COMPARATIVE STUDY BETWEEN MUSCLE ENERGY TECHNIQUE (MET) VERSUS KINESIOTAPING (KT) IN MANAGING WORK RELATED LOW BACK PAIN (WRLBP) AMONG HEALTH PROFESSIONALS: A DOUBLE BLINDED STUDY

Mohammad Miraj1, Mazen Al Qahtani1, Msaad Al Zhrani1, Ahmad Alanazi1, Fuzail Ahmad1, Faizan Kashoo1, Riyaz Ahamed2, Deepak Kumar3

1Department of Physical Therapy & Health Rehabilitation, College of Applied Medical Sciences, Majmaah University, Al Majmaah-11952, Saudi Arabia
2College of Medicine, Majmaah University, Al Majmaah-11952, Saudi Arabia
3Department of Physical Therapy, Athar Institute of Health and Management Studies, 117/1, Gautam Nagar, New Delhi 110049 India

1m.molla@mu.edu.sa

ABSTRACT

Background: Work related chronic low back pain (WRLBP) is one of the commonest problem classified under work related musculoskeletal disorders (WMSDs). Muscle Energy Techniques (METs) and Kinesiotaping (KT) are two of the most popular manual therapy techniques of current times widely practiced by physiotherapists across the world. No studies have been conducted earlier to measure their effectiveness on WRLBP.

Objectives: To compare the effectiveness of MET versus KT along with lumbar stabilization exercises on WRLBP.

Methodology: 42 male physiotherapy and nursing professionals with mean age of 37.73 ± 7.76 years experiencing WRLBP for more than 90 days with pain scores greater than 4 on Visual analogue Scale (VAS) were randomly assigned to group A (MET + Conventional Physiotherapy (CPT) and group B (KT+CPT) having 20 subjects each. The CPT comprises of moist heat along with lumbar stabilization exercises which were a part of Home Exercise Program (HEP). The outcome measures taken for assessment were VAS for pain measurement, Roland Morris Disability Questionnaire (RMDQ) for functional disability, Tampa Scale for fear of movement (kinesiophobia) and Trunk ROM.

Results: Statistically significant improvement was recorded for all outcome variables in both groups (A and B) for both week 2 and 4th as compared to their baseline values. However, MET performed better than KT for all outcome measures (P**<0.05) over the 4 weeks intervention for the treatment of WRLBP patients.

Conclusion: The study suggests that MET along with lumbar stabilization exercises may be better treatment method than KT in managing WRLBP patients thereby accepting the alternate hypothesis.

Keywords: WRLBP, MET, Kinesiotaping, Lumbar Stabilization Exercises

I. INTRODUCTION

Work related Low back pain (WRLBP) is one of the major occupational health hazards across the globe affecting millions of workers worldwide. Previous literature suggests that the overall burden of LBP arising from these ergonomic exposures is responsible for 60.1 million disability adjusted life years (DALY) in 2015, witnessing a whooping increase by 54% since 1990’s [1]. It is responsible for causing 77% of the overall disabilities (the highest in the world) with major incidences reported from among low income and middle income countries, including Asia, Africa, and Middle East in the last couple of years[2][3]. Jackson et al. (2016) in his hallmark report after compilations from top 40 meaningful publications covering almost two-third of the world has reported that
prevalence of chronic LBP among the working class will be 2-5 times more (95% CI 1.21–4.10) than in nonworking populations for reasons that were not clear. WRLBP not only affects a person physically in terms of affecting mobility, causes long term disability as well as adversely affects quality of life but also adds to the economic burden because of the direct (health-care) costs, and indirect (work absenteeism or productivity loss) costs, associated with it [4].

