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EFFECT OF MUSCLE ENERGY TECHNIQUE (MET) VERSUS CONVENTIONAL PHYSIOTHERAPY ON PAIN AND DISABILITY IN FEMALE UNIVERSITY PROFESSORS WITH NON-SPECIFIC LOW BACK PAIN

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ABSTRACT

Background: Non-specific low back pain is a common musculoskeletal disorder affecting university professors being particularly susceptible due to their work environment. Prolonged sitting, extensive computer use, and repetitive tasks, particularly among female professors, can contribute to the development and persistence of low back pain.
Aim and Objective: To Assess the effect of MET and conventional physiotherapy on pain and disability in female University Professors with non-specific low back pain.
Methodology: 30 female university professors with non-specific low back pain were divided into two groups A and B (n=15). Conventional Physiotherapy was given to group A while Muscle Energy Technique was performed in Group B. Both groups received their respective treatments twice a week for four weeks. Pain intensity was measured using the visual analogue scale VAS, and disability levels were assessed using MODI and then the data was analyzed.
Conclusion: The findings suggest that Muscle Energy Technique is more effective than conventional physiotherapy in reducing pain and disability in female university professors with non-specific low back pain.
Keywords: Non-specific low back pain, conventional physiotherapy, MET, VAS and MODI

I. INTRODUCTION

Low Back Pain (LBP) is a type of pain that can be acute, sub-acute, or chronic, and can affect anyone. It can be specific or non-specific, with specific LBP causing pain due to a specific disease or structural issue in the spine, and non-specific LBP causing pain without a specific cause. In over 90% of cases, LBP is of non-specific origin[1]. Around 50% to 80% of the adult population, according to current estimates, experiences at least one episode of LBP in their lifetime.[2] LBP mostly affects women, implying a link to the female reproductive system. The sex difference in occurrence is mostly explained by the fact that female muscular and ligamentary supports are not as robust as males.[3] LBP is the most prevalent occupational health issue in industrialized countries, accounting for 20%-30% of workers' compensation claims and causing the most disability globally, with 58.2 million DALYs in 1990 and 83 million in 2020.[4]

LBP can be caused by a variety of conditions, including prolonged sitting and standing, bad posture, and certain vocations, such as teaching. The job description for teachers includes a wide range of jobs and obligations that may predispose them to LBP. Teachers may sit for extended periods of time when preparing teaching materials, whether at work or home. While presenting lectures, they may stand for extended periods

of time or adopt difficult positions such as bending, reaching, and twisting. Changing postures might cause back discomfort due to the constant loading of muscles.

In literatures, there are many interventions which are employed by clinicians to manage NSLBP. Pharmacological management is taken as a first line intervention to treat NSLBP. In this domain, muscle relaxants such as Tizanidine, NSAIDs (Ibuprofen), Opioids, tricyclic antidepressants are used. In conservative management, physical therapy is one of the best treatment options which are now commonly used in our society. In Physical therapy various modalities such as US, MWD, IFT, SWD, IRR, Traction and other manual interventions are employed by the physical therapists.[5] In the past, surgical interventions were recommended for patients with NSLBP who had failed conservative care however, this approach is now discouraged.

IFT (Interferential Therapy) is a form of electrotherapy used to relieve pain. It is an alternating electric current of medium frequency and with amplitude modulated at a low frequency. The most prevalent theory cited to explain the modulation of pain by interferential current is the pain gate control theory[6].This theory suggests that stimulation of afferent fibers of large diameter (alpha and beta) promotes the activation of local inhibitory circuits of the dorsal horn of the spinal cord and thus, prevents the pain impulses carried by small diameter fibers (C and A delta) to reach higher centers.[7]

Heat therapy has long been used to relieve pain and improve overall health. It is used now in a number of ways, including heat pads or wraps, hot baths, and heat lamps.[8] Heat treatment treats pain and muscle spasms in several ways. Low-level superficial heat stimulates temperature-sensitive nerve endings (thermoreceptors), which then send messages to the lumbar dorsal fascia and spinal cord, blocking pain signal processing (nociception).[9]

