



Original Article

Efficacy of Muscle Energy Technique alone and in combination with Interferential Therapy for the Treatment of Non-specific Low Back Pain

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ABSTRACT

Non-specific back pain is one of the prevalent musculoskeletal disorders in general population worldwide and also a major contributor of days lost from the work. It is considered one of the major causes of financial burden on the healthcare. **Objective:** To compare the effectiveness of muscle energy technique alone and in combination with interferential therapy in the management of non-specific back pain. **Methods:** After getting the review ethical committee approval from The Neurocounsel Clinics, current RCT was initiated from 21 May, 2023 to 20 September 2023 and registered at ClinicalTrials.gov under NCT06098053. Sample size was calculated by Epitool which came 30. Simple random sampling technique was used to randomize participants into two equal groups. Group A was given muscle energy technique and group B was given muscle energy technique plus interferential therapy. 2 sessions/week for 4 & half weeks. Evaluation was done at pain numeric scale & EQ-5D-5L (QoL). Pre and post-test analysis was done by use of SPSS version 21 and level of significance was kept $p < 0.05$. **Results:** The mean age in group A was 31.40 ± 10.91 whereas in group B it was 26.93 ± 11.69 . Mann Whitney U test showed significant difference ($p < 0.05$) between groups on the basis of PNS and insignificant difference ($p > 0.05$) between groups on the basis of QoL. **Conclusions:** It was concluded from the results of this study that MET and IFT are more effective in alleviating patient's pain but are equally effective in improving quality of life in patients suffering from non-specific back pain.

INTRODUCTION

Back pain is one of the most prevalent musculoskeletal (MSK) conditions worldwide in general population [1, 2]. There are many types of back pain but non-specific back pain (NSBP) is most common among all. According to the Global Burden of Diseases (GBD), back pain ranks sixth frequently encountered disorder among 290 MSK conditions [3, 4]. Around 85% of all humans experience back pain once in their life time. Most of them recover within 2-3 weeks spontaneously and in around 30% to 39% this condition becomes chronic [5]. Due to NSBP activities

of daily livings (ADLs) as well as productivities of sufferers are compromised. As a result, billions of dollars are spent annually worldwide to treat this disorder. Muscular insufficiency, weakness, faulty biomechanics, stress, anxiety, blood supply compromise of muscles and poor posture are the main cause of NSBP [6]. In literature, there are many interventions which are employed by clinicians to manage this condition. Pharmacological intervention is taken as a first line intervention to treat NSBP. In this domain, muscle relaxants such as Tizanidine, NSAIDs

(Ibuprofen), Opioids, tricyclic antidepressants (SSRI) are used [7, 8]. In severe causes, where nerve impingement is the main cause of back pain then surgical intervention such as laminectomy is adopted by the surgeon to manage back pain and its associated symptoms [9]. 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 ultrasonic therapy, microwave, TENS, Interferential therapy, Shortwave, infrared, traction and other manual interventions are employed by the physical therapists [10, 11]. Fred Mitchell invented a manual technique used to relax the spastic muscles and to enhance their strength as well as elasticity. He named this technique as muscle energy technique (MET) [12, 13]. Actually, there are two components of this intervention, one is called Post Isometric Relaxation (PIR) and other is known as Post facilitation Stretch (PFS). This technique is simple and has beneficial effects as illustrated in literature for NSBP. Interferential therapy is also used by Physiotherapist to treat muscular pains as depicted in literature [14]. The purpose of this study was to compare the efficacy of muscle energy technique alone and in combination with interferential therapy for the treatment of non-mechanical back pain.

