nonsteroidal anti-inflammatory drugs (NSAIDs), Corticosteroids and Cymbalta. In severe cases of KOA, physician advise to go for arthroplasty to replace or repair damaged knee joint. Current treatment options for knee osteoarthritis have limited effectiveness and potentially adverse side effects. But physical activity strengthens the muscles around the knee joint, and it may help relieve stiffness.

Subjects and Methods:-

80 subjects (Males: -35, Females: - 45) with age ranging between40 to 75years participated in this study. Potential subjects were screened through a routine medical check-up and those satisfying diagnostic criteria of osteoarthritis of knee were randomly recruited from Nandha Naturopathy and Yoga Medical College and Hospital, Erode, Tamilnadu, India. All participants provided written informed consent.

Inclusion criteria:

Participants in the study will be women and men aged between 40-75 years, clinical knee osteoarthritis according to the American College of Rheumatology Clinical Criteria and Kallgren and Lawrence (KL) radiographic osteoarthritis grade 2 and 3 (mild to moderate radiographic osteoarthritis)

Exclusion criteria:

Volunteers are excluded who are present with severe knee osteoarthritis according to the KL classification (grade 4), other known major musculoskeletal impairments in the lower extremities or the back or prostheses in any joint of the lower extremities, known serious coronary heart diseases or cancer, body mass index >35, Scheduled for surgery in any joint, known mental or psychological diseases, Known drug abuse, contraindications for MRI. Also excluded those who miss two consecutive sessions without justification, as well as volunteers who are absent from 10% of the intervention sessions.

After satisfying the inclusion criteria recruitment of the patients with initial screening will be collected covering personal and socioeconomic data, lifestyle, medications, identification of the existence of other diseases, anthropometric assessments, and baseline blood pressure divided in to two groups Group 1 is Study group and Group 2 is Control group.

Group 1 Study group: -Swedish massage with Hot Mud withCalotropis Gigantea leaves (SwHmCg): Subject received100 gm Hot Mud mixed with freshly grained 50 gmCalotropis gigantea leavesheated with water up to 45 °C then was applied to the affected knees for 45 minutes daily for the period of 10 days after Swedish massage.

Group 2: -Control Group: Swedish massage with Hot Mud (SwHm): Subject received 100gm Hot Mud heated with water up to 45 ℃ then was applied to the affected knees for 45 minutes daily for the period of 10 days after Swedish massage.

Assessment Instrument:
The intensity of the pain is recorded by using a visual analogue scale (VAS). This consists of a 10cm line containing numbers ranging from 0 to 10, where 0 represents "no pain" and 10 represents "worst possible pain.

Western Ontario and McMaster Universities Secondary Osteoarthritis index (WOMAC) is widely used in the evaluation of Hip and Knee Osteoarthritis. It is a self-administered questionnaire consisting of 24 items divided into 3 subscales assessing the three dimensions of pain, disability and joint stiffness in knee and hip osteoarthritis.

Results:-

All 80 participants were completed the study (males=35, female=45) none of them reported any adverse events. Gender-wise distribution on each group was figured in Fig: 1. Most of the participants were aged between 40 to 75 years with the average age of interventional group was 58 and the control group was 54. Subjects were randomly assigned to either interventional groups or control groups by simple random sampling method. Results of the pre and post intervention comparisons of both the groups are given in Table. 1. Statistical analysis revealed that both control and interventional group showed significant reduction in pain, disability and joint stiffness. There was a 69.5% reduction of pain after Swedish massage, Hot mud and Calotropis gigantea application (pre-VAS6.48, SD ±.987; post VAS 1.98, SD ± .920) whereas 44% reduction of pain after Swedish massage and Hot mud application (pre-VAS 6.38, SD ± 1.005; post VAS 3.58, SD± 1.038). WOMAC showed 30 % reduction in interventional group after the 10 days of intervention (Pre WOMAC 35.05, SD ± 5.551; Post WOMAC 24.42, SD ± 5.088) and 19% of reduction in control group (Pre WOMAC 34.78, SD ± 5.632; Post WOMAC 28.25, SD ± 5.624).

Fig 1:- Gender wise distribution in both Groups.