In the present day, as treatment methods evolve daily, so does the physiotherapy. One such improvement is the muscle energy technique (MET). It is a type of manual therapy frequently used by physical therapists to improve musculoskeletal function and alleviate pain. It was developed in 1948 by Fred Mitchell.[10] MET is based on the concepts of Autogenic Inhibition and Reciprocal Inhibition. MET targets the soft tissue primarily, but also contribute towards joint mobilization. It lengthens the shortened muscles, and acts as a lymphatic or venous pump to aid the drainage of fluid or blood which further increases the ROM.[11]

Now, it has come to our attention that a significant number of female university professors suffer from NSLBP. Since, they are crucial in influencing the future via mentoring and education, their health is vital to society. A well-rested professor is able to carry out their duties as a mentor, researcher and information provider with coherence. This positive feedback loop benefits the community as a whole. So, this study intends to compare the effectiveness of MET versus conventional physiotherapy in reducing pain and improving disability among the female university professors experiencing NSLBP. Understanding the differential impact of these interventions could offer valuable insights into optimizing treatment strategies for this specific demographic, ultimately enhancing the recovery and well-being.

AIM:

This study aims to compare the effectiveness of Muscle Energy Technique (MET) versus conventional physiotherapy in reducing pain and improving disability among female University Professors experiencing Non Specific Low Back Pain.

OBJECTIVES:

1) To assess the effect of MET on pain and disability in female University Professors.

2) To assess the effect of conventional physiotherapy on pain and disability in female University Professors.

3) To compare the effectiveness of two different techniques in improving non-specific low back pain.

HYPOTHESIS:

Alternative Hypothesis (H1 or Ha): There will be a significant improvement in pain and disability in female university with non-specific low back pain treated with muscle energy technique compared to those treated with conventional physiotherapy.

Null Hypothesis (H0): There will be no significant improvement in pain and disability in female university professors with non-specific low back pain treated with muscle energy technique compared to those treated with conventional physiotherapy.

SIGNIFICANCE OF THE STUDY:

The findings of this study may guide physiotherapy professionals in choosing more targeted and efficient interventions for this specific demographic, potentially improving patient's outcomes and quality of life.

3.1Population and Sample

Female university professors of age 31-40 years with primary complaint of non-specific low back pain were included from various universities of Jhajjar, Haryana.

3.2 Data and Sources of Data

30 University professors.

3.3 Theoretical framework

Independent Variables: 1) MET (Muscle Energy Technique)
2) Conventional Physiotherapy

Dependent Variables: 1) Pain
2) Disability

PROCEDURE:

The procedure was described to all of the subjects. Pain and disability were measured for all individuals using the Visual Analogue Scale (VAS) and the Modified Oswestry Index (MODI) Questionnaire, respectively. Two equal groups of 15 were formed. Group A participants received conventional physiotherapy, which included IFT and a hot pack, whereas Group B received the PIR (Post Isometric Relaxation) Muscle Energy technique. Each group member had a total of eight sessions, two each week for four weeks.

In Group A the subjects were positioned in prone lying on the couch. Conventional physiotherapy treatment was administered by using Interferential Therapy (IFT) on patient in a relaxed position using a quadripolar technique. The IFT machine's frequency was ranged from 80 to 100 Hz rhythmic with mild current intensity to create an interference effect in the tissues. The treatment protocol were included 10-minute sessions, 4 times/ 2 weeks, based on the patient's pain threshold .And after that hot pack wrapped in mackintosh sheet along with towel was applied over the back for 8-10 minutes. On the other hand in Group B Muscle Energy Technique was used on two muscles: Quadratus Lumborum and Erector Spinae. After positioning, the patient was asked to exert 30% effort against the therapist's force and maintain the contraction for 7-10 seconds, followed by 5 seconds. When the patient exhaled, the therapist would move the muscle to the next limitation barrier. The posture was kept for 10-60 seconds, with 3-5 repeats.