METHODS

Current Randomized Control Trial was initiated after getting approval from REC of The Neurocounsel Clinics, Islamabad. The duration of this study was 4 months from 21 May 2023 to 20 September 2023. Sample size of current study was calculated by Epitool which came 30 by use of 95% confidence interval, 80% power of the study and mean of group A 67.4 and of group B 75.06. Therefore, forty participants were included in this study who had met the inclusion criteria. Those participants were included in this study who had pain score was 4-8 on Pain Numeric Scale (PNS). Both gender who had age between 20-55 years old without any comorbidity of any kind were included. All those individuals who had any kind of comorbidity such as diabetes mellitus (DM), Parkinson disease, disc disorder, nerve impingement and other MSK disorder were excluded from this study. Simple random sampling technique of non-probability was employed to recruit and divide the participants into two groups were used. Two equal groups (n=15) were formulated. Group A participants were given muscle energy technique (MET) and Group B was given MET along with Interferential therapy (IFT). Total 9 sessions were given to each group participants at the rate of 2 sessions per week for total four and a half week. Among MET technique just PIR (Post Isometric Relaxation) was used and the duration of interferential therapy was kept at 10 minutes. Data were collected by the use of PNS [15] (Pain

numeric scale) for pain and EQ-5D-5L [16] which is used to measure the quality of life. Data were collected at baseline and after 9 weeks of intervention by above mentioned tools. Firstly, normality of data were checked by the use of Shapiro Wilk test. As value of this test came $p < 0.05$ which depicted that data were non-normally distributed. Therefore, non-parametric test was used to analyze our data. SPSS version 21.0 was used in current study. Level of significance in this study was kept at $p < 0.05$.

RESULTS

There was total thirty participants in current study which were equally divided into two groups, each group contained 15 participants. The mean age of participants in group A (Control group) was 31.40 ± 10.91 whereas in group B (Experimental group) it was 26.93 ± 11.69 . The frequency of participants between age of 20-30 years old was 06(40.0%) in group A while in group B it was 08(53.2%). The frequency of age between age group of 31-40 years and 41-50 years were 05(33.3%) and 04(26.7%) in group A respectively whereas in group B it was 04(26.7%) and 03(20.1%) respectively. When comparison was made between groups on the basis of gender it was found that there were 06(40.1%) females and 09(59.9%) males in group A while in group B there were 07(46.6%) females and 08(53.4%) males (Table 1).

Table 1: Demographic Characteristics of Study Variables

Variables	Frequency (%)	
	Group A	Group B
Age		
Mean \pm SD	31.40 \pm 10.91	26.93 \pm 11.69
20 to 30 years	06(40.0)	08(53.2)
31 to 40 years	05(33.3)	04(26.7)
41 to 50 years	04(26.7)	03(20.1)
Gender		
Female	06(40.1)	07(46.6)
Male	09(59.9)	08(53.4)

When non-parametric test (Mann Whitney U test) was used to analyze the data between groups on the basis of Pain Numeric Scale, as our data were non-normally distributed, it was found that the median and Interquartile range at the baseline in group A (Control) was 6(4) whereas in Group B (Exp) it was 7(2). After completion of this study median (IQR) in group A (Control) was 3(1) while in group B it was 2(1). As the value of p was < 0.05 which accepted our null hypothesis that MET alone is not effective in the treatment of non-specific back pain (Table 2).

Table 2: Intergroup Analysis of Pain Numeric Scale in Experimental and Control Group

Assessments	Groups	MD (IQR)	U	p-value
At 0 session	Control	6(4)	109.50	0.83
	Exp	7(2)		
After 9 sessions	Control	3(1)	112.75	0.04
	Exp	2(1)		

When between groups analysis was done on the basis of EQ-5D-5L quality of life it was found that there was no difference between groups at the baseline as $p < 0.05$ which depicted an insignificant difference between groups. After the 9 sessions of interventions, it was found that the median and IQR of mobility in control group was 2(2) whereas in experimental group 1(0). Median (IQR) of self-care, usual activities, pain/discomfort, anxiety/depression and overall health after 9 sessions of intervention in control group was 2(2), 2(1), 1(0), 1(0), 2(1) and 85(19) respectively. In all variables of EQ-5D-5L, value of $p < 0.05$ which showed insignificant difference between both groups. All median & IQR of experimental group are depicted in Table 3.