Literature review suggests that some professions are susceptible for developing LBA quite early by the nature of their jobs. While some professions are more prone to develop low back ache as compared to others, vast number of studies have been published regarding association of various job factors including long working hours, prolonged sitting, standing, poor posture, frequent bending, stooping, repetitive strains etc. to develop into mechanical LBA. Among the various professionals, healthcare professionals and especially the physiotherapists and nurses have reported to have the highest prevalence of LBA. Latest Studies by Ibrahim et al. (2019) had reported prevalence of WRLBP among nurses was 74.8 % in Malaysia [5], whereas Boukerma et al. (2017) reported that 66.6% nurses working in hospitals suffer from LBA in Algeria [6], with pain been significantly higher between age group of 30-49 years of age group and with 2 -5 years of seniority in the hospital. Similarly, Shishira and Pavana (2018) had recorded a prevalence of 66% among physiotherapists in India [7]. In KSA, Gaowgzeh (2019) reported 61.7% of nurses in Jeddah complained of LBP [8]. Though, studies with reference to various health professionals are quiet low but whatever literature is available, among them nurses and physiotherapists are one of the most vulnerable groups exposed to LBA [9,10].

Physiotherapy which is among of the most sought pathies in the world especially with context to medical issues and problems concerned with movement disorders, it has been observed that different treatment modalities and techniques have been used from time to time to measure their effectiveness in managing the problems as well as addressing the various physical issues concerned with LBA. These methods range from using electrotherapeutic modalities to manual therapies (chiropractic to kinesiology to exercises, spinal manipulations to various educational programs[11–13].

Literature review suggests that muscle energy technique’ (will be referred further as MET) is a special type of manual therapy where muscle contraction is produced by the patient in a precisely controlled position and direction against a counterforce applied by the physiotherapist so as to improve the normal physiologic function of the joints as well as decrease pain [2,12]. The therapist thus assists the patient in stretching, strengthening and relaxing those shortened or dysfunctional muscles thereby restoring normalcy and joint mobility.

Kinesiotaping (will be referred further as KT) is one of the latest addition in the physiotherapist’s treatment kit and is a novel rehabilitation method for facilitating body’s natural healing process without causing any restriction to the joint’s ROM as well as providing support and stability to muscles and joints [4]. Developed by Japanese maverick Chiropractic, Kenzo Kase in the mid 70’s, Kinesiotaping is a technique used in the clinical management of people with chronic LBA or nonspecific LBP [14]. The technique advocates the use of these novel tapes, which claim to have properties same like skin and have more elasticity than the conventional bandage. While the tape could be stretched up to 120-140 % of original length but for all practical purposes, Kase (2003) has recommended to use 25-50% of its original length [15]. The tape is attached to the skin, thereby elevating the epidermis causing decrease in nociceptive stimulus.

Literature review suggests that while MET has been compared with almost all types of manual therapies but the published number of researches are very limited [12]. As far as our knowledge goes, no study has been conducted till date where MET’s been compared with Kinesio taping for WRLBP patients [12]. Henceforth, the aim of the study is to measure the effectiveness of MET versus Kinesio taping in WRLBP patients, which is not only very relevant in the current times but also would very meaningful since LBP among health professionals is a very common entity.

As far as KSA is concerned, as literature review reveals, this would be the first study of its type in the kingdom. Few studies have been conducted in the past regarding the effectiveness of either Kinesio taping or MET been evaluated separately for separate conditions [14,16,17]. Therefore, the study was proposed to compare the effectiveness of MET with Kinesio taping among WRLBP patients with respect to certain clinical and functional outcomes namely, pain, functional disability, trunk range of motion (ROM) and kinesiophobia.
II. METHODOLOGY

Study Design
A double blinded randomized controlled trial study was used (two group, pre-test, post-test experimental group design), where the physiotherapy and nursing professionals were recruited from AIHMS New Delhi as well as College of Applied Medical Sciences located at Al-Majmaah city. The study protocol and ethical clearance was sought from Research Ethical Committee. The study commenced on November 2019 and was completed in March 2020.