For quadrates lumborum muscle the therapist will stood at waist level behind the patient who was in side lying position. The patient will extend the highest arm over the head to firmly hold the top of the table and, on an inhale, will adduct the uppermost leg until the therapist palpates strong quadratus activity, generally elevating by about 30 degrees. The patient will be asked to maintain the leg in an isometric position, allowing gravity to provide resistance. Following a 10-second contraction, the patient will be instructed to hang his leg slightly behind him over the back of the table. The therapist will straddle it and cradle the pelvis with both hands, bending back to remove any slack and ease the pelvis away from the lower ribs during exhale.The stretch will be held for 30 seconds.

For erector spinae muscle the patient was told to sit on a treatment table, with his legs suspending over the edge. The therapist stepped behind the patient and placed one leg on the table towards the side where bending and rotation would occur. The therapist positioned the patient in flexion, side bending, and rotation over the therapist's knee. After reaching a comfortable limit of flexion, the patient was instructed to look in the direction of rotation and hold her breath for 7-10 seconds.

3.4Statistical tools and econometric models

The collected data is analysed with the help of software SPSS 25. For analysis of the collected data T test was used. Means of the collected data were calculated as per requirement and graphs were made with the help of software and the MS excel.

IV. RESULTS AND DISCUSSION

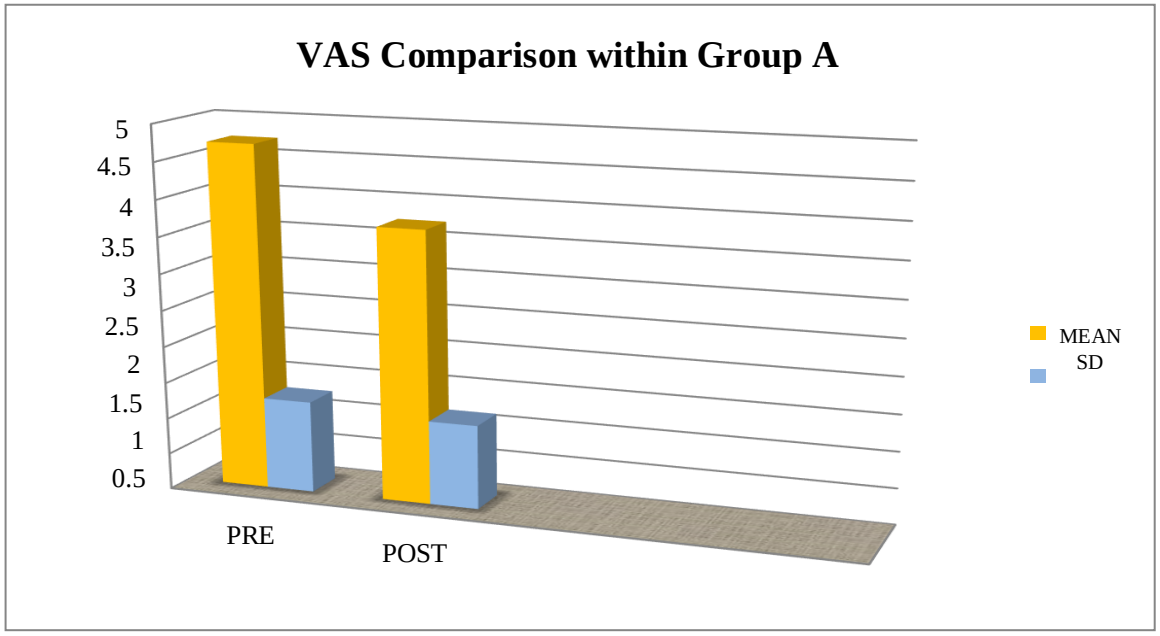
The study was conducted on 30 female university professors with non-specific low back pain. The group A included 15 subjects, who were given conventional physiotherapy, whereas the Group B also included 15 subjects with non-specific low pain, who were given Muscle energy technique. Total 8 sessions were given to each group participants at the rate of 2 sessions per week for total four weeks. The subjects included in this study are of 31-40 years age group.