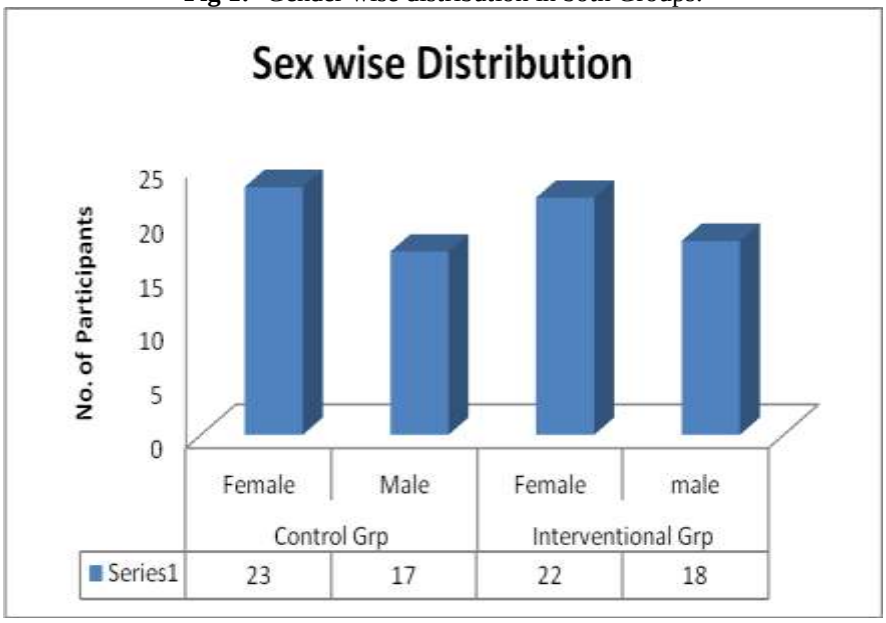

Table 1:- Paired Samples Test.

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	WOMACpre-WOMACpost	6.525	1.867	.295	5.928	7.122	22.101	39	.000
Pair 2	VASpre - VASpost	2.800	.911	.144	2.508	3.092	19.429	39	.000

Pair 3	WOMACprecg - WOMACpostcg	10.625	2.317	.366	9.884	11.366	29.002	39	.000
Pair 4	VASprecg - VASpostcg	4.500	1.086	.172	4.153	4.847	26.206	39	.000

The Calotropis gigantea application along with Swedish massage and hot mud group (Interventional group) shows a statistically significant reduction of pain, disability and joint stiffness after 10 days of treatment than only Swedish massage and hot mud group. The Independent t tests between the two groups were plotted in table 2. The Interventional group showed significance of reduction in VAS score F= 2.747, p= <0.001. WOMAC also shows a significant reduction in interventional group F= .071, p= <0.001.

Table2:- Independent Samples Test.

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Dv womac	Equal variances assumed	.071	.791	8.923	78	.000	10.625	1.191	8.255	12.995
	Equal variances not assumed			8.923	77.416	.000	10.625	1.191	8.254	12.996
Dv Vas	Equal variances assumed.	2.747	.101	21.101	78	.000	4.500	.213	4.075	4.925
	Equal variances not assumed			21.101	77.615	.000	4.500	.213	4.075	4.925

Discussion:-

Calotropis gigantea, also known as crown flower or giant milkweed, is a plant with potential medicinal properties[5]. Its application may involve using extracts or compounds from the plant on the affected area. Calotropis gigantea have anti-inflammatory properties[4], while Swedish massage improves blood circulation and muscle relaxation. Swedish massage is a well-known massage technique that involves kneading, long strokes, and circular movements to promote relaxation and reduce muscle tension[2][3][6]. Heat and minerals present in the hot mud are believed to have therapeutic effects on joints and muscles. Hot mud treatment offers the benefits of heat therapy, which can alleviate pain and muscle tension. Also enhanced tissue penetration: Combination of these treatments may improve the penetration of therapeutic agents into the affected tissues, potentially leading to more profound effects. The combined treatment involving Calotropis gigantea application, Swedish massage, and hot mud has the potential to be more effective than using only Swedish massage and hot mud treatment for addressing knee pain, disability, and joint stiffness. However, further research is needed to establish its effectiveness and safety before making definitive claims.

The combined treatment is that Calotropis gigantea application, when combined with Swedish massage and hot mud treatment, might lead to a synergistic effect. Combination of these treatments may have a greater impact on pain relief, disability improvement, and reduction of joint stiffness compared to using Swedish massage and hot mud treatment alone.

Conclusion:-

The paired samples test results indicate a statistically significant reduction in pain, disability, and joint stiffness in the group receiving the combined treatment of Calotropis gigantea application, Swedish massage, and hot mud compared to the group receiving only Swedish massage and hot mud. The independent samples test further supports these findings, showing significant differences in both WOMAC and VAS scores between the two groups. The combination of these interventions appears to have a synergistic effect, leading to a more profound reduction in knee pain and improvement in disability and joint stiffness. The study suggests that the combined treatment involving

Calotropis gigantea application, Swedish massage, and hot mud holds promise for addressing knee-related issues. The potential synergistic effect of these treatments opens avenues for future investigations into their combined therapeutic benefits. However, caution is advised, and additional research is essential to validate these findings and ensure the safety and efficacy of the proposed intervention.

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