Participants
This study was conducted in the college teaching department. The male physiotherapy and nursing professionals, aged 23 to 55 years and experiencing WRLBP for more than 90 days with pain scores greater than 4 on Visual analogue Scale (VAS) were recruited for the study [18,19]. The exclusion criteria were prevalence of any medical conditions including Spondylolisthesis, History of spinal surgeries, Osteoporosis, Psychiatric disorders, Serious Cardio-respiratory disease, Spinal tumor or Fracture, Active or recent malignancy, Spinal canal stenosis, Neuropathic pain, Large herniated disc, and Scoliosis [20,21]. In addition, potential participants underwent a simple trunk muscle test to determine that motor control exercise treatment was indicated [22,23]. Those who fulfilled the eligibility criteria and consented to participate were recruited for the study.

Methods
Using statistical power of 80%, effect size of 0.20 and level of significance set at 0.05, the minimum sample size of 36 participants was needed to detect difference of 2 cm in pain intensity between the groups on the VAS Index. Assuming a drop out of 20% due to some personal reason or developing allergy due to tape, a total of 42 subjects were required. The participants were then randomly allocated into 2 groups, group A who were treated with MET along with conventional physiotherapy (referred further as CPT) (MET + CPT, n = 21) and group B, who were given KT with CPT (i.e. KT + CPT, n = 21). The Conventional physiotherapy treatment was given to both groups which comprised of moist heat pack along with motor control exercises (also known as lumbar stabilization exercises for the LBA) as per the standard guidelines [18,24,25].

Thorough physical assessment of the patients was done with baseline readings been taken by Examiners 1 and 2 who was blinded to the allocation of patients to different groups. Various outcome variables namely Numeric pain rating scale (NRS) used to measure pain, Trunk ROM measured using Modified Schober’s Test, Roland-Morris Disability Questionnaire for measuring low back functional disability and Tampa Scale for measuring fear of movement among the LBP patients (Kinesiophobia), using the standard methods [26–30].

Both the groups A and B, were randomized by Examiner 3 and 4 who was unaware of the assessment made by Examiner 1 and 2. Examiner 2 allocated the participants randomly to the assigned groups where MET and KT were carried out by Examiner 5, 6, 7, and 8 who had earlier trained in MET and KT. The treatment examiners were unaware about the actions taken by assessment examiners. The outcome measure at weeks 2 and 4 were recorded by Examiners 1, 2, 3, and 4 who had not made the assessments earlier.

Application of MET
The method used for providing MET to the patients with WRLBP (group A, n=20) was a standardized treatment described in details [31]. The MET Technique for WRLBP involves the voluntary contraction of the thoracolumbar muscles in a precisely controlled direction at varying levels of intensity against a distinct executed counterforce applied by the Physiotherapist. The patient was prepared and asked to lie on the couch. Assuming the patient had a left flexion restriction, he would be placed on right side of the couch (so that the articular movements at zygapophyseal joints can be felt). The patient was asked to come to side lying position, with so closed enough to the couch that the therapist is able to stabilize the pelvis with his hand. The Therapist then palpated the L3 spinous process and extends the patient’s legs until motion is palpated at L3. The Therapist then flexes the patient’s trunk superiorly until motion is palpated again at L3. The 3rd movement involved the therapist by having flexed the trunk inferiorly until again motion is palpated at L3. Now, the patient’s trunk is rotated until the motion is again palpated at L3. The last movement in the sequence is side bending of the patient’s trunk until motion is palpated at L3. At that position, the therapist keeps the hand under the right leg and the patient was commanded to push his legs down against the therapists’ hand for 5 seconds, causing isometric contraction. The entire process is repeated 4 times and L3 is re-evaluated for alignment and range of motion symmetry and bettering of symptoms.
Application of Kinesio Taping

Before the application of Kinesio taping, skin allergy test was done mandatory for all participants included in experimental group. The test was conducted by application of a small patch of kinesio tape on patient’s abdomen and was left for duration of 24 hours. All the patients were instructed to remove the tape immediately if any sort of irritation or itching is felt and report this to the research team as soon as possible. Such patients were examined next day at the site of application for any allergic reaction. Those participants who developed allergic were not included in the study.