COMPARISON OF PRE AND POST-PAIN IN NON-SPECIFIC LOW BACK PAIN OF GROUP A : -

Table: Representing the mean, standard deviation and their significance of pain In GROUP A

VARIABLE	PRE MEAN ± SD	POST MEAN±SD	SIGNIFICANCE
VAS	4.73±1.27	3.73±1.16	.013

* P value is significant at p<0.01



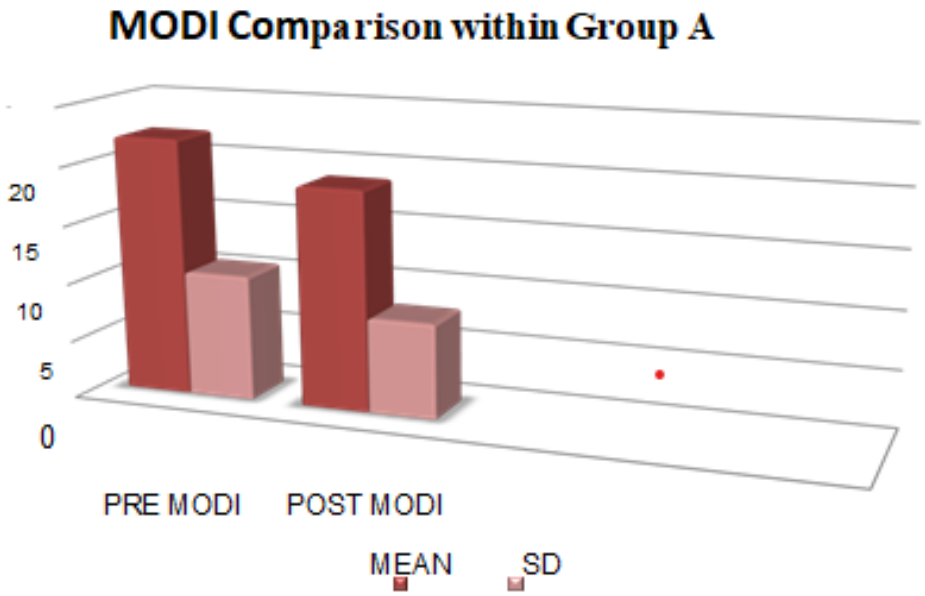
Graph: Representing the mean, standard deviation and significance of pain in Group A

Paired sample T-test was used to find out significant difference for pain. The results showed significant differences in pain between pre (4.73±1.27) and post (3.73±1.16) outcomes.

COMPARISON OF PRE & POST DISABILITY IN NON-SPECIFIC LOW BACK PAIN OF GROUP A:

Table: Representing the mean, standard deviation and their significance of disability In GROUP A

VARIABLE	PRE MEAN ± SD	POST MEAN ± SD	SIGNIFICANCE
MODI	22.13±10.8	18.9±8.2	0.55



GRAPH: REPRESENTING THE MEAN, STANDARD DEVIATION AND SIGNIFICANCE OF DISABILITY IN GROUP A

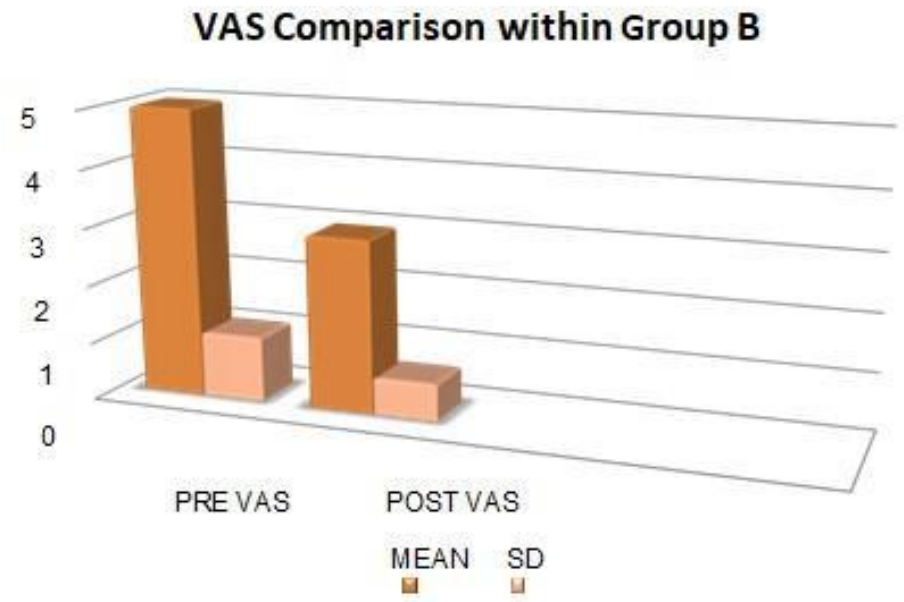
PAIRED SAMPLE T-TEST WAS USED TO FIND OUT SIGNIFICANT DIFFERENCE FOR DISABILITY. THE RESULTS SHOWED SIGNIFICANT DIFFERENCES IN DISABILITY BETWEEN PRE (22.13±10.8) AND POST (18.9±8.2) OUTCOMES.