Table 3: Intergroup Analysis of Quality of Life (EQ-5D-5L) in Experimental and Control Group

Variables (EQ-5D-5L)	Groups	Md (IQR)	U-value	p-value
Baseline Mobility	Control	4(3)	93.00	0.34
	Exp	3(3)		
Baseline Self care	Control	4(2)	102.0	0.63
	Exp	3(2)		
Baseline Usual activities	Control	5(4)	87.00	0.27
	Exp	3(2)		
Baseline Pain/Discomfort	Control	4(2)	106.0	0.87
	Exp	5(2)		
Baseline Anxiety/Depression	Control	4(2)	101.5	0.91
	Exp	5(2)		
Baseline Overall Health status	Control	20(16)	76.00	0.20
	Exp	22(18)		
After 9 sessions Mobility	Control	2(2)	84.50	0.27
	Exp	1(0)		
After 9 sessions self-care	Control	2(1)	69.50	0.08
	Exp	1(1)		
After 9 sessions Usual activities	Control	1(0)	103.50	0.64
	Exp	1(1)		
After 9 sessions Pain/Discomfort	Control	1(0)	91.50	0.40
	Exp	2(0)		
After 9 sessions Anxiety/Depression	Control	2(1)	97.20	0.58
	Exp	2(1)		
After 9 sessions Overall Health status	Control	85(19)	86.00	0.27
	Exp	78(10)		

DISCUSSION

Naik Prashant *et al.*, conducted a RCT on low back pain patients to evaluate the efficacy of MET and positional release therapy. They formulated two groups in their study as we did in our study. They gave 8 sessions of interventions to each group and evaluated on the basis of visual analogue scale for pain and MODS for disability. They found that MET and PRT are effective on within group analysis ($p < 0.05$) but there was insignificant difference ($p > 0.05$) between groups on post intervention analysis. Our study also showed that MET is effective on decreasing pain but had depicted insignificant results on quality of life [17]. Ahmad *et al.*,

conducted a scoping review to evaluate the effectiveness of muscle energy technique in the management of chronic low back pain. They used the recommended work of Arksey and O'Malley and found that MET is an effective and beneficial intervention for the management of low back pain. Our study results are also positively reinforced by the outcomes of this study that MET is an effective interventional technique for the pain management and QoL improvement of NSBP sufferers [18]. Franke *et al.*, conducted a systemic review to compare the efficacy of MET to no intervention for the management of non-specific back pain. They included 12 RCTs in their study and their assessment was done by the use of GRADE tool. They concluded from their systemic review that MET is not effective or had extra benefits than other intervention for the patients of NSBP as compared to other intervention. Our results contradict from the outcomes of this study as our study showed marked improvement on patient's pain and QoL but their results showed no difference on pain and disability [19]. Akodu *et al.*, conducted a RCT on patients of NSBP and compared muscle energy technique and core stabilization exercises. They recruited 69 patients of non-specific back pain in their study and divided into four groups. First group was given MET intervention and the second group was given core stabilization exercises (CSE) and third group was given both MET and CSE and fourth group was given just stretching exercises. All groups were evaluated on the basis of pain, disability (MODS). They found that group three showed marked significant difference ($p < 0.05$) as compared to other interventions. Our study results also positively reinforced that MET alone has no significant difference on the basis of pain and QoL [20]. Tantawy *et al.*, conducted a randomized control to evaluate the efficacy of interferential therapy (IFT) for the management of chronic non-specific low backache patients. They formulated two groups (Group A was of IFT and Group B was of no intervention) in their study as we did in ours. They gave 3 sessions of IFT for 4 weeks to each group. Evaluation was done after the 4 weeks of intervention on the basis of VAS (Pain), QoL (SF-36) and disability. They found that IFT group showed significant ($p < 0.05$) results as compared to control group. Our study results positively reinforced that IFT group along with exercises is an effective intervention for reducing patient's pain and improving QoL [21]. Hurley *et al.*, conducted a RCT to evaluate the effectiveness of manipulation and interferential currents for the management of NSBP. They formulated three groups in their study. Group A was given manipulation and group B was given interferential currents and group C was given both interventions in combination. Evaluation was done on the basis of VAS and disability and found that all interventions were equally effective in the

management of NSBP. Our results are also supported by this study [22].

CONCLUSIONS

It was concluded from the results of this study that MET and IFT are more effective in alleviating patient's pain but are equally effective in improving quality of life in patients suffering from non-specific back pain.

Authors Contribution

Conceptualization: AZ

Methodology: MI, KH

Formal analysis: IS, MI, KH

Writing-review and editing: AZ, IS, MSH, ST, MS

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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