The Intervention group (n=20) was supposed to be treated with Kinesiotape (Kinesio Tex Gold, 2 in x 103.3 ft, Kinesio®, Albuquerque, New Mexico, USA) as instructed by Kenzo Kase KT Manual [15], the standard operational procedure required the patient to be instructed beforehand the steps for the application with patient at ease. The part where tape has to applied (Thoracolumbar region) in the current condition, the skin of the back is cleaned with alcohol swabs to ensure the application part is devoid of any lotions, creams etc. Unwanted hairs have to be removed if any of it is present. The therapist stands behind the back of the patient. The initial anchor point of the tape (4-5 cm) was removed carefully from the paper backing and at the same time the patient was asked to perform maximal forward flexion. The base of tape was applied to the paraspinal muscles at T7, located at inferior angle level of scapula without any tension. Base of tape was stabilized, and pressure was applied in downward direction to increase tissue tension. The tape was then applied over the paraspinal muscles to the lumbosacral junction. At the Lumbosacral junction the tape was directed at 45 degrees angle towards the sacroiliac joint. The patient was guided to return to original position to rest before applying the second piece. Second longitudinal part of kinesio tape was put along the paraspinals on other side. Patient was asked to extend the lumbar spine to 15 degrees to apply the horizontal piece of kinesio tape. Holding the kinesio tape by its tail, it was pulled gently with mild tension and applied along Jacobs’s line (the line drawn between the right and left posterior superior iliac crests). The tails were applied to the iliac crests with minimal tension on the ends. The tape was gently rubbed to activate the glue. The method required skilled experienced PT practitioner who had trained and certified for kinesio taping for all 3 levels (KT 1, 2, and 3).

The lumbar stabilization exercises is a standardized set of 7 exercises which includes drawing-in-maneouvre, standing extension stabilization, simple supine obliques, standing latissimus dorsi pull down, multi hip abduction, dumbbell overhead and modified Romanian dead lift [18,24,32]. The participants were instructed to perform daily set of these lumbar stabilizing exercises as a part of home exercise program (HEP) [18]. We hypothesized that MET with CPT would have beneficial outcome than Kinesiotaping with CPT (Figure 1).

Before group-wise commencement of actual treatments, application of hot packs were given to the patients for at least 5-15 minutes [33]. The treatment for both the groups went for one month with each participant had to undergo 3 sessions per week with readings for the various outcome variables measured on 2nd and 4th week respectively.

Statistical analysis

The data were verified for the assumptions of normality using Kolmogorov–Smirnov test using Statistical Package of Social Science (SPSS) version 22.0 (Chicago, IL). The normally distributed data were then assessed for mean, SDs, t-values and p-values so as to draw inferences regarding comparison within and between the groups. Participant’s characteristics and demographic data were compared between groups with unpaired t test (ratio data) and Mann-Whitney U tests (for nominal & ordinal data).

III. RESULTS

The baseline characteristics values for the demographic characteristics for all the participants were described as descriptive statistics in Table 3 (p>0.05). In group A (MET + CPT) the majority of subjects were from nursing (60.8%) whereas in control group (Conventional Treatment group), majority of patients were from physiotherapy (52.1%). The final study sample comprised of 40 subjects (n=40) as 2 participants (1 from each group) dropped out. The treatment for both groups continued for 1 month with readings measured for all the outcome variables at 0 week (Baseline line), 2nd week, and 4th week (Table 1).

**VAS Scores: Significant** difference in VAS scores were observed while evaluating for within the group comparisons. It was observed that both Group A as well as group B showed significant improvement in their pain scores when compared to the baseline values at week 2. While group A showed a mean change of 4.19± 0.92(p***<0.05) at week 2 and 6.96 ± 0.87 respectively, group B patients registered a mean decrease of pain by
3.44 ± 0.73 and 5.96 ± 0.81 at week 2 and 4, respectively (p***<0.05). VAS scores comparison between the groups showed that significant improvement in pain scores were observed in group A as compared to group B at week 4 (p**<0.05) (Table 2).