COMPARISON OF PRE AND POST-PAIN IN NON-SPECIFIC LOW BACK PAIN OF GROUP B: -

Table: Representing the mean, standard deviation and their significance of pain In GROUP B

VARIABLE	PRE MEAN ± SD	POST MEAN±SD	SIGNIFICANCE
VAS	5±1.13	3±0.65	.013

* P value is significant at p<0.01



Graph: Representing the mean, standard deviation and significance of Pain in Group B:-

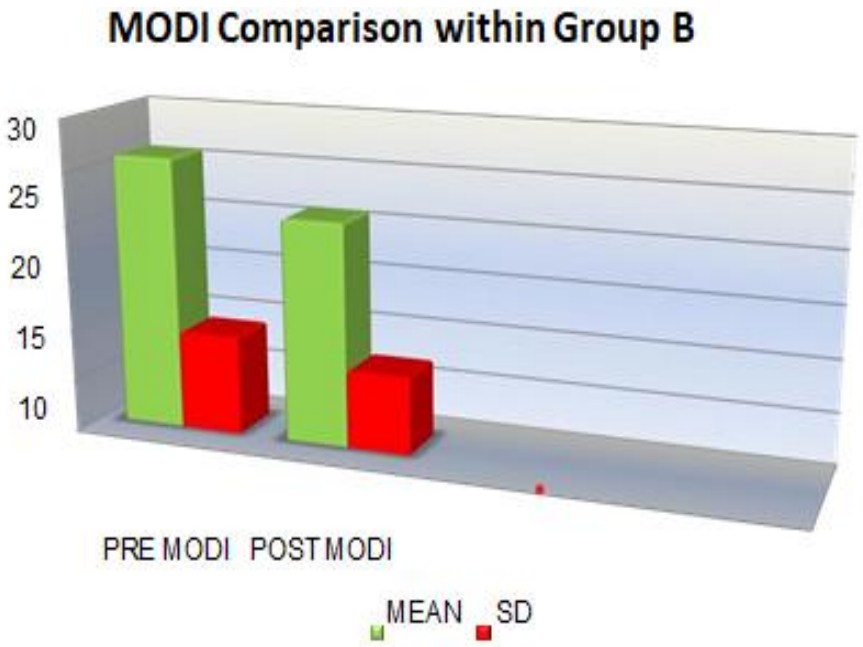
Paired sample T-test was used to find out significant difference for pain. The results showed significant differences in pain between pre (5±1.13) and post (3±0.65) outcomes.

COMPARISON OF PRE & POST DISABILITY IN NON-SPECIFIC LOW BACK PAIN OF GROUP B:

Table: Representing the mean, standard deviation and their significance of disability In GROUP B

VARIABLE	PRE MEAN ± SD	POST MEAN±SD	SIGNIFICANCE
MODI	26.13±9.48	21.33±7.47	0.05

* P value is > 0.05



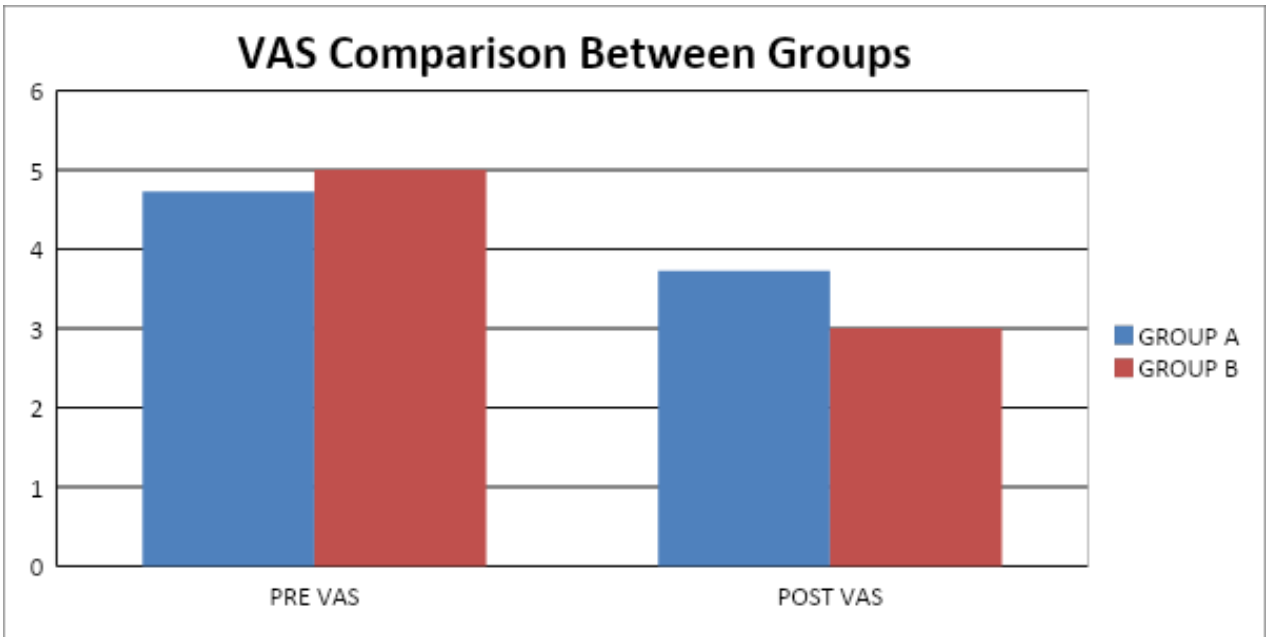
Graph: Representing the mean, standard deviation and significance of disability in Group B:-
Paired sample T-test was used to find out significant difference for disability. The results showed significant differences in disability between pre (26.13±9.48) and post (21.33±7.47) outcomes

COMPARISON OF DESCRIPTIVE DATA OF BOTH THE GROUP POST TEST READINGS:-

Table: Representing the PRE and POST mean and significance of PAIN in both the groups

VARIABLES	PRE MEAN		POST MEAN		SIGNIFICANCE
	Group A	Group B	Group A	Group B	
VAS	4.73	5	3.73	3	0.000*