**Trunk ROM Measurements:** The groups were compared for the trunk movements using measurements for flexion, extension, side flexions (both right and left side) as well as trunk rotations (both right and left). For Within group comparison, in both Groups, A and B statistically significant differences were measured for all movements of the trunk from their baseline values both at week 2 and week (p***<0.05) movements. For within from the baseline values measured at week 2 and week 4 (p**<0.05). Similarly, group A registered statistically significant differences in ROM for all trunk movements in comparison with group B both at week 2 and week 4 (p**<0.05) (Table 3).

**RM Disability Scores:** Same as the VAS Scores, for within group comparison both Groups A & B, measured significant statistical different in their scores as compared to the baseline values both at week 2 and week 4 (p*** <0.05). Similarly for intergroup comparison, group A (MET with CT) scored functionally much better than the group B (KT + CPT) at both week 2 and 4 when compared from their baseline values (p**<0.05)

**TAMPA Kinesiophobia Scores:** Same like improvement in disability scores significant changes in the movement of fear (Kinesophobia) were measured for both within group comparison as well as between the groups. While within group comparison showed statistically significant differences in both groups individually both at week 2 and week 4 (p**<0.05). For intergroup comparison, group A (MET with CT) registered maximum changes as compared to group B, found to be statistically significant at end of week 4(p**<0.05).

To summarize, MET techniques works better to relieve WRLBP symptoms as compared to Kinesiotaping along with lumbar stabilization exercises in long term.

**Table 1.** Showing Baseline characteristics of the participants in between Group A (MET + CPT) and Group B (KT + CPT)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Group A (MET + CPT) (n=20) (M±SD)</th>
<th>Group B (KT + CPT) (n = 20) (M±SD)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>37.73 ± 7.76</td>
<td>36.5 ± 6.51</td>
<td>0.27</td>
</tr>
<tr>
<td>Weight</td>
<td>69.66 ± 6.23</td>
<td>67.84 ± 7.72</td>
<td>0.43</td>
</tr>
<tr>
<td>Profession</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physiotherapy</td>
<td>7(35%)</td>
<td>9(39.13%)</td>
<td>0.47</td>
</tr>
<tr>
<td>Nursing</td>
<td>13(65%)</td>
<td>14(60.8%)</td>
<td>0.63</td>
</tr>
<tr>
<td>Work Experience</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 – 5 years</td>
<td>4(20%)</td>
<td>6(26%)</td>
<td>0.43</td>
</tr>
<tr>
<td>6 – 10 years</td>
<td>9(45%)</td>
<td>12(52.13 %)</td>
<td>0.27</td>
</tr>
<tr>
<td>&gt;10 years</td>
<td>7(35%)</td>
<td>5(21.73%)</td>
<td>0.89</td>
</tr>
<tr>
<td>Place of Work</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Hospital</td>
<td>14(70%)</td>
<td>13(65%)</td>
<td>0.21</td>
</tr>
<tr>
<td>Rehabilitation</td>
<td>3(15%)</td>
<td>6(26%)</td>
<td>0.63</td>
</tr>
<tr>
<td>Center</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department</td>
<td>3(15%)</td>
<td>4(9%)</td>
<td>0.41</td>
</tr>
</tbody>
</table>
Table 2. Showing the within group comparison for VAS, RM Disability Scores, TAMPA for 0, 2, and 4th week after intervention.