* P value is > 0.05



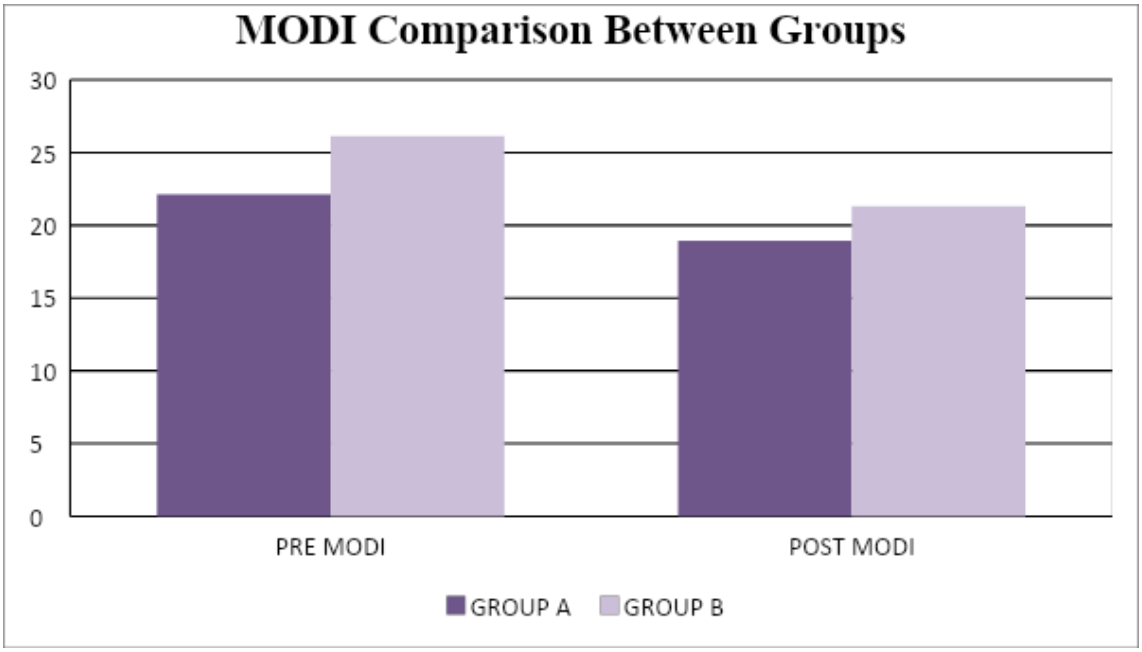
Graphical representation shows the comparison between the VAS of group A and B

Unpaired T-test was used to find out significant difference for Pain. The results showed significant differences in pain between pre (4.73) and post (3.73) outcomes in group A while, pre (5) and post(3)in group B . And the P value is significant at 0.00.

Table: Representing the PRE and POST mean and significance of DISABILITY in both the groups

VARIABLES	PRE MEAN		POST MEAN		SIGNIFICANCE
	Group A	Group B	Group A	Group B	
MODI	22.13	26.13	18.93	21.33	0.000*

* P value is > 0.05



Graphical representation shows the comparison between the Disability of group A and B

Unpaired T-test was used to find out significant difference for disability. The results showed significant differences in disability between pre (22.13) and post (18.93) outcomes in group A while, pre(26.13) and post(21.33) in group B . And the P value is significant at 0.00.

DISCUSSION:

This study aimed to assess the effectiveness of Muscle Energy Technique (MET) with Conventional physiotherapy (IFT and Hydrocollator pack) in treating non-specific low back pain. This study focused on female university professors who had nonspecific low back pain. Patients were chosen based on certain inclusion and exclusion criteria. In Group A, conventional physiotherapy was conducted, but in Group B, Muscle Energy Technique (MET) was used. The results were then analyzed to determine the impact of both approaches on pain and disability. Following the comparison, the paired t test was utilised for analysis, with the P value set at 0.005.

The values obtained from this study indicates that the that the outcome was substantial and Group B shows better effect than Group A. **(Priyanka Dhargalkar et al 2017)** conducted a study among chronic non-specific low back pain, in which they give muscle energy technique to quadratus lumborum, erector spinae, iliopsoas,tensor fascia latae and their control group received conventional physiotherapy(TENS, hot packs, strengthening exercises),they concluded that MET is reducing the pain and improving functional disability than the control group. For functional disability they used Oswestry Disability Index which clearly gives improved functional activities in the group which underwent MET, our findings are similar to theirs, but the difference is that they applied MET to four distinct muscles in the low back area, but we focused solely on two muscles, the quadratus lumborum and the erector spinae, because these are the primary causes of nonspecific low back pain. The post-test results for pain and disability in Group A were (4.73) and (22.13), respectively, whereas in Group B they were (3.73) and (18.93). The unpaired t-test yielded significant findings ($P < 0.005$).The results demonstrated that the Muscle energy approach is considerably beneficial in lowering pain and impairment in non-specific low back pain.

CONCLUSION:

From the result we obtained that the Muscle Energy Technique is more effective as compare to the conventional physiotherapy in reducing the pain and disability among the female physiotherapy university professors with non-specific low back pain. The significant improvements was observed. Muscle Energy Technique was obtained to be more effective in improving pain but less effective in treating Disability. Thus, the MET group suggest that it should be considered a preferable treatment option for managing Non-specific low back pain in this specific population.

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