<table>
<thead>
<tr>
<th>Weeks</th>
<th>VAS</th>
<th>RMDS</th>
<th>TAMPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>W0</td>
<td>8.1 ± 1.84</td>
<td>7.69 ± 1.53</td>
<td>52.46 ± 12.79</td>
</tr>
<tr>
<td>W2</td>
<td>3.91 ± 1.54</td>
<td>4.25 ± 1.73</td>
<td>31.43 ± 6.17</td>
</tr>
<tr>
<td>W4</td>
<td>1.14 ± 1.02</td>
<td>1.73 ± 1.54</td>
<td>10.47 ± 8.53</td>
</tr>
</tbody>
</table>

Table 3. Showing the within group comparison for all Trunk ROM for 0, 2, and 4th week after intervention

<table>
<thead>
<tr>
<th>Weeks</th>
<th>TFROM</th>
<th>TEROM</th>
<th>RSTFROM</th>
</tr>
</thead>
<tbody>
<tr>
<td>W0</td>
<td>4.34 ± 1.42</td>
<td>4.75 ± 1.98</td>
<td>1.24 ± 0.66</td>
</tr>
<tr>
<td>W2</td>
<td>5.74 ± 1.36</td>
<td>5.69 ± 1.45</td>
<td>3.04 ± 0.87</td>
</tr>
<tr>
<td>W4</td>
<td>7.91 ± 1.38</td>
<td>7.78 ± 1.52</td>
<td>3.81 ± 0.84</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weeks</th>
<th>LSROM</th>
<th>RTRROM</th>
<th>LTRROM</th>
</tr>
</thead>
<tbody>
<tr>
<td>W0</td>
<td>11.97 ± 0.63</td>
<td>12.36 ± 0.64</td>
<td>4.62 ± 0.76</td>
</tr>
<tr>
<td>W2</td>
<td>12.74 ± 0.67</td>
<td>13.94 ± 0.85</td>
<td>6.46 ± 0.72</td>
</tr>
<tr>
<td>W4</td>
<td>15.67 ± 0.61</td>
<td>15.03 ± 0.55</td>
<td>8.18 ± 0.91</td>
</tr>
</tbody>
</table>

Where ROM : Range of Motion, TFROM : Trunk Flexion ROM, TEROM : Trunk Extension, RSTFROM : Right Side Trunk Flexion ROM, LSFROM : Left Side Trunk Flexion, RTRROM : Right Trunk Rotation ROM, LTRROM : Left Trunk Rotation ROM, SD: standard deviation, W0: week 0(Baseline data), W2: After 2 weeks of intervention, W4: after 4 weeks of Intervention,* level of significance
IV. DISCUSSION

Our results demonstrated that while both MET and Kinesiotaping along with lumbar stabilization exercises were effective in alleviating the symptoms of WRLBP patients but in the long run, MET seems to work better than kinesiotaping and henceforth superior to Kinesiotaping for treating chronic WRLBP cases. Statistically significant differences were measured at week 4 for all the outcome measures for between group comparisons suggesting MET having better clinical results than kinesiotaping and therefore might be more effective (Table 2, Fig. 2).

WRLBP is a type of pain having its origin from the musculoskeletal structures of the back and is mechanical in nature and are associated (major cause been repetitive strains) with variation in clinical sign been observed depending upon the type of activities one is performing. It can be represented in various forms such as pain, muscle tension, stiffness, muscle heaviness likely to be located below the costal surface upto or over the gluteal folds inferiorly and may aggravate both in intensity and spread due to the muscle shortening, stiffness etc[1].

Literature review also suggests that studies on these novel therapies such as METs, Kinesiotaping are new promising areas of research and have great clinical utility. However, it was suggested that very limited research on their effectiveness had been conducted worldwide. Cocharane Database for Systematic reviews on MET’s (2015) reported that worldwide only 22 studies were reported on their use and comparison of its efficacy with reference to other physiotherapeutic or manual treatments. However on detailed analysis it was viewed that only 12 studies met the inclusion criteria and 10 were discarded[12].

Whatever 12studies that were included for assessment, majority were conducted for acute lumbago and too had high risk for bias as 9 out of 10 were non-blinded. Therefore, one of the principal reasons for conducting this present study was to seek an unbiased opinion regarding the effectiveness of MET with reference to the treatment of low back pain of chronic nature. For this reason, a double blinded study on WRLBP patients was planned. Similarly, published researches on both MET and Kinesiotaping in KSA are both scanty. Whatever limited studies that were conducted on MET in KSA were either Temporomandibular joint pathology or on Myofascial Point Pain at Upper Trapezius muscle respectively[17]. Similarly, with reference to Kinesiotaping. The previous published researches in KSA were again very limited and that too whatever was published that too focussed on the general population. For instance Kachanathu et al.(2014) compared the effect of Kinesiotaping with traditional physical therapy treatment among the general patients in Cairo[14]. Likewise, Al-Shareef and Omar (2016) also conducted the study upon general patient population with treatment intervention been given for 2 weeks [34]. Moreover, the study compared the effect of Kinesiotaping with placebo. Similarly, another study recently published by Alghamdi and Shakwi (2018) studied the effects of Kinesiotaping on balance control and functional performance in athletes with chronic ankle instability patients[16]. Therefore, we emphasized upon these facts and planned to conduct the current study since comparison between MET and Kinesio Taping was never conducted for the WRLBP population and that too to assess the long term effects [12].

We compared MET with Kinesiotaping as both are highly popular and effective. This study is the only identified clinical trial aimed towards evaluating these two methods with relation to chronic WRLBA[12]. MET uses voluntary contraction of the patient’s muscle in a precisely controlled direction against an externally applied counter-force, which is applied by the therapist. Therefore, the technique seems to lengthen a shortened muscle,
mobilize an articulation within a restricted zone and thereby strengthening a physiological muscle. As it stimulates the shortened muscle with focused resistance and graded lengthening, this might reduce localized edema as well as passive congestion within the affected muscle and surrounding structures [12,35]. The benefits of MET along with the execution of Home exercise program (Lumbar stabilization exercises) by patients of group A (MET + CPT) might have done the trick in terms of causing lasting biomechanical changes to the muscle property sort within the affected segments. This could probably explain the reasons for the better results measured in the MET group.

Kinesio taping on the other hand works on gate control theory of pain which suggests that the mechanical stimulus provided by the tape would act through the large-diameter non-nociceptive fibres resulting in pain inhibition and relief. The analgesia ceases, however, as soon as the stimulus is removed. The application of the tape to the chronically weak muscles, especially from the muscle origin to insertion facilitates muscle action [15,36]. Taking cue from the explanation, it can postulated that thoracolumbar fascia which is like a blend of sheet like fibrous membrane covering the muscles of torso as well as sacral region paraspinally, is a very important structure of the myofascial system and plays an eminent role in maintaining posture, transferring of load as well as in respiration[37,38]. The application of the HEP in form of lumbar stabilization program seemed to have permanently adapted the perceived changes made by Kinesio taping causing changes in the muscle property which might be responsible for the changes noted in the outcome variables from their baseline values [18].

Regarding explanation for better performance of MET than KT, the answer might lie in the fact that MET been a complete dynamic treatment modality with active participation from both patient as well as therapist end, facilitation of the patient propelled movements helps in breaking the dysfunction barriers achieving greater improvements. Besides this, the therapeutic of the MET involving a variety of neurological and biomechanical mechanisms including hypoalgesia, altered proprioception, motor programming and control, and changes in tissue fluid might have caused persistent changes in muscle extensibility causing bettering of the spinal movements may be causing enhancement in stretch tolerance [35]. These underlying physiological changes might be responsible for the bettered improvements across all variables noted in the (MET + CPT) group A in week 2 as compared to group B (KT + CPT), even though some may be insignificant. On the other hand, Kinesio taping might work on the phenomenon of soft tension brought about by the tape stretch, causing pain relief, which may in process, increase muscle endurance and promote mobility [39].

Literature review states that among the various healthcare professionals, work related LBP is very common, which may range from sometimes moderate to severe in character. Physiotherapists and Nurses are most prone for WRLBP with incidences ranging from 35.6 % to 67.6 % respectively in KSA [17,40]. Being one of the formidable workforces of the healthcare system around the globe, addressing this concern is of extreme importance. Therefore, the focus of our study was to measure the effectiveness of these novel treatment modality especially, MET and KT among the healthcare professionals especially nurses and physiotherapists, who are quite prone to excessive wear and tear because of the nature of their jobs which requires lot of lifting, patient handling and other strenuous activities and thereby responsible for causing WRLBP [10,16,41].

Sitting long hours, overloading of the back muscles with continuous strenuous activities has been found to be associated with altered pattern of superficial trunk muscles activation, which in along run because of stress, poor posture, unhealthy lifestyle, lack of physical activity, prolonged unaccustomed or strenuous activity etc seem to enhance dysfunction [42–45]. All these seem to be reversed because of MET which along with Lumbar stabilization exercises, might have caused the biomechanical changes in the muscle property thereby reducing pain, dysfunction as well as fear of movement (Table 2).

Cognitive models of kinesiophobia originally proposed by Vlaeyen et al. (1995) suggested that individuals with musculoskeletal pain developed chronic pain syndrome which further reinforced thought and epouses fear of pain, or more specifically, fear that physical activities may cause pain and/or injury recurrence, the reinforcement of such thought processes might have been responsible for the disruption of the functional indexes as measured by RM Disability Score in our study [46]. The effects of MET in form of patient-therapist synergistic actions along with clear open communication might help the patient to trust his therapist completely and help him achieve graded small improvements in spinal range of motion as well as muscle extensibility, which over a period of time along with Lumbar stabilization exercises give boost to patient’s confidence to try new movements and perform ADLs which he was earlier fearful off [47,48].
It is therefore postulated that Kinesiotaping seems to alter these entire phenomena by breaking the pain – inflammation – pain – restriction of movement – pain cycle along with providing support and to the weak muscles. The proven benefits of core stabilization exercise(CSE) for the WRLBP patients has been established earlier in large number of studies, where it has been postulated that CSE tend to enhance activation of local trunk muscles, thereby improving coordination which may lead to stability of the lumbar segments, reducing spinal overload [27,47,48].

The study had many strengths as well as certain limitations too. The strengths were that such a study regarding the effects of 2 most popular manual therapy techniques on such a common problem like WRLBP has not been attempted before. Secondly, literature review suggested that all RCT’s on studies related to MET’s were mainly non blinded, where as our study was a double blinded one to avoid element of biasing. Third, the previous research were mainly on acute LBP or were conducted for immediate effects or maximum for a couple of days. The intervention for the present study was conducted for a month to evaluate its effects, which has some important implications from the clinical perspectives. On the flip side, regarding the limitations, one could be is taking up of a small sample size, which might have affected the results. The other one was taking up of single gender (males) only for the study, giving us no clue about the effects of such treatment upon women. The third limitation could be attributed to the duration of the study which was short by certain yardsticks as (only a month) and therefore could not throw light upon the effects of such intervention upon patients of WRCLBP after 6 months or probably a year, as no follow up was taken as for this study to assess its sustained or the long-term effects. Future research could be conducted to measure the effects of different techniques of MET or Kinesiotaping on WRLBP or by using more objective parameters such as EMG to support our hypothesis or could take into consideration different physiological models to throw more light onto the underlying mechanism responsible for such effects or results.

V. CONCLUSION
Therefore, it is concluded that MET has a clinical therapeutic advantage over kinesiotaping along with lumbar stabilization exercises for managing WRCLBP patients. The study will help the practising therapists to design better therapeutic plans for their patients that may hasten recovery and better adaptation to their working environments.

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Declaration of Interest Statement
The authors report no conflicts of interest.

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